



PROJECT MANUAL

Ceramics Lab Ventilation Building A

Main Campus:
8900 US Highway 14
Crystal Lake, IL

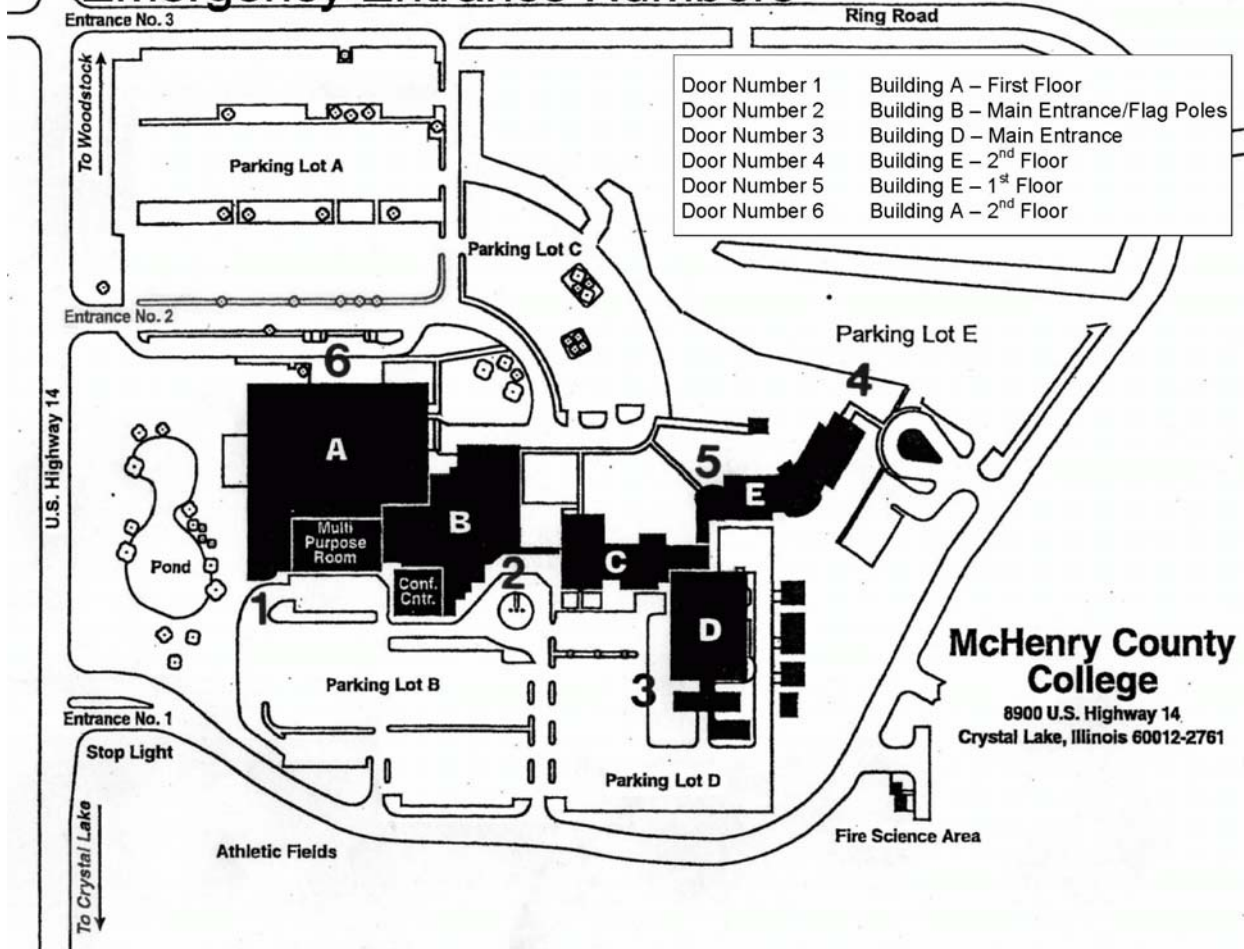
**PROJECT 1227.04
1 JUL 2013**

RuckPate

A R C H I T E C T U R E

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Emergency Entrance Numbers



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LIST OF DRAWING SHEETS
SECTION 00 01 15

1 **Summary:**

1.1 List of drawing sheets included as bidding and contract documents.

2 **Sheet List**

<u>Sheet No.</u>	<u>Description</u>
MD111	Partial First Floor Plan - Mechanical Demolition
M111	Partial First Floor Plan - Mechanical
M121	Partial Second Floor Plan - Mechanical
M131	Partial Roof Plan - Mechanical
M400	Control Diagrams
M500	Mechanical Details
E111	Partial First Floor Plan - Power
E121	Partial Second Floor Plan - Power
E400	Electrical Notes and Schedules

End of Section

**ADVERTISEMENT FOR BIDS
SECTION 00 11 13**

1. Notice is hereby given by the Board of Trustees, McHenry County College, McHenry County, Illinois, that sealed lump sum bids will be received for the following project:

PROJECT:

Ceramics Lab Ventilation
Building A - Main Campus

OWNER:

McHenry County College
8900 US Highway 14
Crystal Lake, IL 60012

ARCHITECT:

RuckPate Architecture
22102 North Pepper Road, Ste 201
Barrington, Illinois 60010
(847) 381-2946 (847) 304-1218 fax

2. **Description:** generally the work may be described as ventilation improvements and related work for the Ceramics Lab and adjacent spaces.
3. **Bids Due:** bids will be received until 10:00 AM, 15 July 2013 at the Business Services Office of the Owner, Building A, Room A246. Bids will be publicly opened and read in the Board Room A217 following the deadline for receipt of bids. Bids received after the deadline will be rejected.
4. **Document Date:** the bidding documents are dated 1 July 2013.
5. **Document Availability:** the bidding documents are available for download at the McHenry County College web site: www.mchenry.edu/bid. Bidders are responsible for verifying that they have obtained all bidding documents, including any addenda that may be issued prior to receipt of bids.
6. **Bid Security:** each bid must be accompanied a bid bond or certified check payable to the Owner in an amount not less than ten percent (10%) of the bid, as required by the Bidding Documents.
7. **Time Bids Held Good:** no bid shall be withdrawn, modified, or cancelled without the consent of the Owner for a period of sixty (60) days after the opening of Bids.
8. **Site Visits:** bidders may visit the site after the Pre-Bid Meeting or by appointment only. Bidders shall contact Ms. Christine Fischer 815-455-8760 (cfischer@mchenry.edu) to schedule a visit.
9. **Pre-Bid Meeting:** an optional Pre-Bid Meeting will be held at: 9:00 AM, 8 July 2013 at Room A217.
10. **Owner's Rights:** the Owner reserves the right to reject any and all bids or waive any informalities at its discretion.
11. **Bonds:** the successful bidder for the project is required furnish Performance and Labor and Material Payment Bonds in an amount equal to one hundred percent (100%) of the contract amount, with sureties acceptable to the Owner, and in the form required by the Bidding documents.
12. **Prevailing Wage:** the successful bidder shall pay not less than the prevailing rates of wages to all laborers, workmen, and mechanics performing work under this contract, as ascertained by the Illinois Department of Labor, and shall submit certified payroll records, in compliance with the Prevailing Wage Act (820 ILCS 130) and the requirements of the Bidding Documents.
13. **Headings:** headings in this notice are for reader's convenience and are not intended to limit the scope of the information.

End of Advertisement

INSTRUCTIONS TO BIDDERS
SECTION 00 21 00

1 DEFINITIONS

1.1 Definitions are as set forth in the 00 73 00 Supplementary Conditions, and elsewhere in the Contract Documents.

2 BIDDING DOCUMENTS

2.1 The Bidding Documents consist of the following documents:

2.1.1 Procurement and Contracting Requirements Group, Division 00, contained in the Project Manual.

2.1.2 Specifications Group, Divisions 01 - 49 inclusive, contained in the Project Manual

2.1.3 Drawings

2.1.4 Addenda issued prior to opening of Bids.

2.2 Availability:

2.2.1 Documents are available on the McHenry County College web site: www.McHenry.edu/bid. Bidders are responsible for verifying that they have obtained all bidding documents, including any addenda that may be issued prior to receipt of bids.

2.3 Interpretation:

2.3.1 Interpretations, clarifications and changes to the Bidding Documents will be made by Addendum only. Bidders shall not rely on any method other than Addendum for interpretation, clarifications and changes to the Bidding Documents.

2.3.2 Requests for interpretation or clarification shall be submitted in writing by mail, fax or delivery to the office of the Architect. Requests shall include reference to Project Manual Section and Paragraph number or Drawing Sheet and Detail number. Requests submitted less than two (2) business days prior to receipt of bids may not be answered.

2.4 Substitutions

2.4.1 Bids shall be based on indicated products and materials, without substitutions.

2.4.2 Bidders may propose substitutions on the form provided with the Bid Form.

2.4.3 Substitutions will not be used to determine the low bid.

2.4.4 Substitutions will not be considered prior to award of the Contract. Requirements for substitutions are contained in 01 25 00 Substitution Procedures.

2.5 Addenda

2.5.1 Addendum will be posted on the McHenry County College web site www.McHenry.edu/bid

2.5.2 The Bidder shall ascertain that all Addenda, if any, have been received by the Bidder and shall acknowledge receipt of Addenda in the space provided on the Bid Form.

2.6 Other Information:

- 2.6.1 Time and Place of Pre-Bid Meeting, if any, is indicated in Section 00 11 13 Advertisement for Bids.
- 2.6.2 Site Visits: Restrictions on visits to the site, if any, are indicated in Section 00 11 13 Advertisement for Bids.
- 2.6.3 AIA Documents: Referenced AIA Documents are available for purchase from www.aia.org; AIA Chicago, 222 Merchandise Mart Plaza, Suite 1049, Chicago, Illinois 60654, (312) 670-7770; and are available for viewing at the office of the Architect.

3 BIDDING PROCEDURES

3.1 Form of Bids

- 3.1.1 Bidders shall make use of complete documents to prepare bids.
- 3.1.2 Bids shall be submitted using the Bid Form provided, complete with all necessary bid submittals.
- 3.1.3 All blanks shall be filled in by typewriter or by hand in ink.
- 3.1.4 All dollar figures shall be expressed in words and numbers, written words shall govern in the case of discrepancy.
- 3.1.5 All necessary representations and certifications shall be completed and submitted with the Bid.
- 3.1.6 Two copies of the Form of Bid and bid submittals shall be submitted.

3.2 Bid Security

- 3.2.1 Each Bid shall be accompanied Bid Security in the form of a Bid Bond or certified check made payable to the Owner, in an amount not less than ten percent (10%) of the Base Bid, or aggregate amount of multiple Base Bids offered. The attorney-in-fact who executes the bond shall affix a certified and current copy of the power of attorney. Bonds shall be written on AIA Document A310 Bid Bond, by surety with a rating A-, A, or A+ by Best Insurance Guide, latest edition.
- 3.2.2 The Owner will retain Bid Security of Bidders under consideration of award until a Contract is executed with the successful Bidder and the Performance and Labor and Material Payment bonds are delivered.
- 3.2.3 If the Bidder to whom a Contract is awarded fails to enter into a contract with the Owner and deliver Bonds and suitable evidence of insurance within ten (10) calendar days from the date notification of award, the Bidder will be considered as having abandoned the Bid and the bid security shall be forfeited to the Owner as liquidated damages for the delay and loss caused the Owner by reason of such failure on the part of the Bidder.

3.3 Submission of Bids

- 3.3.1 Bids shall be submitted in a sealed, opaque envelope, marked:
SEALED BID FOR
PROJECT NAME, PROJECT NUMBER (*Bidder insert applicable information*)
- 3.3.2 Mailed bids shall be inside a separate mailing envelope.
- 3.3.3 Bids shall be submitted prior to the time for receipt of Bids and at the place identified in the Advertisement for Bids
- 3.3.4 If Bidder wishes to submit bids for multiple separate Bid Packages (when so identified in the Bid Documents) submit a complete and separate bid for each package, with each bid in a separate, clearly marked, sealed envelope.

3.4 Withdrawal or Modification of Bids

- 3.4.1 A bid shall not be withdrawn, modified or cancelled after the time for receipt of bids for the period stipulated on the Form of Bid.
- 3.4.2 A Bid may be withdrawn if a written notice is received at the administration office of the Owner prior to the time of receipt of the Bids.
- 3.4.3 Bids withdrawn and modified may be resubmitted prior to the time for the receipt of Bids.

3.5 Examination of Documents

- 3.5.1 Bidders shall thoroughly examine the Bidding Documents, shall visit the site and become familiar with the local conditions under which work will be performed, shall become familiar with applicable laws and regulations governing the work, and shall correlate all observations and information with the requirements of the of the Bidding Documents.
- 3.5.2 Bidders shall report any errors, inconsistencies and ambiguities, in writing, to the Architect at once.
- 3.5.3 Complete sets of Bidding Documents shall be used by Bidders in submitting a bid.
- 3.5.4 No division of work by trades or subcontractors is intended by the division of the Project Manual or Drawing sheets.

3.6 Other Bid Submittals

- 3.6.1 The Bidder shall submit qualifications statements and documentation of experience as identified in Section 00 45 13 Bidder's Qualifications.
- 3.6.2 The Bidder may be required to submit information regarding the amount and type of work to be performed by Bidder's own forces, and/or the identity, qualifications and other information regarding subcontractors, when required by the Bid Documents.
- 3.6.3 The Bidder may optionally submit additional information which will demonstrate the Bidders responsibility. Such information shall be labeled "Optional Submittal" .

4 POST-BID SUBMITTALS

- 4.1 Within 24 hours of a request by the Owner the Bidder shall submit additional Post-Bid Submittal information identified in Section 00 45 13 Bidders Qualifications.

5 CONSIDERATION OF BIDS

5.1 Opening Bids

- 5.1.1 Bids will be publicly opened and read at the time and place indicated in the Advertisement for Bids.

5.2 Rejection of Bids

- 5.2.1 The Owner shall have the right to reject Bids: 1) which arrive after the stated time for receipt of the bids, 2) from a Bidder which did not attend a mandatory pre-bid meeting, 3) received by oral, telephonic or telegraphic means, 4) which are incomplete or do not contain required data, 5) not accompanied by a required bid security or by other data required by the Bidding Documents, 6) which are in any way is incomplete, irregular, or which otherwise deviates from the requirements of the Bid Documents, 7) from a Bidder who the Owner has determined as non-responsible.

5.2.2 The Owner shall have the right to reject all Bids.

5.3 Bid Evaluation and Award

5.3.1 The Owner shall have the right to waive informalities or irregularities in a Bid received and to accept the Bid which, in the Owner's judgement, is in the Owner's best interest.

5.3.2 It is the intent of the Owner to award a Contract to the low responsible Bidder(s), as determined pursuant to the Bidding Documents

5.3.3 There are two prime concerns in awarding the Contract(s): the lowest Bid and the responsibility of the Bidder, in the opinion of the Owner, to complete the project satisfactorily and within the time set forth in the Bidding Documents.

5.3.4 Low Bid:

5.3.4.1 The low bid amount will be determined on the basis of Base Bid plus accepted Alternate Bids.

5.3.4.2 Substitutions will not be considered in evaluating the low bid.

5.3.4.3 When the Bid Form includes line-item bidding or multiple Base Bids, the Owner reserves the right to split the award among multiple bidders in the manner that provides the best value to the Owner, in the Owner's opinion.

5.3.5 Responsible Bidder

5.3.6 In determining whether a Bidder is a "responsible Bidder", the Owner will consider information provided by the Bidder and by others relating to the Bidder's history of satisfactorily completing work on time and reputation for performing in a prompt, efficient manner without conflict with the owner or architect, and will particularly consider the following factors:

5.3.6.1 Bidder's history of timely project completion without revision or extension of schedule for factors that were within the Bidder's control or which the Bidder should have anticipated.

5.3.6.2 Bidder's history of completing projects without additional expense to the owner for factors that were within the Bidder's control or which the Bidder should have anticipated.

5.3.6.3 Bidder's history of completing projects without accident, injury, or damage to property.

5.3.6.4 Bidder's history of performance on projects in occupied and partially occupied facilities, with minimum disruption to on-going uses of the facility during construction.

5.3.6.5 Bidder's history of cooperation with owners and architects during construction and completion of projects without adversarial actions, arbitration or litigation, except where not due to Bidder's own material fault or neglect.

5.3.6.6 Bidder's history of maintaining accurate and complete project documentation, submitting complete and accurate applications for payment, waivers and other required documents and making timely payment to subcontractors and suppliers.

5.3.6.7 Bidder's history of providing adequate personnel and management resources for the efficient prosecution and successful completion of projects without undue burden on owners or architects.

5.3.6.8 Bidder's possession of adequate personnel, management and financial resources for the successful completion of the project.

5.3.6.9 Bidder's history of continuous business operation in the current form of business organization for at least five years prior to the date of this bid:

- 5.3.6.9.1 Without resort to protection from creditors under bankruptcy laws, placement under receivership or similar action.
- 5.3.6.9.2 Without termination of a contract by an owner, except through no material fault of the Bidder.
- 5.3.6.9.3 Without claim on Bidder's bond.
- 5.3.7 False or deceptive responses in any material submitted, or failure to provide required materials may be interpreted as evidence of non-responsibility.

6 PERFORMANCE AND PAYMENT BONDS

- 6.1 Performance Bond and Payment Bond shall be written on AIA Document A312, or other form acceptable to the Owner,, in the amount of one hundred percent (100%) of the Contract Sum .
- 6.2 Bonds shall be dated on or after the date of the Contract.
- 6.3 Bonds shall be delivered to the Owner within seventy-two (72) hours of the execution of the Contract. The attorney-in-fact who executes the bond shall affix a certified and current copy of the power of attorney.

7 INSURANCE:

- 7.1 The successful bidder is required to furnish insurance, including guarantees of indemnity to the Owner and Architect, in form and amounts required by the Bidding Documents.

8FORM OF AGREEMENT

- 8.1 The Contract for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum, 2007 edition, as modified below:
 - 8.1.1 Add the following Sub-subparagraph 3.4:
"3.4 The Contractor shall achieve final completion of the entire Work not later than thirty (30) days after the date of Substantial Completion.
 - 8.1.2 Delete Subparagraph 8.2 and substitute with the following Subparagraph:
"Payments due and unpaid under the contract shall bear interest in accordance with the provisions of the Local Government Prompt Payment Act (50 ILCS 505/)"

End of Section

PRELIMINARY SCHEDULES
SECTION 00 31 13

1 Summary:

- 1.1 This Section contains preliminary schedule information which establishes mandatory schedule criteria with which the Contractor is obligated to comply.
- 1.2 Schedule information contained herein is preliminary in that it establishes minimum requirements. The Contractor shall prepare detailed schedules incorporating and consistent with this preliminary information, and shall execute the Work to achieve the objectives of the Preliminary Schedules.
- 1.3 The Owner reserves the right to change dates and sequences identified in the Preliminary Schedule subject to equitable adjustment of the Contract Time.
- 1.4 Information on the Owner's Academic Calendar is available at the Owner's web site: <http://www.mchenry.edu/AcademicCalendar.asp>

2 Time of Commencement:

- 2.1 Work shall commence upon execution of the Contract, and delivery to the Owner of Performance and Payment Bonds and satisfactory evidence of Contractor's insurance.
- 2.1.1 The performance of work on site may be restricted subject to the requirements of Section 01 10 00 Summary, and dates established in the Preliminary Schedule, below.

3 Completion Date:

- 3.1 The Contractor shall achieve Substantial Completion of the Work so the Owner's can occupy and use the Work, for the use for which it is intended, by the date established as the Completion Date.
- 3.2 When phased completion and occupancy of various portions of the Work is intended, a Completion Date is established for each phase or portion of the Work
- 3.3 The Completion Date is a date certain, and may be changed only by Change Order properly executed by the Owner and Architect.
- 3.4 In the event that the Completion Date in the Contract between Owner and Contractor differs from the Completion Date specified herein, the Completion Date stipulated in the contract shall take precedence.

(Continued on next page)

4 **Preliminary Schedule**

15 Jul 2013	Receipt of Bids
16 Jul 2013	Anticipated notice of contract award
22 Jul 2013 22 Jul - 02 Aug 2013	Commence work on site Work area available Mondays and Fridays only during normal hours 6AM - 3PM.
05 - 07 Aug 2013	Work area available, any time
08 Aug 2013	Last day of Summer Session Classes Final Exam - no work permitted
09 -16 Aug 2013	Work area available, any time
16 Aug 2013	Start of Fall Session
19 Aug 2013	Completion Date - Substantial Completion (Base Bid)
18 Oct 2013	Final Completion Date (Base Bid)

4.1 Refer to Section 01 23 00 for Alternate Bid 3 - Relaxed Schedule and stipulate the Alternate Completion Date on the Bid Form.

End of Section

**OWNER'S TAX EXEMPTION
SECTION 00 33 13**

1 Tax Exemption:

- 1.1 The Owner holds an exemption from the Illinois Retailers Occupation Tax, the Illinois Use Tax, and Illinois Service Occupation Tax. A copy of the Owner's Certificate of Tax Exemption will be provided after execution of the Contract.

2 Other Taxes:

- 2.1 Contractor shall include in the Bid and shall pay all other applicable taxes.

End of Section

**BID FORM
SECTION 00 41 00**

Bid to: Board of Trustees
McHenry County College
8900 US Highway 14
Crystal Lake, IL 60012

Bid from: _____
(Bidder's name)

(Bidder's address)

(Telephone Number)

(Fax Number)

1 The Undersigned Bidder acknowledges receipt of:

1.1 Project Manual and Drawings for
Ceramics Lab Ventilation - Building A
Project No. 1227.04
Dated: 17 Jun 2013

1.2 Addenda: No. _____ Dated _____
No. _____ Dated _____
No. _____ Dated _____
No. _____ Dated _____

2 The Undersigned Bidder represents that:

- 2.1 Bidder has examined the site where the Work is to be executed; and has become familiar with local conditions and applicable laws and regulations as they might in any way affect the cost and/or execution of the Work.
- 2.2 Bidder has carefully examined and understands the Bidding Documents and that the Bid is in accordance with these documents.
- 2.3 Bidder has based this Bid upon the materials, equipment and systems required by the Bidding Documents without exception.
- 2.4 Bidder has checked all of the figures contained in this Bid and further understands that the Owner will not be responsible for any errors in or omissions from the Bid.
- 2.5 Time is an essential condition of this Bid, and that the Completion Date required by the Bidding Documents is a reasonable and achievable requirement.
- 2.6 The person(s) signing this Bid is(are) fully authorized to sign on behalf of the named firm and to fully bind the named firm to all the conditions and provisions of the Bidding Documents.
- 2.7 No person or company other than the Bidder, unless otherwise disclosed herein., has any interest whatsoever in this Bid or the Contract that may be entered into as a result hereof, and that in all respects the Bid is legal and fair, submitted in good faith, without collusion or fraud.

2.8 Bidder has complied or will comply with all licensing requirements and with all other local, state, and national laws, and regulations and that no legal requirement has been or will be violated in making or accepting this Bid, in awarding the Contract to the Bidder or in the prosecution of the Work required thereunder.

3 The undersigned Bidder further represents that the Bidder will enter into and execute a Contract with the Owner within seven days of Notice of Award, if awarded on the basis of this Bid, and in connection therewith will:

3.1 Furnish all bonds and insurance required by the Bidding Documents.

3.2 Commence the Work immediately upon execution of the Contract and delivery to the Owner of Bonds and suitable evidence of insurance.

3.3 Execute the Work in accordance with the Bidding Documents and provide all labor, materials, plant, equipment, transportation and other facilities as necessary or required for the complete and satisfactory execution of the Work.

3.4 Prosecute the Work regularly and diligently and complete the Work on or before the Completion Date required by the Bidding documents.

3.5 Provide the equipment and personnel necessary for timely and proper completion of the Work, and will provide additional equipment and personnel, including overtime labor and additional work shifts beyond the normal working hours, if necessary, to complete Work by the required Completion Date, without additional cost to the Owner.

4 The undersigned Bidder agrees that:

4.1 This Bid shall be valid after the opening of Bids for a period sixty (60) calendar days, and that this Bid shall not be modified, withdrawn or cancelled during that time period without consent of the Owner.

4.2 The Owner may reject Bids subject to the provisions of the Bidding Documents and may waive any informalities or irregularities in the bidding to accept the Bid which, in the Owner's judgement, is in the Owner's best interest.

5 BASE BID

Bidder agrees to perform all Work including the specified allowances, as set forth in the Bidding Documents for the sum of:

_____ Dollars (\$_____)

6 ALTERNATE BIDS

Alternate Bid 1 - Re-Use Existing Exhaust Ductwork

(Add) (Deduct) _____ Dollars (\$_____)

Alternate Bid 2 - Stainless Steel Closure at Counter

(Add) _____ Dollars (\$_____)

Alternate Bid 3 - Relaxed Schedule

(Add) (Deduct) _____ Dollars (\$_____)

Substantial Completion Date: _____ 2013
(Insert date proposed for completion under this alternate)

7 Work By Own Forces

7.1 Bidder proposes to perform _____ percent of the project labor with Bidder's own forces, which shall include the following types of work:

8 SUBSTITUTIONS

8.1 The following is a schedule of substitutions offered by the Bidder, with the difference in price being added to or deducted from the Base Bid.

	<u>Manufacturer's Name & Product</u>	<u>Add</u>	<u>Deduct</u>
8.1.1	_____	_____	_____
8.1.2	_____	_____	_____
8.1.3	_____	_____	_____
8.1.4	_____	_____	_____
8.1.5	_____	_____	_____
8.1.6	_____	_____	_____

8.2 Bidder agrees that:

- 8.2.1 Substitutions proposed by the Bidder will not be used in determining the low responsible Bidder.
- 8.2.2 The Owner is not obligated to consider any substitution proposed by the Bidder.
- 8.2.3 Rejection of any substitution offered will not affect the Base and Alternate Bids.
- 8.2.4 Substitutions offered but not accepted prior to execution of the Contract may be withdrawn.
- 8.2.5 Substitutions shall be incorporated in the Work only if Owner's acceptance is indicated in the Contract or in a written Change Order properly executed by Owner and Architect.

8.3 In proposing the substitutions herein, the Bidder represents that::

- 8.3.1 Bidder has investigated the proposed substitution, and has determined that it is equal or superior in all respects to that specified.
- 8.3.2 Bidder will provide the same guarantee for the substitution as for the item specified.
- 8.3.3 Bidder will coordinate installation of an accepted substitution into the Work, making all such changes as may be required for the Work to be complete in all respects.
- 8.3.4 Bidder waives all claims for additional costs related to the substitution.
- 8.3.5 Cost data is complete and includes all related costs under his Contract, and will pay all costs incurred by the Owner for investigation, evaluation and changes to the design and Contract Documents which may be required to incorporate the proposed substitutions.

9 BIDDERS CERTIFICATIONS

9.1.1 Eligibility: The undersigned Bidder hereby certifies that Bidder is not barred from submitting this bid as a result of a bid-rigging or bid-rotating violation of 720 ILCS 5/33E-3 or 33E-4.

9.1.2 Illinois Human Rights Act: The undersigned Bidder hereby certifies pursuant to Illinois Human Rights Act, 775 ILCS 5, that Bidder has adopted a written sexual harassment policy that includes at a minimum the following information: (I) the illegality of sexual harassment; (ii) the definition of sexual harassment under Illinois law; (iii) a description of sexual harassment, utilizing examples; (iv) internal complaint process including penalty; (v) the legal recourse, investigative and complaint process available through the Illinois Department of Human Rights and the Illinois Human Rights Commission; (vi) directions on how to contact the Department and Commission; and (vii) protection against retaliation as provided by Section 6-101 of the Illinois Human Rights Act.

9.1.3 Illinois Drug-Free Workplace Act: (initial one of the two certifications below, as applicable)

_____ The undersigned Bidder hereby certifies that Bidder has fewer than 25 employees.
(Initial)

Or

_____ The undersigned Bidder, having 25 or more employees, hereby certifies pursuant the Illinois Drug-Free Workplace Act, 30 ILCS 580, that Bidder shall provide a drug-free workplace for all employees engaged in the performance of work under the contract by complying with the requirements of the Illinois Drug-Free Workplace Act and, further certifies, that Bidder is not ineligible for award of this contract by reason of debarment for a violation of the Illinois Drug-Free Workplace Act.

9.1.4 Certification Regarding Criminal Background Investigations: At the direction and expense of Owner, any employee of Contractor or its subcontractors shall submit and pass a Criminal Background Check as a condition of employment on the Project. The employees of contractor shall submit on forms supplied by Owner, verified identifying information including name, address, Social Security Number, date of birth, height, weight, hair, eye color, previous names and addresses, prior criminal convictions other than minor traffic violations and any pending criminal charges, and authorization to release the results of the background check to the Owner. The information submitted shall be certified by the employee under penalty of perjury. Any employee of Contractor whose Criminal Background Check reflects convictions as enumerated in 105 ILCS 5/21/-21a shall not be employed on the Project.

Contractor represents, warrants and certifies that no officer or director will knowingly engage any employee on the Project who has been convicted of committing or attempting to commit indecent solicitation of a child, public indecency, prostitution, soliciting for a prostitute, soliciting for a juvenile prostitute, pimping, juvenile pimping, exploitation of child, obscenity, sexual assault, aggravated criminal sexual assault, criminal sexual abuse, aggravated criminal sexual abuse and or those offenses defined in the Cannabis Control Act.

9.2 These certifications are executed on the date hereinafter indicated by the designated Bidder or by its duly authorized officer.

By: _____
(Signature)

(Title)

(Printed Name)

(Date)

10 Non-Collusion Affidavit:

The undersigned bidder or agent, being duly sworn, deposes and says that this proposal was prepared independently for this project and that it contains no fees or amounts other than for legitimate execution of this work as specified, and that it includes no understandings or agreements in restraint of trade.

By: _____
(Signature of Bidder or Agent) (Title)

(Printed Name) (Date)

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

My commission expires: _____

Notary Public _____ Seal

(Remainder of Page Intentionally Blank)

11 BIDDERS SIGNATURE

Respectfully submitted, this ____ day of _____ 20____

(Name of firm)

By: _____
(Signature)

(Printed Name) (Title)

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

Notary Public _____

My commission expires: _____

11.1 If Bidder is a corporation, attach a sworn statement signed by an Executive Officer of the corporation, stating that the individual signing and executing this proposal is authorized to bind this corporation thereby and affix corporate seal.

12 ENCLOSURES (two copies of each)

- ___ This Bid Form
- ___ Contractor's Qualification Statement, AIA A305, and attachments
- ___ Supplementary Qualification Statement and attachments
- ___ Bid Security
- ___ Disclosure of interested persons or entities (if applicable - see ¶ 2.7)
- ___ Corporate authorization to bind (see ¶ 12.1)
- ___ Optional Information (describe) _____

End Bid Form

**BIDDERS QUALIFICATIONS
SECTION 00 45 13**

1 RELEVANT EXPERIENCE

- 1.1 Years in Business: Bidder shall have conducted business in the current form of business organization for a minimum of five (5) continuous years prior to the date of this bid. (Provide information on AIA A305 ¶ 1.)
- 1.2 Relevant Projects: Bidder shall have successfully completed, within five (5) years prior to the date of this bid, a minimum of three (3) projects in the State of Illinois of similar scope, complexity and contract amount for institutions of higher education, or institutions of public education, or other public sector experience which is relevant to this project. (Provide information on Supplementary Qualification Statement form included in this Section).
- 1.3 Failure to Complete: Bidder shall **not** have failed to satisfactorily complete any project in the past five (5) years except where not due to a material fault of the Bidder. (Provide information on Supplementary Qualification Statement form included in this Section.)
- 1.4 Project Manager: The Project Manager proposed by the Bidder for the project shall have a minimum of three (3) years experience managing institutional or commercial projects for a prime contractor, and at least one (1) public project in the State of Illinois of similar scope, complexity and contract amount. (Provide information on Supplementary Qualification Statement form included in this Section.)
- 1.5 Field Superintendent: The Field Superintendent proposed by the Bidder for the project shall have a minimum of three (3) years superintending institutional or commercial projects for a prime contractor, and at least one (1) public project in the State of Illinois of similar scope, complexity and contract amount. (Provide information on Supplementary Qualification Statement form included in this Section).
- 1.6 The Owner shall be the sole judge of the relevance and adequacy of bidder's experience, and may consider information obtained independently from bidder's submittals.
- 1.7 The Project Manager and Field Superintendent proposed by the Bidder shall not be changed without the Owner's written approval.

2 LICENSURE AND PREQUALIFICATION

- 2.1 Bidder or bidder's proposed subcontractors shall be appropriately licensed to perform the work of this project at the date of this bid.
- 2.2 Roofing Work: when the project includes roofing work, either the Bidder or the Bidder's proposed subcontractor shall be licensed in the State of Illinois as a Roofing Contractor.
- 2.3 Plumbing Work: when the project includes plumbing work, either the Bidder or the Bidder's proposed plumbing subcontractor shall be registered as a plumbing contractor with the Illinois Department of Public Health.
- 2.4 Paving Work: When the project includes paving work of more than \$50,000, either the Bidder or the Bidder's proposed subcontractor shall be pre-qualified by the Illinois Department of Transportation. For the applicable categories of work.
- 2.5 Subcontractors proposed to satisfy licensure and pre-qualification requirements shall not be changed without written approval of the Owner.

3 MANDATORY BID SUBMITTALS

- 3.1 Contractor's Qualification Statement, AIA Document A305, latest edition, completed.

3.2 Supplementary Qualifications Statement, using the form provided at the end of this section, with attachments.

4 OPTIONAL BID SUBMITTALS

4.1 The Bidder may optionally submit additional information which will demonstrate the Bidders responsibility. Such information shall be labeled "Optional Submittal" .

5 WORK BY OWN FORCES OR BY SUBCONTRACTORS

5.1 The Bidder's ability to perform a portion of the work with its own forces; the qualifications of certain subcontractors and nature and extent of work so performed may be considered essential qualifications.

5.2 When such information is stipulated or required on the Bid Form, Bidder shall provide complete information on the Bid Form and indicated Bid Submittals.

5.3 Work By Own Forces shall include only the labor provided by persons directly employed by the Contractor, whose labor shall be documented by certified payroll records. Labor provided by subcontractors or other independent contractors; equipment, and materials shall not be considered in evaluating Work By Own Forces.

6 WORK BY SUBCONTRACTORS

6.1 The qualifications of certain subcontractors and nature and extent of work so performed may be considered essential qualifications.

6.2 When such information is stipulated or required on the Bid Form, Bidder shall provide complete information on the Bid Form and indicated Bid Submittals.

6.3 Work By Own Forces shall include only the labor provided by persons directly employed by the Contractor, whose labor shall be documented by certified payroll records. Labor provided by subcontractors or other independent contractors; equipment, and materials shall not be considered in evaluating Work By Own Forces.

7 POST-BID SUBMITTALS

7.1 Bidders under consideration for award of Contract shall, within twenty-four (24) hours after request of the Owner or Architect submit the following information:

7.1.1 Audited financial statement.

7.1.2 Proposed construction schedule.

7.1.3 Supporting documentation for proposed substitutions, if any, indicated on the Bid form. Supporting documentation requirements are indicated in Section 01 25 00 Substitution Procedures.

End of Section
(2 pages follow)

SUPPLEMENTARY QUALIFICATION STATEMENT

Project: _____

Complete and submit with Bid Form

Bid From: _____

- 1 On a separate sheet, list all projects for a college, university, institution of higher education or public education, that your organization has completed in the last five years, including the following information for each:

Project Name
Owner Name, address, telephone.
Architect Name, address, telephone
Final Contract Amount
Total Change Order Amount
Scheduled Date of Substantial Completion
Actual Date of Substantial Completion,
Percentage and Description of Work Performed with Own Forces.

- 2 In the absence of at least 5 projects listed for item 1 above, provide the same information listed above for at least 5 comparable projects (other than higher education) completed within the last five years, including the following information for each:

All items listed for Item 1 above
Explain why each project listed is relevant to the work of this contract.

- 3 Has your organization incurred any penalties, liquidated damages or compensatory settlements in the last five years? _____. If so, attach a separate sheet of paper listing each such project, including the following information for each:

Project Name
Owner Name, address, telephone.
Amount of the penalty, liquidated damages or settlement
Brief explanation of the matter.

- 4 Has your organization ever failed to satisfactorily complete any work awarded to it? _____. If so, attach a separate sheet of paper listing each such project, including the following information for each:

Project Name
Owner Name, address, telephone.
Amount of the penalty, liquidated damages or settlement
Brief explanation of the matter.

(Continued on next page)

SUPPLEMENTARY QUALIFICATION STATEMENT - CONTINUED

- 5 Proposed Project Manager name: _____ . Attach Project Manager’s resume including information to substantiate compliance with the relevant experience requirements.

- 6 Proposed Field Superintendent name: _____ . Attach Field Superintendent’s resume including information to substantiate compliance with the relevant experience requirements.

- 7 If project includes roofing::
(if none, mark NA):
IL Licensed Roofing Contractor name: _____ , Lic. #: _____

- 8 If project includes plumbing:
(if none, mark NA)
IDPH Plumbing Contractor name: _____ , Reg. #: _____

- 9 If project includes paving work in excess of \$50,000:
(if none, mark NA)
IDOT pre-qualified Paving Contractor name: _____ , . #: _____

10 Signature

Dated this _____ day of _____ 20____

(Name of firm)

The undersigned bidder or agent, being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

(Signature)

(Printed Name)

(Title)

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

Notary Public _____

My commission expires: _____

**OWNER-CONTRACTOR AGREEMENT FORM
SECTION 00 52 00**

1 Sample Forms

- 1.1 AIA A101-2007 “Standard Form of Agreement between Owner and Contractor” , as modified and included at the end of this section

End of Section

(8 pages follow)

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AIA[®] Document A101[™] – 2007

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)

Board of Trustees
McHenry County College
8900 U. S. Highway 14
Crystal Lake, Illinois 60012

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

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

Ceramics Lab Ventilation
Building A
8900 U. S. Highway 14
Crystal Lake, Illinois 60012

Project No. 1227.04

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

RuckPate Architecture
22102 North Pepper Road, Suite 201
Barrington, Illinois 60010
Telephone Number: (847) 381-2946
Fax Number: (847) 304-1218

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. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

AIA Document A201[™]-2007, 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
- 10 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 the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)



If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:



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

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than () days from the date of commencement, or as follows:

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

19 August 2013

Portion of Work

Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.

(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

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

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 4.3 Unit prices, if any:

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

Item	Units and Limitations	Price Per Unit (\$0.00)
------	-----------------------	-------------------------

§ 4.4 Allowances included in the Contract Sum, if any:

(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price
------	-------

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 ten (10) days prior to the end of a month, the Owner shall make payment of the certified amount to the Contractor not later than 45 days after receipt by Owner. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than the following month 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, unless objected to by the 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 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of ten percent (10%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™-2007, General Conditions of the Contract for Construction;
- .2 Add 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), less retainage of ten percent (10%);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201-2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

- .1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201-2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)
- .2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201-2007.

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

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

As in Section 01 29 00 - Payment Procedures for Project No. 1227.04 dated 1 July 2013 and Section 00 72 00 - General Conditions, Article 9 - Payments and Completion.

§ 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 Section 12.2.2 of AIA Document A201-2007, 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:

As in Sections 01 77 00 Closeout Procedures, 01 29 00 - Payment and Procedures, and 00 72 00 - General Conditions, Article 9 - Payments and Completion, all part of the Project Manual for Project No. 1227.04 dated 1 July 2013.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as 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.)

§ 6.2 BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:

(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, 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.)

Arbitration pursuant to Section 15.4 of AIA Document A201–2007

Litigation in a court of competent jurisdiction

Other *(Specify)*

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 A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 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.)

(Paragraph deleted)

§ 8.3 The Owner’s representative:
(Name, address and other information)

§ 8.4 The Contractor’s representative:
(Name, address and other information)

§ 8.5 Neither the Owner’s nor the Contractor’s representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction, as amended and included in the Project Manual.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
00 72 00	General Conditions	1 July 2013	57

§ 9.1.4 The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

See "Exhibit A" attached.

Section	Title	Date	Pages

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

Number	Title	Date
MD111	Partial First Floor Plan - Mechanical Demolition	1 July 2013
M111	Partial First Floor Plan – Mechanical	1 July 2013
M121	Partial Second Floor Plan – Mechanical	1 July 2013
M131	Partial Roof Plan – Mechanical	1 July 2013
M400	Control Diagrams	1 July 2013
M500	Mechanical Details	1 July 2013
E111	Partial First Floor Plan – Power	1 July 2013
E121	Partial Second Floor Plan – Power	1 July 2013
E400	Electrical Notes and Schedules	1 July 2013

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

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

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

- .1 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:
- .2 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid,

Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

1. Section 00 11 13, Advertisement for Bids as contained in the Project Manual for Project No. 1227.04 dated 1 July 2013.
2. Section 00 21 00, Instruction to Bidders, as contained in the Project Manual for Project No. 1227.04 date 1 July 2013.
3. Section 00 41 00 Bid Form, for Project No. 1227.04 dated 1 July 2013.
4. Section 00 45 13, Bidder's Qualifications, for Project No. 1227.04 dated 1 July 2013.
5. Bid Bond for Project No. 1227.04.
6. AIA Document A312, Performance Bond, for Project No. 1227.04.
7. AIA Document A312, Payment Bond, for Project No. 1227.04.
8. AIA Document A305, Contractor's Qualification Statement, 1986 Edition.

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201-2007.
(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201-2007.)

Type of insurance or bond	Limit of liability or bond amount (\$0.00)

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)

PART 1 - GENERAL

1.01 Project Forms Included:

- A. The following forms are included at the end of this section:
 - 1. RFI - Request for Interpretation
 - 2. Sample CG2026 Additional Insured Endorsement Form
 - 3. Change Order Request Detail
 - 4. Authorization for Criminal Background Investigation

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section
(5 pages follow)

(page intentionally blank)

RFI

Project Name _____

PKG#:	RFI#	Date Created:	Date Required:
-------	------	---------------	----------------

To:		From:	
Phone:	Fax:	Phone:	Fax:

Subject	Discipline	Category
Drawing References:		Spec Section References:

Question:

Suggestion:

Response:

Signature: _____ Date: _____

Sample CG2026 Additional Insured Endorsement Form

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED - DESIGNATED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART.

SCHEDULE

Name of Person or Organization:

SAMPLE ONLY

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

WHO IS AN INSURED (Section II) is amended to include as an insured the person or organization shown in the Schedule as an insured but only with respect to liability arising out of your operations or premises owned by or rented to you.

CG 20 26 11 85

Copyright, Insurance Services Office, Inc. 1984

CHANGE ORDER REQUEST DETAIL Project Name: _____

Change Order Request Detail					COR #	
Project Name						
Project Number					Date Submitted	
Contractor/Subcontractor					Contractor's Request No.	
Description of Change						
Labor						
Description	Classification	Hours	Hourly Rate	Raw Cost		
		x	=	\$ -		
		x	=	\$ -		
		x	=	\$ -		
		x	=	\$ -		
				Labor Total	\$ -	
Material & Equipment						
Description	Qty	Unit	Unit Price	Raw Cost		
		x	=	\$ -		
		x	=	\$ -		
		x	=	\$ -		
		x	=	\$ -		
				Subtotal	\$ -	
				0.00%	Sales Tax \$ -	
				10%	Markup on M & E \$ -	
				Materials & Equipment Total	\$ -	
Subcontractors						
Subcontractor	Description of Subcontract Work			Raw Cost		
				Subtotal	\$ -	
				5.00%	Markup on Subcontract Work \$ -	
				Subcontract Total	\$ -	
				LMS: Labor + Materials & Equipment + Subcontract Total	\$ -	
Bonds & Insurance						
Description	Rate			Raw Cost		
Performance and Payment Bonds	0.00%	x	LMS Total	= \$ -		
Builder's Risk Insurance		x	LMS Total	= \$ -		
Project Protective Liability Insurance		x	LMS Total	= \$ -		
				Bonds & Insurance Total	\$ -	
				Grand Total	\$ -	
Notes						
1 COR # to be assigned by Construction Manager or General Contractor						
2 Attach additional sheets as necessary. Include a separate sheet for each subcontractor						
3 Hourly rates for labor from Hourly Labor Rate sheets, which include markup						
4 Markup is subject to limitations established in the Contract Documents.						
5 Bonds & Insurance may be added only to the extent that the specific coverages are required by the Contract Documents						

AUTHORIZATION FOR CRIMINAL BACKGROUND INVESTIGATION

The undersigned hereby authorizes the Board of Trustees, McHenry County College, Crystal Lake, McHenry County, Illinois to request a criminal background investigation from the Illinois State Police, and to receive criminal history record information pursuant thereto.

(Contractor /Employer name printed or typed)

(Applicant or Employee name printed or typed)

(Signature of Applicant or Employee)

Date _____, 20_____

CLOSEOUT FORMS
SECTION 00 65 00

1 Summary:

1.1 Forms used in the process of contract closeout.

2 Forms:

2.1 The following forms are hereby incorporated by Reference:

2.1.1 "Contractor's Affidavit of Payment of Debts and Claims", AIA Document G706.

2.1.2 "Contractor's Affidavit of Payment of Release of Liens", AIA Document G706A.

2.1.3 "Consent of Surety to Final Payment", AIA Document G707

2.2 The following forms are included elsewhere in the Project Manual:

2.2.1 Contractor's Request for Substantial Completion Inspection: Section 01 77 00

2.2.2 Contractor's Certification Regarding Regarding Final Completion: Section 01 77 00

2.2.3 Contractor's Certification of Final Completion and Request for Inspection: Section 01 77 00

2.2.4 Asbestos Free Construction Certification: Section 00 73 19.01

End of Section

GENERAL CONDITIONS
SECTION 00 72 00

1 General Conditions:

- 1.1 The general conditions of the Contract are contained in "General Conditions of the Contract for Construction" AIA A201, 2007 Edition, as amended and included at the end of this section, hereinafter collectively referred to as the "General Conditions".

End of Section
(57 pages follow)

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DRAFT AIA® Document A201™ - 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Project Name

Ceramics Lab Ventilation – Building A

THE OWNER:

(Name and address)

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Dr. Vicky Smith, President

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THE ARCHITECT:

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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.

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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. The Contract Documents do 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 proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT AND CONSTRUCTION DELIVERY

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. The Work shall also include labor, materials, equipment and services provided or to be provided by Contractors, its lower tier subcontractors and sub-sub-contractors, material suppliers or any other entity for whom the Contractor is responsible under or pursuant to the Contract Documents. The Contractor acknowledges and agrees that at the time of attachment hereto or incorporation herein each Contract Document is adequate and sufficient to provide for the completion of the Work described therein, and includes all work, whether or not shown or described, which reasonably may be inferred to be required or useful for the completion of the Work described therein in accordance with all applicable laws, rules, ordinances, 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 and certify termination of the Agreement under Section 14.2.2.

§1.1.9 FINAL COMPLETION

Final completion is achieved at the time that final inspection has been performed by the Architect and the final Certification and Application for Payment, has been submitted by Architect to the Owner, and accepted by the Owner for payment.

§1.1.10 PROVIDE

Where the word “provide” appears, it shall be interpreted to mean “the Contractor shall furnish all labor, material, equipment and accessory appurtenances or materials necessary to install and/or complete the Work.”

§ 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.

§ 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. The Contractor represents that its lower tier subcontractors, manufacturers and suppliers engaged or to be engaged by it have been supplied all Contract Documents necessary to fulfill all prescriptive or performance requirements of the Work.

§ 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 Site Investigation: By executing the Contract, the Contractor acknowledges that he has satisfied himself as to the nature and location of the work, the general and local conditions, including those bearing upon access (including partial or total restriction in access), transportation, disposal, staging, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, ground water table or similar physical conditions of the ground, the character, quality and quantity of surface and sub-surface materials to be encountered, the character of equipment and facilities needed prior to and during the prosecution of the work and all other matters which can in any way effect the work or the cost thereof under this Contract. Throughout the course of construction Owner shall maintain a full time high quality education program in the facilities under construction. Any failure by the Contractor to acquaint himself with all the available information concerning these conditions will not relieve him from any obligations with respect to his Contract.

§1.2.5 Should discrepancies appear among the Contract Documents or between the Contract Documents and existing conditions, the Contractor shall request an interpretation from the Architect before bidding. If the Contractor fails to make such request, it is presumed that both provisions were included in the bid and the Architect shall determine which of the conflicting requirements shall govern. The Contractor shall perform the work at no additional cost to the Owner in accordance with the Architect's determination. Where conflicts exist between or within the Contract Documents or between the Contract Documents and applicable standards, codes, ordinances or manufacturer's recommendations, and clarification has not been requested from the Architect prior to bidding as provided for above, the more stringent or higher quality standard shall prevail. Large scale drawings shall take precedence over small scale drawings, figured dimensions on the drawings over scaled dimensions and noted material over graphic representations.

§1.2.6 The Contractor shall provide all work and materials which any section or part of the Drawings, Specifications or conditions require him to provide regardless of whether such requirement is or is not faithfully repeated in other parts of documents thereof to which the provision might be appropriate.

§1.2.7 All Work shall conform to the Contract Documents. If work is required in a manner to make impossible to produce work of the highest quality, or should discrepancies appear among the Contract Documents, the Contractor shall request in writing an interpretation from the Architect before proceeding with the Work. The Contractor shall not make changes to or deviate from the Construction Documents without receiving written acceptance by the Architect and Owner. If the Contractor fails to make such request, no excuses will thereafter be entertained for failure to carry out the Work in the required manner or provide required guarantees, warranties or bonds.

§1.2.8 Should a conflict occur in or between Drawings and Specifications. Contract is deemed to have included the better quality and larger quantity of work.

§1.2.9 The Contractor shall provide all work and materials which any Section or part of the Drawings, Specifications or Conditions require him to provide regardless of whether such requirement is or is not faithfully repeated in other parts of Documents thereof to which provisions might be appropriate.

§1.2.10 Whenever a provision of the Specifications conflicts with agreements or regulations in force among members of trade associations, unions or councils which regulate or distinguish what work shall or shall not be included in the Work of a particular trade, the Contractor shall make all necessary arrangements to reconcile such conflict without delay, damage, or cost to the Owner, and without recourse to the Architect or the Owner. In case progress of the Work is affected by undue delay in furnishing or installing items of material or equipment required under the Contract because of a conflict involving such agreement or regulations, the Architect may require that other material or equipment of equal kind and quality be provided at no additional cost to the Owner.

§1.2.11 The Agreement shall govern over all the other Contract Documents. In cases of discrepancies among the Contract Documents other than the Agreement, the matter shall be submitted to the Architect for clarification prior to proceeding with the Work involved. No increase or decrease in Contract Sum shall result, provided such clarification is consistent with the intent of any of the documents in discrepancy.

§ 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 and owners of their respective Instruments of Service, including the Drawings and Specifications, including those in electronic form, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect’s or Architect’s consultants’ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the 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, Architect and the Architect’s consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner, the Board of Trustees of McHenry Community College is a body politic and corporation, State of Illinois and is the 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 authority to the extent established by Board Resolution to bind the Owner with respect to matters requiring the Owner’s approval or authorization. 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 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 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. The Contractor shall provide such information or other assistance as the Architect or the Owner may request in connection with obtaining such permit. § 2.2.3 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 be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work. The Contractor shall review such information furnished by the Owner and compare such information with observable physical conditions and the Contract Documents and shall promptly report to Owner and Architect in writing any conflicts, errors or omissions that it recognizes. The Contractor shall also be responsible for any such conflicts, errors or omissions that it should have recognized exercising the standard of care provided in Subparagraph 3.1.2. The Contractor represents that it has inspected the location of the Work and has satisfied itself as to the condition thereof, including, without limitation, all structural, surface and subsurface conditions based upon the soil and subsurface engineering and investigative reports (including any environmental site assessments), if any, provided by the Owner and such site investigations and other appropriate due diligence investigations as a prudent contractor for a Project of this size, scope and quality would undertake. The Contractor shall undertake such further investigations and studies as may be necessary or useful to determine surface, subsurface and existing conditions. Based upon the foregoing inspections, understandings, agreements and acknowledgements, the Contractor agrees and acknowledged (i) that the Contract Sum is just and reasonable compensation for all the Work, including all reasonably unforeseen, foreseen and foreseeable risks, hazards and difficulties in connection therewith and (ii) that the Contract Time is adequate for the performance of the Work.

§ 2.2.4 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.

§ 2.2.5 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.

§ 2.3 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 repeatedly fails to carry out Work in accordance with the Contract Documents, or fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials or equipment so as to be able to complete the Work within the Contract Time or fails to remove and discharge (within ten days) any lien filed upon the Owner's property or project designated funds by anyone claiming by, through or under the Contract, or disregards the instructions of the Architect or the Owner, the Owner may 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, except to the extent required by Section 6.1.3. These rights shall be in addition to, and not a restriction of, any other rights of the Owner under this Contract. This right shall be in addition to, and not in restriction or in derogation of Owner's rights under Article 14. The Owner's right to stop the work shall not relieve the Contractor from his sole and exclusive responsibility for site safety. The Owner's exercise of the right to stop the Work shall be solely for Multiple Prime Contractor's failure to complete the Work in accordance with the Contract Documents and shall in no way be construed as placing the Owner in charge of the Work or in any way responsible for site safety.

§ 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 and fails within a forty eight (48) hour period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner within ten (10) days after request.

§2.5 OWNER'S RIGHT TO AUDIT

§2.5.1 Each Contractor and lower tier subcontractor shall make and keep for a period of not less than three (3) years full and accurate records of all laborers, mechanics and other workers employed by them on the project and the records shall include each worker's name, address, telephone number, social security number, classification or classifications, the hourly wages paid in each period, the number of hours worked each day and the starting and ending times of work each day (820 ILCS 130/5) as well as material costs incurred and items billed in connection with the performance of the Work, which records shall be open to audit by the Owner or its authorized representatives during performance of the Work and until three (3) years after Final Payment. In addition, the Contractor shall make it a condition of all subcontracts relating to the Work that any and all Subcontractors will keep accurate records of costs incurred and items billed in connection with their Work as set forth herein and that such records shall be open to audit by the Owner or its authorized representatives during performance of the Work and until three (3) years after its completion.

Contractor and each subcontractor shall submit monthly a certified payroll to the Owner consisting of (1) the information contained in the preceding paragraph; (2) certification that the records are true and accurate; (3) the hourly rate paid is not less than the general prevailing rate of hourly wages required by the Prevailing Wage Act; and (4) affiant is aware that filing a false certified payroll is a Class B misdemeanor.

Upon two (2) business days' notice, Contractor and each subcontractor shall make such records available to Owner at reasonable business hours at Owner's site.

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, if required in the jurisdiction where the Project is located. 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. The Contractor shall at all times in performing its services under this Agreement exercise the degree of care and due diligence in a manner equivalent to other highly qualified, experienced and reputable contractors performing similar services for large high schools, national colleges and universities for projects of like size, kind and complexity.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the 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 the Contractor has visited the site, become generally familiar with local conditions including the need for ongoing and uninterrupted operations under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. The Contractor hereby specifically acknowledges and declares that upon incorporation herein each Contract Document is full and complete through its required level or degree of completion, is sufficient to have enabled the Contractor to make necessary determinations therefrom, including the Cost of the Work and that each of

the Drawings, the Specifications and addenda upon incorporation herein is sufficient to enable the Contractor to construct the Work outlined therein. In addition, if the Contractor performs any activity and if it knows or should have known, exercising the standard of care in Subparagraph 3.1.2 that any of the Contract Documents with respect to such activity contains an error, inconsistency or omission, the Contractor shall be responsible for such performance and shall bear the cost for correction thereof.

§3.2.1.1 To the best of Architect's knowledge, materials and systems known to contain hazardous materials have not been specified or shown in the Contract Documents. The Contractor shall review the Contract Document and notify the Owner and the Architect in writing of any materials and systems shown or specified, which, to the best of Contractor's knowledge, may contain hazardous materials. Except with the Owner's prior written consent, the Contractor shall not incorporate into the Work any materials or systems which to the best of Contractor's knowledge, may contain hazardous materials, even if shown or specified in the Contract Documents.

§ 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 2.2.3, 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. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. 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. The exactness of grades, elevations, dimensions, or locations given on any drawings issued by the Architect or the Work installed by other contractors, is not guaranteed by the Architect or Owner. In all cases of interconnection of his work with existing work, Contractor shall field measure and verify at the site all dimensions relating to such existing or other Work. Any errors due to the Contractor's failure to so verify all such grades, elevations, locations, or dimensions shall be promptly rectified by him without extra cost to the Owner.

§ 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 make 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 as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences unless the Contractor recognized or should have recognized such error, inconsistency, omission or difference and failed to report it to the Architect between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor exercising the standard of care provided in subparagraph 3.1.2 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 not proceed with that portion of the Work without further written instructions from the Architect.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons 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 The Contractor has the responsibility to ensure that all material suppliers and Subcontractors, their agents, and employees adhere to the Contract Documents, and that they order materials on time, taking into account the current market and delivery conditions and that they provide materials on time. The Contractor shall coordinate its Work with that of all others on the Project, including deliveries, storage, installations, and construction utilities. The Contractor shall be responsible for the space requirements, locations, and routing of its equipment. In areas and locations where the proper and most effective space requirements, locations, and routing cannot be made as indicated, the Contractor shall meet with all others involved, before installation, to plan the most effective method of overall installation.

§ 3.3.5 If any of the Work is required to be inspected or approved by any government authority, the Contractor shall cause such inspection or approval to be performed and coordinate same with 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 or be construed as an approval or acceptance of the Work or any part hereof.

§ 3.3.6 The Contractor acknowledges that it is the Contractor's responsibility to hire 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.

§ 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. The Contractor shall receive and memorialize all materials and labor entering into the Work site and shall keep full, detailed accounts thereof.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 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. The Contractor shall not permit at any time on the Site, any alcohol or controlled substances whether inside or outside of buildings or structures. Possession or use of any of the foregoing at or adjacent to the Site or nearby shall be adequate grounds for the termination of anyone involved in the Work.

§ 3.4.4 The Contractor shall engage workmen who are skilled in performing the Work and all Work shall be performed with care and skill and in a good workmanlike manner under the full-time supervision of an approved engineer or foreman. The Contractor shall be liable for all property damage including repairs and replacements of the Work and economic losses which proximately result from the breach of this duty.

§ 3.4.5 The Contractor and any subcontractors shall be required to conform to labor laws of the State and various acts amendatory and supplementary thereto and to other laws, ordinances and legal requirements applicable thereto. It shall be the duty of the Contractor engaged in this Work to enforce among all personnel directly or indirectly employed by him, all rules which the Owner may establish for conduct of such personnel on the premises. The Contractor shall keep a responsible representative on the Project throughout the Work until Substantial Competition of the Work and until Final completion of the Work unless Owner shall otherwise consent in writing.

§ 3.4.6 The Contractor shall pay, if applicable, not less than the prevailing rate of wages as established, to all laborers, workmen, and mechanics in the performance of Work under this Contract pursuant to an act of the General

Assembly of the State of Illinois entitled, "An Act regulating wages of laborers, mechanics, and other workmen employed under contracts for public works," 820 ILCS 130/0.01 et seq. To determine the current prevailing wage rate see: (IDOL Website). www.state.il.us/agency/idol/rates.hlm/

§ 3.5 WARRANTY

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 of good quality free from defects in the quality of the Work the Contract Documents. . Work, materials, or equipment not conforming to these requirements may 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, except modifications necessitated by Contractor's failure to cure, 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 execute and deliver, before final payment, a written two (2) year Warranty in approved form. The warranty shall be of the complete Work. Portions of the Work that fail during the period of the warranty shall be replaced in whole or in part at no additional cost to the Owner. If Contractor fails to correct defective or nonconforming work, Owner may, but shall not be obligated, to correct it at Contractor's cost, which shall be charged to Contractor. Correction of defective Work shall include all damage done to the Project as a result of corrective action. The period of the Warranty shall be extended for **an additional two (2) year** for those portions of the Work that fail. Work which is repaired or replaced shall be warranted for **two (2) years** following the Owner's written acceptance of the repair or replacement.

§3.5.3 All Work included under this Specification, unless extended elsewhere herein, shall be guaranteed against defect in material and workmanship for a period of two (2) years from the date of final acceptance of the Work as evidenced by the issuance of the Final Certificate of Payment and payment by the Owner. This guarantee and the repair and replacement obligations described in 3.5.5 below are in addition to and not in derogation of Owner's right under law.

§3.5.4 Where any material, process or method of operation or application procedure is required, which, in the opinion of the Contractor, would render the Work unsuitable for the required Warranty, then, before any work is started, such unsuitable process or application method shall be objected to in writing to the Architect and the Owner, stating reasons and recommending other methods so that the Work, when completed, will be suitable for the required Warranty. In the event the Contractor's recommendation is approved, the Work shall be installed in accordance therewith, at no change in the Contract Sum, unless otherwise authorized.

§3.5.5 Any defective Work or material shall be replaced or corrected to the satisfaction of Owner immediately upon notification by the Owner at no cost to the Owner. The guarantee of repair or replacement items shall be renewed for an additional **two (2) years** upon the completion of the repair or replacement.

§3.5.6 Defective materials, equipment or workmanship occurring within the Warranty period may be repaired, where the repair produces results conforming to Contract requirements relating to appearance, performance and reliability. Where the nature of the defective materials, equipment or workmanship is such that acceptable results cannot be obtained by repair, such defective items shall be removed and replaced with new materials, equipment or workmanship complying with the Contract requirements. All remedial work shall be subject to the Architect's approval.

§3.5.7 Certain guarantees are required under various sections of the specifications. At the completion of the Work, all such guarantees covering materials, workmanship, maintenance etc., as specified, shall be secured from the various Subcontractors, Materialmen and Manufacturers of the Contractor, and forwarded to the Architect, together with a letter addressed to the Owner summarizing the guarantees, stating the character of the Work, the Subcontractor or Manufacturer, name of material or equipment Seller, period of guarantee and conditions of guarantee. Owner shall be designated as an intended third party beneficiary of any such Guarantee or Warranty. Further, Contractor by executing the Agreement assigns the right of enforcement of all such Guarantees or Warranties to Owner.

§3.5.8 The Contractor shall furnish maintenance and 24 hour call back service for equipment provided by him for a period of three (3) months after final completion. This work shall include all necessary adjustments, greasing, oiling, cleaning, supplies and parts to keep the equipment in proper operation except such parts made necessary by misuse, accidents, or negligence not caused by the Contractor or any of its Subcontractors.

§ 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. The Owner, a public body, is exempt from all applicable federal, state and local sales tax. Retail sales tax shall not be included in the contract amount. The Owner's Illinois Tax Exempt No. is _____, Expiration _____. To the extent tool, fuel, lumber and other end use or consumption items are not incorporated into the Project, Contractor shall promptly notify Owner in order to afford the Owner the opportunity to purchase these items directly. Should Owner promptly exercise its right to do so, it shall so notify Contractor. Owner shall be granted a credit against the Contractor's Contract for the direct costs incurred by Owner.

§ 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. The Contractor shall procure all certificates of inspection, use, occupancy, permits and licenses, and give all notices necessary and incidental to the due and lawful prosecution of the Work (or any phase or portion thereof) in sufficient time for occupation of the Project (or any phase or portion thereof) in accordance with the approved schedule for the Work. The costs of such procurement, payment and delivery are included within the Contract Sum.

§ 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.

§ 3.7.3 If the Contractor performs Work knowing it to be 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.

§ 3.7.4 **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 five (5) 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 an equitable adjustment 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 in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 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.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 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.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

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

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's review and approval a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at no less than monthly or more frequent intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Construction Schedule shall not be revised without the prior review and approval of the Owner and the Architect. The Construction Schedule is attached hereto and made a part hereof as **EXHIBIT**. The Contractor acknowledges that uninterrupted educational services must be maintained throughout the course of the Project. Contractor shall schedule the Work so as not to cause an interruption of Owner's provision of educational services. Contractor's interruption of the Owner's provision of educational services constitutes a material breach of the contract.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be 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, 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. The Owner's and Architect's silence to a submitted schedule that exceeds time limits current under the Contract Documents shall not relieve the Contractor of his obligations to meet those time limits, nor shall it make the Owner liable for any Contractor damages incurred as a result of increased construction time or not meeting those time limits. Similarly, the Owner's silence to a Contractor's schedule showing performance in advance of such time limits shall not create or infer any rights in favor of the Contractor for performance in advance of such time limits.

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

§3.10.4 Should the Contractor fail to adhere to the Construction Schedule, the Contractor shall furnish such additional labor and/or services, or work sufficient overtime as may be necessary to make progress conform to the Construction Schedule at no additional cost to Owner. Failure to adhere to the Construction Schedule, or failure to take steps to regain the Construction Schedule shall constitute a cause for the Owner to take over portions of the Work in accordance with § 2.4.1 or termination and a declaration of default under the terms of the Agreement.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect, and Owner and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed and as a condition precedent to final payment, record documents shall be certified by Contractor that they show complete and exact “as-built” conditions: stating sizes, kind of materials, vital piping and conduit locations and similar matters. All Shop Drawings for HVAC, mechanical, electrical, fire protection (sprinkler and alarm) and plumbing and all record drawings and all Drawings and Specifications for the Work shall be available in hard copy and in compatible approved electronic format.

§3.11.2 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 permit drawings shall be delivered to the Owner within thirty (30) days of final completion of the Work.

§ 3.11.3 Plans and sections of all concealed work, particularly concealed piping and conduit, and deviations from conditions shown on the Contract Drawings, shall be shown and dimensioned on the record drawings. Contractor shall develop layout drawings for all concealed work that is schematically indicated on Contract Drawings.

§ 3.11.4 The Contractor and his subcontractors shall maintain an accurate record of deviations and changes from the Contract Documents which occur in the work; shall indicate all such deviations and changes on “back grounds” of the Contract Documents; and shall turn over to the Owner upon completion of the work, all such documents and information, such as final shop drawings and sketches, marked prints and similar data indicating the as-built conditions. Plumbing, HVAC and Electrical Contractors shall record all changes or deviations in their work from what appears on the Contract Documents. The “back grounds” of the Contract Documents shall be furnished to the Contractor. The cost of recording and transferring the changes or deviations to the “back grounds” shall be included in the contract price for the respective work including work modified by Change Order. The as-builts shall be delivered by the Contractor to the Owner prior to the final acceptance of the Project and issuance of final payment.

§ 3.11.5 Each Mechanical and Electrical Contractor shall provide the Owner with three (3) copies of all operating manuals at the time of delivery of each major piece of equipment. The Contractor shall promptly provide the Owner with such copies.

§ 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.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which 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.

§ 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 requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing 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 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. 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, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the purpose of checking for conformance with the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.12.11 When professional certification of performance criteria of materials, systems, or equipment is required by the Contract Documents, the Contractor shall provide the person or party providing the certification with full information on the relevant performance requirements and on the conditions under which the materials, systems, or equipment will be expected to operate at the Project site. The certification shall be based on performance under the operating conditions at the Project site. The Architect shall be entitled to rely upon the accuracy and completeness of certifications.

§ 3.12.12 After the award of the Contract, a request by the Contractor for a substitution of materials or equipment in place of those specified in the Contract Documents will be considered only under one or more of the following conditions:

- (a) Required for compliance with local authority interpretation of code requirement or insurance regulations then existing as approved in writing by the Architect.
- (b) Unavailability if specified products through no fault of the Contractor.
- (c) Subsequent information discloses inability of specified precuts to perform property or to fit in designated space.
- (d) Manufacturer/Fabricator refused to certify or guarantee performance of secured product as required.
- (e) When it is clearly seen in the judgment of the Architect that a substitution would be substantially to the Owner's best interest, in terms of cost, time, or other considerations.

Substitution requests shall be written timely and accompanied by adequate technical and cost data. Requests shall include a complete description of the proposed substitution, name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data, and any other data or information necessary for a complete evaluation by the Architect.

§ 3.13.1 USE OF SITE

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

§3.13.2 Contractor agrees that it will take reasonable and necessary steps to minimize the impact of the Work on Owner's education programs, and on nearby and adjacent properties, whether owned by the Owner or other persons or entities. In that regard, prior to the start of construction at the Site the Architect and Owner shall establish a "Site Access and Control Plan;" which upon approval by the Owner shall constitute a Contract Document. The Site Access and Control Plan shall designate all means of ingress and egress to the Site, parking areas, storage areas, staging and temporary facilities and such other matters as the Architect, the Owner or any governmental authority deems relevant and shall be consistent with the other Contract Documents and permit the construction of the Work and execution of the Project as otherwise required hereby. The Contractor shall cause all persons at the Site to comply with the Site Access and Control Plan unless directed otherwise by the Architect, the Owner or any governmental authority, provided however, that notification or direction from a governmental authority in contradiction of the Site Access and Control Plan shall not become a basis for any claim of Change Order for any additional time or cost under the Contract.

§ 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 and patching shall be restored to the condition existing prior to the cutting, fitting and 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 such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§3.14.3 Costs resulting from ill-timed cutting and patching shall be borne by the party responsible and shall not be the basis for claims for compensation in excess of the Contract Sum.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall on a daily basis keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. Accumulated debris resulting from operations under each Contract shall be removed daily from premises by Contractor responsible for same; or shall be disposed

of as directed by the Owner or Architect. At completion of the Work, the Contractor shall remove all waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so without notice as required by Article 15 and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect 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 such 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 a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall waive any right of contribution and shall indemnify and hold harmless the Owner, the Architect, and their agents, employees, board members and directors from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees and economic or consequential damages, arising out of or occurring in connection with the performance or lack of performance of the Work to the extent that any such claim, damage, loss or expense is caused in whole or in part by any negligence or any act or omission of any Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

§3.18.1.2 To the fullest extent permitted by law, the Contractor shall indemnify, defend, protect and hold harmless the Owner, Architect, Architect's consultants and any other person or entity designated by Owner and the trustees, officers, directors, shareholders, board members, partners, representatives, agents, employees of any of them, (collectively, the "Indemnitees") from and against all losses, claims, causes of action, liabilities, injuries, damages and expenses, including but not limited to attorneys' and consultant fees and expenses, that the Indemnitees may incur by reason of any injury or damage sustained to any person or property (including, but not limited to, any one or more of the Indemnitees) arising out of, or occurring in connection with, the performance or lack of performance of the Work, breach of the Agreement by Contractor or the acts of omissions of the Contractor, its Subcontractors, sub-subcontractors, suppliers or anyone directly or indirectly employed by any of them or anyone for whose acts they may be liable regardless of whether or not such loss, claim, cause of action, liability, injury, damage or expense is caused in part by an Indemnitee. Such obligation shall not extend to losses, claims, causes of action, liabilities, injuries, damages or expenses to the extent such result from the negligence or willful misconduct of an Indemnitee. Nothing herein shall be deemed to abridge the rights, if any, of the Owner, Architect or the Contractor to seek contribution where appropriate.

§ 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 agrees to indemnify, defend and hold harmless the Indemnitees from and against any and all judicial actions (including reasonable attorneys' fees related to any such actions) and judgments incurred by the Indemnitees in connection with any labor related activity arising from the Contractor's performance of the Work. As used in these Contract Documents, "labor related activity" includes, but is not limited to, strikes, walk-outs, informational or organizational picketing, use of placards, distribution of hand-outs, leaflets or other similar acts at or in the vicinity of the Project or in the vicinity of any other facility where the Owner conducts business. The

Owner shall advise the Contractor if any labor related activity occurs and the Contractor shall arrange for the legal representation necessary to protect the Indemnitees' interest, provided such representation is approved by the Owner in advance.

§3.18.4 The obligations of the Contractor under this Article shall be deemed to include as an additional liability any injury or damage arising from the failure to use or from the misuse by any Contractor or any Contractor's agents or employees, of any scaffold, hoist, crane, ladder, support, temporary stairwell or other mechanical contrivance erected or constructed by any person or for any other kind of equipment owned, furnished or rented.

§3.18.5 The Contractor shall defend each Indemnitee, through counsel selected by such Indemnitee, which approval shall not be unreasonably withheld, in any action, proceedings or arbitration brought against the Indemnitee by reason of any such claim described in this Paragraph 3.18. The Contractor's obligation to defend an Indemnitee shall not extend to any action, proceeding or arbitration which asserts or alleges only that the injury to the claimant resulted solely from the negligence or misconduct of the Indemnitee and from no other cause or if a final judgment is obtained establishing that such injury to the claimant resulted solely from the negligence or willful misconduct of the Indemnitee, in which latter event Contractor's obligation to defend such Indemnitee shall cease upon the date such judgment becomes final, and such Indemnitee shall thereupon reimburse Contractor for its reasonable attorneys' fees and court costs in so defending such Indemnitee.

§3.18.6 The Contractor expressly agrees that he shall have sole and exclusive responsibility to maintain Site safety. The obligation of the Contractor under this Section 3.18.6 shall be construed to include, but not be limited to injury or damage upon failure to use or misuse by the Contractor, his agents and employees of any scaffold, hoist, crane, stay, ladder, support or other mechanical contrivance erected or constructed by any person or any or all other kinds of equipment, whether or not owned or furnished by the Contractor. The Contractor expressly agrees that it is exclusively responsible for compliance with OSHA and local regulations for construction and that it is the "employer" on this Project within the meaning of those regulations.

§3.18.7 If any claim or lien or stop-notice or any other demand for payment on security therefor, including claims or demands upon performance and payment bond sureties for this Contract, is made or filed with the Owner of the Project by any person claiming that Contractor or any Subcontractor or supplier or any other person claiming under any of them has failed to perform its contractual obligations or to make payment for any labor, services, trust fund contribution, materials, equipment, taxes or other item furnished or obligation incurred for, or in connection with, the Work, or if at any time there shall be evidence of such nonperformance or nonpayment of any claim or lien or stop-notice or other demand for which, if established, the Owner or the Project might become liable, then the Owner shall have the right to retain from any payment then due or thereafter to become due under the Contract or to be reimbursed by Contractor for an amount sufficient to (i) satisfy, discharge and defend against any such claim or lien or stop-notice or other demand, or any action or proceeding thereon which may be brought to judgment or award; (ii) make good any such nonpayment, nonperformance, damage, failure or default; and (iii) compensate the Owner for and indemnify it against any and all loss, liability, damages, cost and expense (including attorneys' and consultants' fees and costs) which may be sustained or incurred in connection therewith.

§ 3.18.8 Contractor shall ensure that its contracts with Subcontractors contain indemnification provisions requiring Subcontractor to provide to Owner, Owner's Representative, Architect, and Architect's Consultants the same indemnifications provided by Contractor to Owner, Architect, and Architect's Consultant pursuant to this Agreement. Owner shall be deemed to be a third party beneficiary of those agreements for purposes of enforcing the Contractor claim waiver and indemnification provision of this Agreement.

§ 3.18.9 If the Work is to be performed by trade unions, the Contractor shall make all necessary arrangements to reconcile, without delay, damage, or cost to the Owner and without recourse to the Architect, or the Owner, any conflict between the Contract Documents and any agreements or regulations of any kind at any time in force among members or councils which regulate or distinguish what activities shall not be included in the work of any particular trade. In case the progress of the work is affected by any undue delay in furnishing or installing any items or materials or equipment required under the Contract Documents because of the conflict involving any such agreement or regulation, other material or equipment of equal kind and quality may be provided by the Contractor at no additional cost to the Owner with written approval by the Owner.

§3.18.10 Should any Subcontractor, supplier or other person or Contractor or any of them make, record or file, or maintain any action on or respecting a claim of mechanic's lien, stop-notice, equitable lien, payment or performance

bond or a lis pendens, relating to the Work, the Contractor shall immediately and at its own expense procure, furnish and record appropriate statutory release bonds.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture 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.

§ 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, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 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. 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 will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, 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. However, unless otherwise agreed to by the Owner, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. Neither the Owner nor the Architect will have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate 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 Owner's separate contractors, if any shall be through the Construction Manager, if any, or Owner. Any direct communications between the Owner and the Contractor that affect the performance or administration of the Contract shall be made or confirmed in writing, with copies to the Architect, and any such communications that represent a modification of the Contract requirements shall be documented appropriately.

§ 4.2.5 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.

§ 4.2.6 The Architect with the Owner's prior consent has authority and responsibility to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority and responsibility to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such 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, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work. The Architect's exercise of rights under this paragraph shall not constitute the assumption of a duty for Site safety which is solely and exclusively that of each Contractor.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, for the purpose of checking for conformance the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness 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, unless otherwise specifically stated by the Architect, 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.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 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 which request shall indicate a preferred but non-binding time frame for the response to avoid adverse impacts on the Construction Schedule. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until fifteen (15) days after written request is made for them.

§ 4.2.12 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.

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

§ 4.2.14 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.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

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

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

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

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period 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. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable 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 previously selected if the Owner or Architect makes reasonable objection to such substitution. The Contractor shall not change a Subcontractor, person or entity previously selected unless the Owner agrees to such change.

§ 5.2.5 Upon request, the Contractor shall provide to the Owner and Architect an executed copy of all subcontracts, purchase orders and other agreements relating to the Work.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms 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, which the Contractor, by these 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. Notwithstanding anything contained to

the contrary in this Contract, any part of the Work performed for the Contractor or its Sub-contractor shall be pursuant to a written Subcontract between the Contractor and such Subcontractor, which shall be prepared on a master form of Subcontract which the Contractor has, prior to the execution of any such Subcontract (or Sub-subcontractor), submitted for approval to the Architect and Owner, which Subcontract shall contain provisions that (i) require that such portion of the Work be performed in accordance with the requirements of the Contract Documents; (ii) require timely submission of Subcontractor (or Sub-subcontractor, if requested by Owner) payment applications to enable the Contractor to apply for payment in accordance with the provisions of Article 9; (iii) waive all rights the subcontracting parties may have against one another or that the Subcontractor (or Sub-subcontractor) may have against the Owner for damages caused by fire or other perils covered by the property insurance described in Paragraph 11.3; (iv) recognize the rights of the Owner pursuant to the Contingent Assignment of Subcontracts under Subparagraph 5.4.1 and require the Subcontractor (upon notice by the Architect or Owner that the Architect or Owner has terminated the Multiple Prime Contractor pursuant to the terms of Article 14, and the Owner has elected, pursuant to Subparagraph 5.4.1 to retain the Subcontractor pursuant to the terms of its Subcontract with the Multiple Prime Contractor) to complete the unperformed obligations under such Subcontract and, if requested by the Owner, to enter into an appropriate agreement evidencing the fact that the Subcontractor is bound to the Owner under its Subcontract in the manner in which it has been bound to the Multiple Prime Contractor; (v) require the Subcontractor (and Sub-subcontractor) to carry and maintain insurance in accordance with the requirements of the Contract Documents; and (vi) contain no provisions inconsistent with any of the foregoing clauses (i) through (vi) of this Subparagraph 5.3.1.

§5.3.2 The Contractor shall not entertain bid proposals or enter into any subcontract, contract, agreement, purchase order or other arrangement ("Arrangement") for the furnishing of any portion of the materials, services, equipment or Work with any party or entity if such party or entity is an Affiliated Entity (as defined below) unless such Arrangement has been approved by the Owner, after full disclosure in writing by the Contractor to the Owner of such affiliation or relationship and all details relating to the proposed Arrangement. The term "Affiliated Entity" means any entity related to or affiliated with the Contractor, its employees, officers or directors or with respect to which the Contractor, its employees, officers or directors has direct or indirect ownership or control, including, without limitation, any entity owned in whole or part by the Contractor, its employees, officers or directors.

§ 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 for cause pursuant to Section 14.2 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 rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

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

~~§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner’s own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.~~

§ 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 report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report 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, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor 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. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor’s delays, improperly timed activities, damage to the Work or defective construction.

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

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 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 without notice as required by Article 15 and 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 subject to the Owner’s prior approval.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive

or order for a minor change in the Work. Any substitution for specified or previously approved materials, equipment, systems or procedures proposed by or through the Contractor shall be effective only upon issuance of a Change Order. The Contractor shall notify the Architect immediately upon becoming aware of the unavailability or improper nature of any previously approved materials, equipment, systems or procedures.

§ 7.1.4 For any changes in the Work requested by the Contractor involving more than a three (3) calendar day extension of time, the Contractor shall submit critical path schedules showing the original schedule and impact of the proposed change justifying the requested extension of time. The Owner may at its option refuse the extension of time and have the Contractor perform the work within the original schedule. Contractor shall provided all reasonable costs for completing the work including overtime and acceleration costs as part of its proposal for any Contractor initiated Change Order requesting a time extension.

§ 7.1.5 If a proposal for additional work is requested by the Owner which involves additional time, at the Owner's option, the Owner may extend the completion date for that portion of the work included in the change, without extending the Contract Time for the remainder of the work.

§ 7.1.6 Changes which involve credits to the Contract Sum shall include overhead, profit, general conditions, bond and insurance costs.

§ 7.2 CHANGE ORDERS

§ 7.2.1.1 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.

§ 7.2.1.2 Adjustments in the Contract Sum and the Contract Time shall be effected only by a properly executed Change Order. The Contractor and Owner agree that notwithstanding other provisions herein, the combined overhead and profit included in the total cost of any Change Order shall not exceed the following schedule:

- .1 For the Multiple Prime Contractor, for work performed by his own forces, ten percent (10%) of the cost.
- .2 For the Multiple Prime Contractor, for work performed by the Multiple Prime Contractor's subcontractor, five percent (5%) of the amount due to the subcontractor.
- .3 For each Subcontractor or Sub-Subcontractor involved, for work performed by that Subcontractor or Sub-Subcontractor's own forces, ten percent (10%) of the cost.
- .4 Total cost to Owner shall not exceed fifteen percent (15%), regardless of the number of levels of Subcontractors and Sub-Subcontractors involved.

§ 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 subject to the schedule in paragraph 7.2.1.2 :

- .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 7.3.7.

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

§ 7.3.5 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.

§ 7.3.6 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.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect as approved by the Owner shall determine the method and 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, an amount for overhead and profit as set forth in the Agreement. . 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 7.3.7 shall be limited to the following:

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

§ 7.3.8 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 with the Owner's approval 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.

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. The time of Substantial Completion is of the essence in this Agreement including, but not limited to, the time of Substantial Completion of each phase or portion of the Project, as set forth in the Construction Schedule.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined. The term "business day" shall mean a calendar day, exclusive of Saturdays, Sundays and federal holidays.

§ 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, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance and bonding required by Article 11 to be furnished by the Contractor and Owner and upon receipt of all permits. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. The Work shall be Substantially Complete to permit Owner to Occupy the Project for its intended use on or before date stipulated in the Contract Schedule.

§ 8.2.4 The Contractor shall reimburse the Owner for all Architect's fees for additional services necessitated by Contractor's failure to achieve Substantial Completion within the time established in the Agreement and for more than one inspection for each Substantial Completion and Final Completion.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an wrongful act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes (other than disputes limited to the work force of, or provided by the Contractor or its Subcontractors), fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control which could not and should not have been anticipated by it; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine. No such Change Order extending the Contract Time shall result in any increased payment to the Contractor for any other amounts of any nature, additional time being the Contractor's sole and exclusive remedy.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15. A copy of such Claim shall be delivered to the Owner and Architect. Contractor shall take all steps reasonably possible to minimize the impact of such delay on the Owner.

§ 8.3.3 In no event shall any delays or extensions of time be construed as cause or justification for payment of extra compensation to the Contractor. Any claims for an increase of the Contract Time shall be made in writing to the Architect within seven (7) days of the cause of delay.

§ 8.3.4 The Contractor shall not be entitled to recover from the Owner or Architect and hereby waives all rights which it or its Subcontractors or any other person may otherwise have to recover, any costs, expenses and damages of any nature which it or its Subcontractors or any other person, may suffer by reason of delay, or disruption in the performance of the Work or any portion thereof for any reason, the extension of Contract Time granted herein being the Contractor's sole and exclusive remedy.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§9.1.1 Notwithstanding anything to the contrary contained in the Contract Documents, the Owner may withhold any payment to the Contractor hereunder if and for so long as the Contractor fails to perform any of its obligations hereunder or otherwise is in default under any of the Contract Documents; provided, however that any such holdback shall be limited to an amount sufficient in the reasonable opinion of the Owner to cure any such default or failure of performance by the Contractor.

§ 9.2 VERIFIED SCHEDULE OF VALUES

Within twenty-one (21) days of Notice of Award, each Contractor shall submit to the Architect a verified Schedule of Values allocated to various portions of the Work, identifying by name and address all Contractors, Subcontractors and others furnishing materials indicating the amount due or to become due in accordance with 770 ILCS 60/5 and with each pay application certified payroll records of labor under the contract in accordance with the Prevailing Wage Act reporting requirements as set forth in 820 ILCS 130/5(a), before any payments are required to be made. The Schedule of Values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect or Owner may request.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 Subject to the other terms and conditions regarding payment contained in this Contract, no later than the 13th day of each month, each Contractor shall submit to the Architect and the Owner an itemized Application for Payment in draft form covering payments through the end of such month together with such substantiating data as the Owner and the Architect may require, including but not limited to draft lien waivers, sworn statements, individual labor time cards and information necessary to comply with the Prevailing Wage Act, billing records, invoices and requisitions and reflecting retainage as provided in this Contract. The Owner and the Architect shall review and comment upon such draft submittals. Then, not later than the 18th day of the month, the Contractor shall deliver to the Architect and the Owner its actual Application for Payment together with appropriate back-up. In addition, such Application for Payment shall contain a certification by each of the Trade Contractors that there are no written claims of mechanics' or materialmen's liens with respect to the Work, that all due and payable bills with respect to the Work have been paid to date or shall be paid from the proceeds of such Application for Payment, that there is no known basis for the filing of any mechanics' or materialmen's liens on the Work, and that waivers from all Subcontractors and Sub-Subcontractors constitute an effective waiver of lien under the laws of Illinois to the extent of payments that have been made or with respect to payments that will be made concurrently with such Application for Payment. The Architect shall not certify any payment for a period of at least five (5) days after receipt of an Application for Payment or until any and all objections to payment made by the Owner have been satisfactorily resolved. THE LAW REQUIRES THAT THE CONTRACTOR SHALL SUBMIT A SWORN STATEMENT OF PERSONS FURNISHING MATERIALS AND LABOR BEFORE ANY PAYMENTS ARE REQUIRED TO BE MADE TO THE CONTRACTOR, 770 ILCS 60/5. Owner intends to make payment in reliance upon the accuracy of the verified schedule of values.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 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 material supplier, unless such Work has been performed by others whom the Contractor intends to 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.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for

Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work. This paragraph shall not be construed as relieving each Contractor from the sole responsibility for all materials and work upon which payments have been made, or the restoration of any damaged or improperly placed Work or as a waiver of the right of the Owner to require the fulfillment of all the terms of the Contract.

§9.3.4 The first payment request shall be accompanied by Contractor's Partial Waiver of Lien only, for the full amount of the payment. Each subsequent monthly payment request shall be accompanied by the Contractor's Partial Waiver for the full amount of the payment, and by the partial Waivers of Subcontractors and Suppliers who were included in the immediately preceding payment request, to the extent of that payment. The above waivers requirements shall not affect the duty of the Contractor to pay each Subcontractor and for each Subcontractor to promptly pay each Subsubcontractor each month the amount to which he is entitled. Request for final payment shall be accompanied by Final Waivers of Lien from each Contractor, all Subcontractors and Suppliers of material who have not previously furnished such final waivers. Final waivers shall be for the full amount of the contract.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's actual Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part 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 and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, exercising professional skill and care, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. 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. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. 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, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material 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.

§9.4.3 All applications for payment shall be accompanied by affidavits from the Contractor and Subcontractors containing such information and in such form as approved by Owner. With respect to each payment being made to any Contractor, Subcontractor or Materialman, the application shall be accompanied by a Waiver of Lien, either partial and/or final, duly executed by the persons who receive the payment and as shown on such affidavits, which Waiver of Lien shall be in a form approved by Owner.

§9.4.4 Not later than the last day of each calendar month the Owner will make partial payments to Contractor, on the basis of duly verified and approved Contractor's applications and Estimate of Work performed during the preceding calendar month under the Contract, but to insure the proper performance of Contracts, the Owner will retain ten percent (10%) of the amount of each estimate. Owner reserves the right to reduce the amount of retainage at 50% completion subject to the review and approval of Architect and Surety; and at any time, the Owner reserves the right to restore retainage to a full ten percent (10%) of the total work performed and certified by Architect. No interest shall be paid on retention.

§9.4.5 All sworn Statements and Waivers shall be submitted along with payment request not later than the 18th day of the month for work and materials supplied through and including the end of the prior calendar month. If the waivers and affidavits are submitted within the time required above, the Architect will promptly and in no event later than sixty (60) days after the receipt thereof notify the Contractor of the Owner's objection to any waiver or affidavit furnished. The Contractor shall thereafter supply another waiver or affidavit to remedy the defects objected

thereto and in no event later than eighteen (18) days after the first of the month following the end of the preceding month for which the affidavit and waiver was applicable. Failure of the Contractor to supply all of the affidavits and waivers in form acceptable to the Owner within the time required above shall be grounds for withholding the entire progress payment for all work and material furnished for the prior month until the next progress payment would become due and all acceptable affidavits and waivers are furnished. Subject to the above conditions, no partial payments on a monthly progress payment application by Contractor will be made if all of the sworn statements and waivers are not acceptable to Owner and are not supplied to the Architect within the time required above.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor 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. 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, to such extent as may be necessary in the Architect'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 for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 actual or threatened damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- .7 repeated failure to carry out the Work in accordance with the Contract Documents; or
- .8 material failure to comply with any provision of the Contract Documents.

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

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers 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 Architect will reflect such payment on the next Certificate for Payment.

§9.5.4 If the Contractor disputes any determination by the Architect with regard to any Certificate of Payment, the Contractor shall nevertheless expeditiously continue to perform the Work.

§9.5.5 At the election of the Owner, in lieu of the Owner's remedy described in Subparagraph 9.5.1 above, a sufficient sum may be retained by the Owner as determined to be necessary for the purpose of setting aside a reasonable reserve to fully correct the loss or to protect the Owner from the loss for the items above set forth.

§9.5.6 The Owner shall not be deemed to be in breach of this Agreement by reason of the withholding of any payment pursuant to any provision of the Contract Documents provided the Architect has approved the Owner's action or the Work for which payment is being withheld shall have been rejected by any governmental authority.

§9.5.7 If, at any time, there should be evidence of any liens or claims for which, if established, the Owner will become liable and which would be chargeable to the Contractor, the Owner shall have the right to retain, out of any payment due or thereafter to become due an amount sufficient to completely indemnify the Owner against such lien or claim. Should there prove to be any such lien or claim after all payments are made, the Contractor shall repay the Owner all sums which the Owner may be compelled to pay in discharging such lien or claim, including any legal fees or other costs resulting from the lien or claim.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 The Architect's Certificate of Payment shall be processed and forwarded to the Owner within seven (7) days after the Architect's receipt of the Contractor's actual Application for Payment. The Owner shall make payment to the Contractor of the amount specified in the Certificate for Payment (which shall provide for all applicable retentions) on or before the 20th day of the following month. Such payment by the Owner shall not constitute approval or acceptance of any item of cost in the Application for Payment. The Owner shall make no payment until the Owner has received from the Contractor original sworn statements and lien waivers for the portion of the Work covered by such payments current through the period covered and trailing lien waivers for the portion of the Work covered by such payments current through the period covered and lien waivers from Sub-Subcontractors and Materialmen current through not more than 30 days prior to the period covered by such payment.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven 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 material and equipment 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 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, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment 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, 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 or relieve Contractor of any of its obligations hereunder with respect thereto.

§ 9.6.7 Contractor shall provide 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 and 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..

§9.6.8 Notwithstanding any other provision to the contrary, the Owner reserves the right to make payment directly to any Subcontractor of the Contractor (or jointly to the Contractor and Subcontractor) in such amounts as the Owner determines to protect the Owner's interest from a lien or asserted lien or other claim, and the amount owed the Contractor shall be reduced by the amount of any such payment by the Owner. Exercise of this option shall not create any claims or rights by any Subcontractor or any other party against the owner or the Owner's funds.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within ten (10) days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within ten (10) days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, 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 shut-down, delay and start-up, plus interest as provided for in the Contract Documents. Notwithstanding the foregoing, the Contractor shall not stop the Work, nor shall the Contract Time or Contract Sum be increased during the pendency of a bona fide dispute between the Owner, Architect and the Contractor.

§ 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 so that the Owner can occupy or utilize the Work for its intended use. The Work or phase of the Work will not be considered suitable for Substantial Completion review until all Project systems included in the Work are operational as designed and scheduled, all designated or required governmental inspections and certifications have been made and posted, designated instruction of the Owner's personnel in the operation of systems has been completed, and all final finishes within the Contract or phase of the Contract are in place. In general, the only remaining Work shall be minor in nature, so that the Owner could occupy the Project on that date and the completion of the Work by the Contractor would not materially interfere or hamper the Owner's normal business operations and/or use and enjoyment of the Project. As a further condition of Substantial Completion acceptance, the Contractor shall certify that all remaining Work will be completed within thirty (30) calendar days or as agreed upon following the Date of Substantial Completion. Upon the Owner's written consent, the Date of Substantial Completion of landscaping portions of the Work may be as mutually acceptable to the Owner and the Contractor. The Contractor shall secure and deliver to the Architect written warranties and guarantees from its Subcontractors, Sub-Subcontractors 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, whether performed by it or by its Subcontractors at any tier. If in the event Contractor does not complete remaining work within thirty (30) days of Substantial Completion, Owner shall give the Contractor written notice of the remaining Work to be completed. If the Contractor fails to complete the remaining work to be completed within seven (7) days of receipt of the written notice, the Owner reserves the right to complete the remaining Work in accordance with 2.4 without further notice to the Contractor. All costs incurred by Owner to complete punch list work therein shall be offset against Contractor's final payment.

§ 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 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 to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 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 such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 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 when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 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, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and

submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

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

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written 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 and, 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 terms and conditions of 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.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, 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 (6) a final Contractors sworn statement from the Contractor duly executed and acknowledged showing all Subcontractors to be fully paid, and similar final sworn statements from Subcontractors and, where appropriate, from Sub-Subcontractors, and final waivers of lien covering all Work and (7) such other information or documentation as Owner may require. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of 'call back 'warranties and special warranties required by the Contract Documents.

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

Each Contractor shall be solely and exclusively responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of its Work on the Contract. Neither the Owner nor the Architect is responsible for safety precautions and programs in connection with the performance of the Work under the Contract. Each Contractor shall be responsible for coordinating safety precautions and programs as between separate Contractors.

§ 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 or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall 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. If the Contractor fail to give such notices, or fail to comply with such laws, ordinances, rules, regulations and lawful orders, it shall be liable for and shall indemnify and hold harmless the Indemnitees as provided in Subparagraph 3.18.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) 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, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under 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. Prior to commencing construction at the Site, each Contractor shall submit to the Architect and Owner its written safety plan for the Site (the "Safety Plan") which Safety Plan shall set forth Contractor's proposed safeguards for the Work performed by its forces, coordination with other multiple primes and the safeguards for the Site such as, periodic safety meetings, safety inspections, posted rules and shall provide Architect and Owner with monthly updates to the Safety Plan evaluating the status thereunder. In addition, the Contractor shall immediately notify the Architect and Owner of any accidents, injuries or losses at the Site or associated with the Work but in any event within twenty-four (24) hours of such occurrence with a detailed written report within three (3) business days thereof.

§ 10.2.7.1 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.

§10.2.7.2 The Contractor shall protect adjoining property and shall provide barricades, temporary fences, and covered walkways or other devices required to protect the safety of passers-by, as required by prudent construction practices, local building codes, ordinances or other laws, or the Contract Documents.

§10.2.7.3 The Contractor shall maintain Work, materials and apparatus free from injury or damage from flood, rain, wind, storms, frost, cold or heat. If adverse weather makes it impossible to continue operations safely in spite of weather precautions, the Contractor shall cease the Work and notify the Architect and Owner of such cessation. The Contractor shall not permit open fires on the Project Site. In addition, the Contractor shall, at its sole cost and expense promptly repair any disturbance to walls, utilities, sidewalks, curbs, roadways and the property of third parties (including municipalities) resulting from the performance of the Work, whether by it or by its Subcontractors at any tier. The Contractor shall maintain streets in good repair and traversable and clean 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, written notice of such 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.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. 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 report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written 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. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. 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.

§ 10.3.3

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances 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 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§10.3.6 The Contractor shall review the Contract Document and promptly notify the Owner and the Architect in writing of any materials and systems shown or specified, which, to the best of Contractor's knowledge, contain hazardous materials.

§10.3.7 Except with the Owner's prior written consent, the Contractor shall not incorporate into the Work any materials or systems, which to the best of Contractor's knowledge, contain hazardous materials, even if it is shown or specified in the Contract Documents.

§ 10.4 EMERGENCIES

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.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's and Subcontractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.
- .9 Liability insurance shall include all major divisions of coverage and be on a comprehensive basis including:
 - a. Operations and Premises Liability (including Elevator Liability, if applicable);
 - b. Independent Contractor's Protective Liability;
 - c. Completed Operations and Products Liability (maintained in effect for a period of four (4) years after the date of final payment);
 - d. Personal Injury Liability;
 - e. Broad Form Property Damage Liability endorsement, with exclusions "X", explosions, "C", Collapse, and "U", underground deleted;
 - f. Contractual, including specified provisions for the Contractor's indemnification obligation hereunder;
 - g. Owned, non-owned and hired motor vehicles;
 - h. Broad form property damage, including completed operations;
 - i. Errors and Omissions Coverage (for design/build or performance portions of the Work, if applicable);
 - j. Blanket Contractual Liability (applicable to the Contractor's obligations under Paragraph 3.18);
 - k. Personal and Advertising Injury; and
 - l. Umbrella excess liability.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract

Documents. Contractor shall maintain, at its own expense, the following insurance coverages on an occurrence basis insuring the Contractor, his employees, and agents, and the Indemnities as required herein which insurance shall be placed with insurance companies rated at least "A", "VI" by Best's Key Rating Guide and shall incorporate a provision requiring the giving of written notice to Owner at least thirty (30) days prior to the cancellation or non-renewal of any such policies.

§11.1.2.1 Contractor's Liability Insurance The Contractor shall not commence Work under this Contract until all insurance required herein is obtained and approved by the Architect and Owner; similarly, nor shall the Contractor allow any Subcontractor to commence any portion of the Work.

§11.1.2.2 Comprehensive General Liability Insurance (including limited form contractual liability and completed operations, explosion, collapse and underground hazards), covering personal injury, bodily injury and property damages (including a 'subcontractor's exception to the 'your work' exclusion) in the amount of Two Million Dollars (\$2,000,000) covering personal injury, bodily injury and property damage.

§11.1.2.3 Comprehensive Automobile Liability Insurance, including hired and non-owned vehicles, if any, in the amount of One Million Dollars (\$1,000,000) covering personal injury, bodily injury and property damage.

§11.1.2.4 Workmen's Compensation Insurance in the amounts required by law.

§11.1.2.5 Contractual Liability: Bodily injury, Property Damage Two Million Dollars (\$2,000,000) each occurrence, combined single limit, annual aggregate.

§11.1.2.6 Each Contractor shall provide umbrella or excess of loss coverage for Employer's Liability, Comprehensive General Liability and Auto Liability of not less than Two Million Dollars (\$2,000,000) over primary insurance.

§11.1.2.7 Contractor shall submit valid certificates and, if requested, policies and endorsements, in form and substance satisfactory to Owner and Architect evidencing the effectiveness of the foregoing insurance policies along with original copies of the amendatory riders to any such policies to Owner for Owner's approval before Contractor commences the rendition of any services hereunder. In addition, Contractor shall attach to the certificate of insurance Best's current rating of said insurers.

§11.1.2.8 Contractor shall have the Owner and Architect added as additional insureds to the proceeding comprehensive General Liability Insurance policy, Auto and where necessary, Excess Policy. The insurance policies shall be endorsed to indicate that they are primary as respects the Owner and not contributory with any other insurance available to the Owner.

§11.1.2.9 To the fullest extent permitted by law, the Contractor hereby agrees to indemnify and hold the Owner and Architect and their directors, members, officers, agents, and employees (collectively the "Indemnities") harmless from all losses, claims, liabilities, injuries, damages and expenses, including attorneys' fees, that the Indemnities may incur by reason for any injury or damage sustained to any person or property (including, but not limited to any one or more of the Indemnities) arising out of or occurring in connection with the negligent performance or lack of performance by the Contractor of his duties and obligations under or pursuant to this Agreement.

§11.1.2.10 The Contractor hereby agrees to maintain the insurance described in subparagraphs 11.1.2.1 through 11.1.2. 5 herein during the term hereof and for such longer periods as may be set forth in said subparagraphs. If the Contractor fails to furnish and maintain the insurance required herein, the Owner may after written notice to Contractor purchase such insurance on behalf of the Contractor, and the Contractor shall pay the cost thereof to the Owner upon demand and shall furnish to the Owner any information needed to obtain such insurance.

§11.1.2.11 Contractor shall insure specifically the indemnity contained in subparagraph 11.1.2.9 of this Agreement, and shall include the Indemnities as additional insureds by causing amendatory riders or endorsements to be attached to the insurance policies described in subparagraphs 11.1.2.1 and 11.1.2.2. The insurance coverage afforded under these policies shall be primary to any insurance carried independently by the Indemnities. Said amendatory riders or endorsements shall indicate that as respects the Indemnities, there shall be severability of interests under said insurance policies for all coverages provided under said insurance policies.

§ 11.1.3 Failure of either the Architect or Owner to demand Certificates of Insurance and/or policies shall not constitute a waiver of the contractor's responsibility hereunder. Nor shall review and/or approval by either the Owner or Architect in any way relieve Contractor of its responsibility for furnishing sufficient amounts and coverages of insurance. Said endorsements or amendatory riders shall indicate that as respects said additional insureds, there shall be severability of interests under said insurance policies. The Certificates and amendatory riders or endorsements shall clearly indicate the specific coverage (including contractual liability for the Contractor's obligation under 3.18) and shall contain provision requiring the giving of written notice to Architect Manager and Owner at least thirty (30) days prior to the cancellation, non-renewal or material modification of any such policies, as evidenced by return receipt of United States Certified Mail.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents 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 during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

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

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If by the terms of this insurance any mandatory deductibles are required, or if the Owner elects to increase the mandatory deductible amounts or purchase insurance with voluntary deductible amounts, the Contractor shall be responsible for payment of the deductibles in the event of a paid claim. The Contractor shall carry whatever additional insurance he may deem necessary to protect himself against hazards not covered by the Builder's Risk Insurance, including theft.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit. Owner's insurance shall not cover portions of the Work stored off the site unless expressly agreed to by the Owner in writing. The off site Work to be insured must be clearly identified as Owned by Owner and the location is approved by Owner. This insurance will not cover equipment such as tools owned by mechanics or tools, sheds, hoists, canvasses, tarpaulins, mixers, scaffolding, shoring, apparatus, machinery staging and towers owned or

rented by Contractor and other similar items commonly referred to as construction equipment. At the Contractor's option and expense he may carry theft or other coverage insurance not included in the above coverage, on materials which are in his possession for this Project.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§11.3.1.6 Liability of Contractor and Subcontractor is not limited by purchase of insurance. Nothing contained in the insurance requirements of the Contract Documents is to be construed as limiting the liability of the Contractor, the liability of any Subcontractor of any tier, or the liability of the Architect, or either of their respective insurance carriers. Owner does not, in any way, represent that the coverages or limits of insurance specified is sufficient or adequate to protect the Owner, Contractor, Architect, or any Subcontractor's interest or liabilities, but are merely minimums. The obligation of the Contractor and every Subcontractor of any tier to purchase insurance shall not, in any way, limit their obligations to the Owner in the event that the Owner should suffer an injury or loss in excess of the amount recoverable through insurance, or any loss or portion of the loss which is not covered by either the Architect's, Contractor's or any Subcontractor's insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§11.3.6.1 SUBCONTRACTOR'S OBLIGATION TO OBTAIN INSURANCE. The Contractor shall require that every Subcontractor of any tier obtain insurance of the same character as the Contractor, naming the same Additional Insureds as the insurance required of the Contractor. Before the commencement of any Work by any Subcontractor of any tier, the Contractor shall obtain and furnish the Owner and Architect with Certificates of Insurance naming the Owner, Architect, and all of their officers, directors, commissioners, officials, employees, consultants, volunteers and agents, as Additional Insureds on the insurance required to be obtained by each Subcontractor of any tier. Failure to submit such a certification signed by each Subcontractors shall be grounds to withhold payment in full or in part.

§11.3.6.2 Certificate of Insurance Requirements. All Certificates of Insurance and all insurance policies required to be obtained the Contractor and every Subcontractor of any tier shall provide that coverages afforded under the policies will not be canceled, reduced or allowed to expire without at least thirty (30) days prior written notice given to the Architect and Owner. If any of the insurance coverages are required to remain in force after final payment, all additional Certificates evidencing continuation of such coverage shall be submitted with the final application for payment.

§11.3.6.3 Failure to Comply with Insurance Reporting Provisions. All insurance required of the Contractor and all Subcontractors of any tier shall provide that any failure to comply with reporting provisions of the policies shall not affect coverage provided to the Owner, its officers, directors, commissioners, officials, employees, consultants, volunteers or agents.

§11.3.6.4 Insurance Obtained Shall be Primary Insurance. All insurance required the Contractor and all Subcontractors of any tier shall state that the coverage afforded to the Additional Insureds shall be primary insurance of the Additional Insureds with respect to claims arising out of operations performed by or on their behalf. If the Additional Insureds have other insurance which is applicable to the loss, it shall be on an excess or contingent basis.

§ 11.3.7 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, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, 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 covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, 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 of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance 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 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 Each Contractor, within ten (10) days after receiving notice of the award, shall furnish a Performance Bond and a Payment Bond in the full amount of the Contract agreeing to perform the work and fulfill all obligations in

accordance with all of the provisions of the contract with a Surety rated no less than A, VI, by Best's Insurance Guide Key.

§ 11.4.2 Before commencing the Work, Contractor shall submit to Owner and Architect the bonds. 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.

§ 11.4.3 The Performance Bond and Labor and Material Bonds shall be executed in conformity with American Institute of Architects, Doc. A311 (February, 1970 Edition) or forms approved by Owner. A certified copy of the power of attorney from the surety company stating that the person executing the bond is duly authorized by the Surety to execute the bond shall accompany the bond.

§ 11.4.4 Whenever the Contractor shall be and is declared by the Owner to be in default under the Contract, the surety of the Contractor shall be responsible to make full payment to the Owner and Architect any and all extra work and accounting and other expenses incurred by the Owner and Architect as a result of a Contractor's default and to pay the Owner all attorneys' fees in addition to paying additional construction management expenses, testing, consulting, engineering, accounting and court costs incurred by Owner as a result of a Contractor's default and in protecting the Owner's right under the agreement with the Contractor to remedy the Contractor's default or honor the terms of the Performance Bond. The provisions of this clause for charging of costs, fees and extra work against the Contractor shall apply to Subparagraphs 2.4, 14.2.1 and 14.2.2 as though expressly included therein.

§ 11.4.5 It shall be the duty of the Surety to give an unequivocal notice in writing to Owner within ten (10) days after receipt of a declaration of default of the Surety's election either to remedy the default or defaults promptly or to perform the contract promptly or to pay to Owner the penal sum of the bond, time being of the essence. In said notice of election, the Surety shall indicate the date on which the remedy or performance will commence, and it shall then be the duty of the Surety to give prompt notice in writing to Owner immediately upon completion of (a) the remedy and/or correction of each default, (b) the remedy and/or correction of each item of condemned Work, (c) the furnishing of each omitted item of Work, and (d) the performance of the contract. The Surety shall not assert solvency of its Principal or its Principal's denial of default as justification for its failure to give notice of election or for its failure to promptly remedy the default or defaults or perform the contract. If the Surety reasonably requires additional time to investigate the declaration of default, Surety shall within the foresaid ten (10) days so notify the Owner. In such case, the Owner may, without prejudice to its rights under the performance bond, continue construction of the Work with a temporary completing contractor on a time and material basis and charge the costs of such work to the Surety. Upon completion of the Surety's investigation, the Surety may exercise its rights otherwise contained herein.

§ 11.4.6 As the Work is completed by a completing contractor engaged by Owner in accordance with the terms of the Contract Documents, to the extent that any portion of the Contract Price remains owing after setoff, Owner shall pay completing Contractor in accordance with the Schedule of Values as certified by the Architect. Upon the completion of the Work pursuant to the Agreement, if any funds remain due on said Contract, the same shall be paid to Surety. Upon completion of the Work pursuant to the Agreement, if there is any shortfall in the funds remaining due under said Contract, Surety shall make the Owner whole to the extent of the penal sum of the bond.

§ 11.4.7 The said Principal and Surety further agree as part of this obligation to pay all such damages of any kind to person or property that may result from a failure in any respect to perform and complete said contract including, but not limited to, all repair and replacement costs necessary to rectify construction error, all architectural and engineering costs and fees, all consultant fees, construction management fees and expenses, all testing and laboratory fees, and all legal fees and litigation costs incurred by Owner as a result of the default.

§ 11.4.8 The Surety agrees that other than as is provided in this Bond it may not demand of Owner that Owner shall (a) perform any thing or act, (b) give any notice, (c) furnish any clerical assistance, (d) render any service, (e) furnish any papers or documents, or (f) take any other action of any nature which is not required of Owner to be done under Contract Documents. Any provisions contained within the bonds creating any condition precedent for the Owner not otherwise required herein, or abrogating owner's rights or remedies otherwise available in contract, law, or equity are void.

§ 11.4.9 In the event the Surety shall make any assignment for the benefit of creditors or commit any act of bankruptcy, or if it shall be declared bankrupt, or if it shall file a voluntary petition in bankruptcy, or shall in the

opinion of the Owner be insolvent the Contractor agrees forthwith upon request of the Owner to furnish and maintain other corporate surety with respect to said Bonds satisfactory to the Owner. No further payment shall be deemed due nor shall be paid to the Contractor until new performance and payment bonds are in place.

§11.4.10 In case of any conflict between any provision of the Performance Bond and the Contract Documents, the provisions of the Contract Documents shall prevail.

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 Owner's or 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 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 Owner or Architect has not specifically requested to examine prior to its being covered, the Owner or 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, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after 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 **two (2) 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 an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. 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 2.4.

§ 12.2.2.2 The **two (2)-year** call back warranty 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 The **two (2) -year** call back warranty period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2 provided, however, that the **two year period** shall be extended for an additional **two years** for those portions of the Work that fail.

§ 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, whether completed or partially completed, of the Owner or separate contractors 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 **two (2)-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. Approval of any material or Work at any time during construction will not prevent its subsequent rejection for failure to conform to the requirements of the Contract Documents. No election by the Owner to correct Work shall constitute a waiver of any obligation of a surety upon its performance and labor and material payment bonds.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1.1 GOVERNING LAW

The Contract shall be governed by the law of the Illinois. The Work shall comply with all applicable laws, statutes, ordinances, codes, rules, regulations or orders during its performance and completion. Historical lack of enforcement of any local law shall not constitute a waiver of the Contractor's responsibility for compliance with such law in a manner consistent with the Contract Documents unless and until the Contractor has received written consent for the waiver of such compliance from the Owner and the agency responsible for the local law enforcement.

§13.1.2 PREVAILING WAGE ACT

The Contractor shall pay not less than the prevailing rate of wages as established, to all laborers, workmen, and mechanics in the performance of the Work under this Contract in accordance with "An Act regulating wages of laborers, mechanics and other workmen employed under contracts for Public Works." 820 ILCS 130/1 et seq.

§13.1.3 HUMAN RIGHTS ACT

To the extent required by law, Contractor shall comply with the terms and procedures of the Illinois Human Rights Act. 775 ILCS 10/0.01 et seq. To the extent required by law Contractor agrees as follows:

.1 That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, marital status, national origin or ancestry, age, physical or mental handicap unrelated to ability, or an unfavorable discharge from military service, and further that it will examine all job classifications to determine if minority persons or women are under-utilized and will take appropriate affirmative action to rectify any such under-utilization.

.2 That, if it hires employees in order to perform this contract or any portion thereof, it will determine the availability (in accordance with the Department's Rules and Regulations) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not under-utilized.

.3 That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, marital status, national origin or ancestry, age, physical or mental handicap unrelated to ability, or an unfavorable discharge from military service.

.4 That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the contractor's obligations under the Illinois Human Rights Act and the Department's Rules and Regulations. If any such labor organization or representative fails or refuses to cooperate with the Contractor in its efforts to comply with such Act and Rules and Regulations, the Contractor will promptly so notify the Department and the contracting agency and will recruit employees from other sources when necessary to fulfill its obligations thereunder.

.5 That it will submit reports as required by the Department's Rules and Regulations, furnish all relevant information as may from time to time be requested by the Department or the contracting agency, and in all respects comply with the Illinois Human Rights Act and the Department's Rules and Regulations.

.6 That it will permit access to all relevant books, records, accounts and work sites by personnel of the contracting agency and the Department for purposes of investigation to ascertain compliance with the Illinois Human Rights Act and the Department's Rules and Regulations.

.7 That it will include verbatim or by reference the provisions of this clause in every subcontract it awards under which any portion of the contract obligations are undertaken or assumed, so that such provisions will be binding upon such subcontractor. In the same manner as with other provisions of this Contract, the Contractor will be liable for compliance with applicable provisions of this clause by such Subcontractors; and further it will promptly notify the contracting agency and the Department in the event any Subcontractor fails or refused to comply therewith. In addition, the Contractor will not utilize any Subcontractor declared by the Illinois Human Rights Commission to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.

§13.1.4 NOT BARRED

The Contractor by submitting its bid certifies that the Contractor is not barred from bidding on the contract as a result of a conviction for either bid-rigging or bid rotating. 720 ILCS 5/33/E-11.

§13.1.5 DRUG AND TOBACCO FREE WORKPLACE

The Contractor by submitting its bid certifies that it will provide a drug free and tobacco free workplace and that it is in compliance with the requirements of the Drug Free Workplace Act, 30 ILCS 580.1 et seq.

§13.1.6 SEXUAL HARASSMENT POLICY

The Contractor by submitting its bid certifies that it has a written sexual harassment policy which includes (i) the illegality of sexual harassment; (ii) a definition of sexual harassment; (iii) a description of sexual harassment, utilizing examples; (iv) an internal complaint process including penalties; (v) the legal recourse, investigative and complaint process through the Illinois Department of Human Rights; (vi) directions on how to contact the Department and Commission; and (vii) protection against retaliation for exercising rights under the policy in accordance with 775 ILCS 5/2-105(A)(4).

§13.1.7 The invalidity of any covenant, restriction, condition, limitation, or any other part or provision of the contract documents shall not impair or affect in any manner the validity, enforceability, or effect of the remainder of the contract document.

§13.1.8 CRIMINAL BACKGROUND CHECK To the extent that any person employed by Contractor or its Subcontractors shall have direct daily contact with students in the college, each such employee shall submit to a Criminal Background Check and the Statewide Sex Offender Data Base at Owner expense. Under no circumstances shall any Contractor or Subcontractor employ any person on this Project which is barred from student contact pursuant to 105 ILCS 5/10-21.9.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE All notices given under the Contract Documents shall be in writing and shall be deemed properly served upon receipt if delivered in person, the next business day if delivered by recognized overnight courier or, three (3) days after deposit in the United States mail, if sent postage prepaid by United States registered or certified mail, return receipt requested, addressed as set forth on the cover page of the Contract or to such other address or addresses as any party entitled to receive notice hereunder shall designate to all other parties in the manner provided herein for the service of notice. .

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 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.

§ 13.4.2 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 there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. 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 (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 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 13.5.1, 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 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 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 and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 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.

§ 13.5.5 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.

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

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing in accordance with 815 ILCS 205/2..

§ 13.7 TIME LIMITS ON CLAIMS

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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 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, 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;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.3 If one of the reasons described in Section 14.1.1 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of ninety (90) consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor 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 seven additional days' written 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 if the Contractor

- .1 refuses or fails to promptly supply enough properly skilled workers to diligently prosecute the Work or provide proper materials for the Work;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents ,or
- .5 the Contractor shall institute proceedings or consent to proceedings requesting relief or arrangement under the Federal Bankruptcy Act or any similar or applicable federal or state law, or if a petition under any federal or state bankruptcy or insolvency law is filed against the Contractor and such petition is not dismissed within sixty (60) days from the date of said filing, or if the Contractor admits in writing his inability to pay his debts generally as they become his due, or if he makes a general assignment for the benefit of his creditors, or if a receiver, liquidator, trustee or assignee is appointed on account of his bankruptcy or insolvency;
- .6 Contractor abandons the Work, submits a sworn statement which is intentionally false, or a mechanic's lien or notice of lien is filed against any part of the Work or the site of the Project.
- .7 the Contractor disregards any laws, statutes, ordinances, rules, regulations or orders of a governmental body or public or quasi-public authority having jurisdiction of the Work or the site of the Project; or
- .8 the Owner without prejudice to any right or remedy available to the Owner under the Contract Documents or at law or in equity, may, after giving the Contractor and the Surety under the Performance Bond and under the Labor and Material Payment Bond described in Paragraph 11.4 seven (7) days' written notice, terminate the employment of the Contractor. If requested by the Owner, the Contractor shall remove any part or all of his equipment, machinery and supplies from the site of the Project within seven (7) days from the date of such request, and in the event of the days from the date of such request, and in the event of the Contractor's failure to do so, the Owner shall have the right to remove and store such equipment, machinery and supplies at the Contractor's expense. In case of such termination, the Contractor shall not be entitled to receive any further payment for Work performed by the Contractor through the date of termination.

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

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 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 a detailed accounting 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. Such costs shall include (but not be limited to) the cost of any additional architectural, managerial and administrative services required thereby, any costs incurred in retaining another Contractor or other Subcontractors, any additional interest or fees which the Owner or Architect must pay by reason of a delay in completing of the Work, attorneys' fees and expenses, and any other damages, costs and expenses the Owner may incur by reason of completing the Work or any delay thereof. 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 as described in 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 written 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 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination..

ARTICLE 15 CLAIMS AND DISPUTES DURING CONSTRUCTION

§ 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, payment of money, or other relief with respect to the terms of the Contract during the course of construction. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract during the course of construction. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS DURING CONSTRUCTION

Claims during the course of construction by Contractor must be initiated by written notice to the other party and to the Architect as Initial Decision Maker. Claims by Contractor must be initiated within 21 days after occurrence of

the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If 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 scheduled construction.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims during the course of construction, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten 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 Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker 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 days after receipt of such 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 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, 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.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract upon agreement of the parties shall be subject to mediation. All parties shall carry on the Work and perform their duties during any mediation proceedings, and the Owner shall continue to make payments as required by the Contract Documents.

§ 15.3.2 Unless agreed to otherwise by the parties, Mediation 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. If mediation is agreed to by the parties binding dispute resolution shall be stayed pending mediation for a period of 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.

§ 15.3.3 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

§ 15.4.1.1 During construction and after construction, at the sole discretion of the Owner, all claims, disputes and other matters in question between any of the Architect, Owner, Contractor, Subcontractor or any Material Supplier arising out of, or relating to, agreements to which two or more of said parties are bound, or the Contract Documents or the breach thereof, except as provided in subparagraph 2.6.19 with respect to the Architect's decisions on matters relating to aesthetic effect, shall be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtain, as modified herein. At least one member of the arbitration panel shall be an attorney whose practice is primarily focused on the construction industry. In any such arbitration, the arbitrator shall make separate findings as to liability and the amount of damages with respect to each party to the arbitration to the extent any liability or responsibility for damages exists. The Architect, Subcontractors and Material Suppliers who have an interest in the dispute shall be joined as parties to the arbitration. The Owner's contracts with the Architect and the Contractor's subcontracts with the Subcontractors and Material Suppliers, shall require such joinder. The arbitrator shall have authority to decide all issues between the parties including but not limited to claims for extras, delay and liquidated damages, matters involving defects in the Work, right to payment, whether matters decided by the Architect involve aesthetic effect and whether the necessary procedures for arbitration have been followed. The foregoing agreement to arbitrate and any other agreement to arbitrate with an additional person or persons, duly consented to by the parties, shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrator shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§15.4.1.2 Any Claim arising out of or related to the Contract, except those waived as provided for in Subparagraph 9.10.5, may, with the Owner's consent, be subject to arbitration. Prior to arbitration, the parties may, with the

Owner's consent, endeavor to resolve disputes by mediation unless otherwise agreed in writing, all parties shall carry on the work and perform their duties during any mediation or arbitration proceedings.

§15.4.1.3 In addition to the other rules of the American Arbitration Association applicable to any arbitration hereunder, the following shall apply:

.1 Promptly upon the filing of the arbitration each party shall be required to set forth in writing and to serve upon each other party a detailed statement of its contentions of fact and law;

.2 All parties to the arbitration shall be entitled to reasonable discovery procedures and to the scope of discovery applicable to civil actions under Illinois law, including the provisions of the Code of Civil Procedure and Illinois Supreme Court rules applicable to discovery. Such discovery shall be noticed, sought and governed by those provisions of Illinois law;

.3 The arbitration shall be commenced and conducted as expeditiously as possible consistent with affording reasonable discovery as provided herein. Similarly, the scope of discovery, and the extent of proceedings hereunder relating to discovery, shall be consistent with the parties' intent that the arbitration be conducted as expeditiously as possible.

.4 The arbitrator(s) shall apply the law of Illinois and the terms and conditions of the Contract Documents and this Agreement.

.5 These additional rules shall be implemented and applied by the arbitrator(s).

§ 15.4.1.4 Claims and Timely Assertion of Claims. In the event of any litigation or arbitration between the parties hereunder, all attorneys' fees and other costs incurred shall be borne by the party determined to be at fault and in the event that more than one party is determined to be at fault, shall be allocated equitably by the court or arbitrator.

§ 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 foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, 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 Either party, at its sole discretion, 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.

§ 15.4.4.3 The Owner, Architect, and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

A201-2007 - General Conditions -Without CM 2011 08 19 draft

HEALTH AND SAFETY REQUIREMENTS - ASBESTOS
SECTION 00 73 19.01

1 Summary:

1.1 Section contains special requirements pertaining to asbestos.

2 Health and Safety Requirements:

2.1 Contractor shall ensure that all work under the Contract is performed in compliance with all applicable regulations including, but not limited to:

2.1.1 Asbestos Hazard Emergency Response Act, as amended.

2.1.2 40 CFR 763, 40 CFR 61 and other US EPA Rules and Regulations

2.1.3 Illinois Commercial and Public Building Asbestos Abatement Act (225 ILCS 207/)

2.1.4 Asbestos Abatement for Public and Private Schools and Commercial and Public Buildings in Illinois (77 Ill. Adm. Code 855)

2.1.5 Other rules and regulations promulgated by the Illinois Department of Public Health, municipalities and localities.

2.2 No asbestos or asbestos containing materials shall be used in the Work.

2.3 The Contractor shall certify compliance by submitting the competed form on the following page within SEVEN (7) days of occupancy or use of any portion of the building by the Owner. An duplicate original copy of the certification shall be submitted with the closeout documents.

2.4 Ensure that modifications, patching or demolition required by the work will not disturb asbestos containing materials or release asbestos fibers into the school or environment.

2.5 Suspected asbestos containing materials which have been tested are indicated on the inspection report, a copy of which is available for viewing at the office of the Owner.

2.6 Prior to work commencing on suspect materials verify that all materials which might be disturbed during the course of the work do not contain asbestos.

3 Testing and Abatement:

3.1 If a suspect material has not been tested, the testing will be done by the Owner. Costs for testing will be paid for by the Owner.

3.2 If the material tested is found to contain asbestos work will not proceed until an abatement procedure in conformance with the Illinois Asbestos Abatement Act has been completed. Abatement work will be by the Owner. Costs for the work will be paid by the Owner.

3.3 There will be no additional costs or extensions of contract time due to delays of seven (7) calendar days or less as a result of testing or abatement procedures.

4 Alternative Procedures:

4.1 Work may be relocated or otherwise changed with the Owner's approval in order to avoid disturbing the asbestos containing materials. There will be no additional costs to the Owner for this work.

End of Section
(1 page follows)

**ASBESTOS FREE CONSTRUCTION CERTIFICATION
MCHENRY COUNTY COLLEGE**

Project: _____ Building: _____

Project Address: _____, _____, IL

Architect's Project Number: _____

The undersigned hereby certifies that no asbestos or asbestos containing materials have been used in, or are contained in products used for, the construction of this project through the date of this certification.

Respectfully submitted, this _____ day of _____ 20____

(Name of Firm)

By: _____

Printed Name: _____

Title: _____

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

Notary Public _____

My Commission expires: _____

If the firm is a corporation, attach a sworn statement signed by an executive officer of the corporation stating that the individual signing this certification is authorized to bind this corporation thereby, and affix the corporate seal.

1 Illinois Department of Labor Requirements:

- 1.1 This contract constitutes the construction of a “public work,” within the meaning of the Illinois Prevailing Wage Act, 820 ILCS 130/.01 et seq. (“the Act”). The Act requires contractors and subcontractors to pay laborers, workers and mechanics performing services on public works projects no less than the “prevailing rate of wages” (hourly cash wages plus fringe benefits) in the county where the work is performed. For information regarding current prevailing wage rates, as ascertained by the Illinois Department of Labor. The Contractor and each subcontractor rendering services under this contract shall comply with all requirements of the Act, including but not limited to, all wage, notice and record keeping duties, and shall include in Bids the cost for compliance with the Act
- 1.2 A copy of the Illinois Department of Labor Prevailing Wages for location of the project, current as of the date of the Documents, is included at the end of this Section. As changes are made to the prevailing wages, the Contractor and each subcontractors shall conform to the changes and shall determine when such changes are made. No additional costs shall be incurred by the Owner as a result of changes in the prevailing wage.
- 1.3 The Contractor and each subcontractor shall comply with all record-keeping requirements of the Illinois Prevailing Wage Act, including, but not limited to, (1) make and keep, for a period of not less than 3 years, records of all laborers, mechanics, and other workers employed by them on the project; the records shall include each worker's name, address, telephone number when available, social security number, classification or classifications, the hourly wages paid in each pay period, the number of hours worked each day, and the starting and ending times of work each day; and (2) shall submit monthly a certified payroll in conformance with law, and in the form and manner specified by the Contract Documents, or otherwise as acceptable to the Owner.
- 1.4 The Contractor and each subcontractor shall comply with the Employment of Illinois Workers on Public Works Act (30 ILCS 570). All record keeping requirements are the obligation of the Contractor and Subcontractors.
- 1.5 The Contractor and each subcontractor shall indemnify and hold harmless both the Owner, Architect and their respective officers, employees and agents, from any and all costs incurred, directly or indirectly, by the Owner or Architect in responding to or complying with demands made by the Illinois Department of Labor, or an aggrieved employee of the Contractor or subcontractor, or any third party, as a result of any claimed violation of or inquiry regarding these Acts. Any such cost incurred by the Owner or Architect may be deducted from the Contract Sum. It is the intention that the Owner and Architect shall suffer no time loss or other additional expenses in complying with any inquiry made with regard to these Acts.

End of Section
(5 pages follow)

McHenry County Prevailing Wage for July 2013

(See explanation of column headings at bottom of wages)

Trade Name	RG	TYP	C	Base	FRMAN	M-F>8	OSA	OSH	H/W	Pensn	Vac	Trng
ASBESTOS ABT-GEN		ALL		36.200	36.700	1.5	1.5	2.0	12.78	9.020	0.000	0.500
ASBESTOS ABT-MEC		BLD		34.160	36.660	1.5	1.5	2.0	10.82	10.66	0.000	0.720
BOILERMAKER		BLD		43.450	47.360	2.0	2.0	2.0	6.970	14.66	0.000	0.350
BRICK MASON		BLD		40.680	44.750	1.5	1.5	2.0	9.550	12.00	0.000	0.970
CARPENTER		ALL		42.520	44.520	1.5	1.5	2.0	13.29	12.76	0.000	0.630
CEMENT MASON		ALL		41.550	43.550	2.0	1.5	2.0	9.500	13.76	0.000	0.500
CERAMIC TILE FNSHER		BLD		34.440	0.000	2.0	1.5	2.0	9.700	6.930	0.000	0.610
COMMUNICATION TECH		BLD		36.360	38.460	1.5	1.5	2.0	12.27	10.25	0.000	0.640
ELECTRIC PWR EQMT OP		ALL		36.610	49.750	1.5	1.5	2.0	5.000	11.35	0.000	0.270
ELECTRIC PWR GRNDMAN		ALL		28.310	49.750	1.5	1.5	2.0	5.000	8.780	0.000	0.210
ELECTRIC PWR LINEMAN		ALL		43.830	49.750	1.5	1.5	2.0	5.000	13.58	0.000	0.330
ELECTRIC PWR TRK DRV		ALL		29.310	49.750	1.5	1.5	2.0	5.000	9.090	0.000	0.220
ELECTRICIAN		ALL		43.080	47.380	1.5	1.5	2.0	12.06	11.41	0.000	0.540
ELEVATOR CONSTRUCTOR		BLD		49.080	55.215	2.0	2.0	2.0	11.88	12.71	3.930	0.600
FENCE ERECTOR	E	ALL		34.840	36.840	1.5	1.5	2.0	12.86	10.67	0.000	0.300
FENCE ERECTOR	S	ALL		44.950	47.200	2.0	2.0	2.0	8.890	17.69	0.000	0.400
GLAZIER		BLD		39.500	41.000	1.5	2.0	2.0	11.99	14.30	0.000	0.840
HT/FROST INSULATOR		BLD		45.550	48.050	1.5	1.5	2.0	10.82	11.86	0.000	0.720
IRON WORKER	E	ALL		40.750	42.750	2.0	2.0	2.0	13.20	19.09	0.000	0.350
IRON WORKER	S	ALL		44.950	47.200	2.0	2.0	2.0	8.890	17.69	0.000	0.400
IRON WORKER	W	ALL		35.090	36.840	2.0	2.0	2.0	8.340	22.19	0.000	0.500
LABORER		ALL		37.000	37.750	1.5	1.5	2.0	12.97	9.930	0.000	0.500
LATHER		ALL		42.520	44.520	1.5	1.5	2.0	13.29	12.76	0.000	0.630
MACHINIST		BLD		43.920	46.420	1.5	1.5	2.0	6.760	8.950	1.850	0.000
MARBLE FINISHERS		ALL		29.700	0.000	1.5	1.5	2.0	9.550	11.75	0.000	0.620
MARBLE MASON		BLD		39.880	43.870	1.5	1.5	2.0	9.550	11.75	0.000	0.730
MATERIAL TESTER I		ALL		27.000	0.000	1.5	1.5	2.0	12.97	9.930	0.000	0.500
MATERIALS TESTER II		ALL		32.000	0.000	1.5	1.5	2.0	12.97	9.930	0.000	0.500
MILLWRIGHT		ALL		42.520	44.520	1.5	1.5	2.0	13.29	12.76	0.000	0.630
OPERATING ENGINEER		BLD 1		46.100	50.100	2.0	2.0	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		BLD 2		44.800	50.100	2.0	2.0	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		BLD 3		42.250	50.100	2.0	2.0	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		BLD 4		40.500	50.100	2.0	2.0	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		BLD 5		49.850	50.100	2.0	2.0	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		BLD 6		47.100	50.100	2.0	2.0	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		BLD 7		49.100	50.100	2.0	2.0	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		HWY 1		44.300	48.300	1.5	1.5	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		HWY 2		43.750	48.300	1.5	1.5	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		HWY 3		41.700	48.300	1.5	1.5	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		HWY 4		40.300	48.300	1.5	1.5	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		HWY 5		39.100	48.300	1.5	1.5	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		HWY 6		47.300	48.300	1.5	1.5	2.0	16.60	11.05	1.900	1.250
OPERATING ENGINEER		HWY 7		45.300	48.300	1.5	1.5	2.0	16.60	11.05	1.900	1.250
ORNAMNTL IRON WORKER	E	ALL		42.900	45.400	2.0	2.0	2.0	13.11	16.40	0.000	0.600
ORNAMNTL IRON WORKER	S	ALL		44.950	47.200	2.0	2.0	2.0	8.890	17.69	0.000	0.400
PAINTER		ALL		40.880	42.880	1.5	1.5	1.5	9.650	8.200	0.000	1.250
PAINTER SIGNS		BLD		33.920	38.090	1.5	1.5	1.5	2.600	2.710	0.000	0.000
PILEDRIVER		ALL		42.520	44.520	1.5	1.5	2.0	13.29	12.76	0.000	0.630
PIPEFITTER		BLD		46.000	49.000	1.5	1.5	2.0	9.000	15.85	0.000	1.680
PLASTERER		BLD		40.250	42.670	1.5	1.5	2.0	10.85	10.94	0.000	0.550
PLUMBER		BLD		44.500	47.500	1.5	1.5	2.0	11.05	12.40	0.000	1.700
ROOFER		BLD		38.350	41.350	1.5	1.5	2.0	8.280	8.770	0.000	0.430
SHEETMETAL WORKER		BLD		42.510	44.510	1.5	1.5	2.0	10.04	12.01	0.000	0.780
SIGN HANGER		BLD		26.070	27.570	1.5	1.5	2.0	3.800	3.550	0.000	0.000
SPRINKLER FITTER		BLD		49.200	51.200	1.5	1.5	2.0	10.75	8.350	0.000	0.450
STEEL ERECTOR	E	ALL		40.750	42.750	2.0	2.0	2.0	13.20	19.09	0.000	0.350
STEEL ERECTOR	S	ALL		44.950	47.200	2.0	2.0	2.0	8.890	17.69	0.000	0.400
STONE MASON		BLD		40.680	44.750	1.5	1.5	2.0	9.550	12.00	0.000	0.970
TERRAZZO FINISHER		BLD		35.510	0.000	1.5	1.5	2.0	9.700	9.320	0.000	0.400
TERRAZZO MASON		BLD		39.370	42.370	1.5	1.5	2.0	9.700	10.66	0.000	0.550
TILE MASON		BLD		41.430	45.430	2.0	1.5	2.0	9.700	8.640	0.000	0.710
TRAFFIC SAFETY WRKR		HWY		28.250	29.850	1.5	1.5	2.0	4.896	4.175	0.000	0.000
TRUCK DRIVER		ALL 1		35.850	36.400	1.5	1.5	2.0	7.200	6.000	0.000	0.150
TRUCK DRIVER		ALL 2		36.000	36.400	1.5	1.5	2.0	7.200	6.000	0.000	0.150
TRUCK DRIVER		ALL 3		36.200	36.400	1.5	1.5	2.0	7.200	6.000	0.000	0.150
TRUCK DRIVER		ALL 4		36.400	36.400	1.5	1.5	2.0	7.200	6.000	0.000	0.150
TUCKPOINTER		BLD		40.950	41.950	1.5	1.5	2.0	8.180	10.82	0.000	0.940

Legend: RG (Region)
TYP (Trade Type - All,Highway,Building,Floating,Oil & Chip,Rivers)
C (Class)
Base (Base Wage Rate)
FRMAN (Foreman Rate)
M-F>8 (OT required for any hour greater than 8 worked each day, Mon through Fri.)
OSA (Overtime (OT) is required for every hour worked on Saturday)
OSH (Overtime is required for every hour worked on Sunday and Holidays)

H/W (Health & Welfare Insurance)
Pensn (Pension)
Vac (Vacation)
Trng (Training)

Explanations

MCHENRY COUNTY

FENCE ERECTOR (EAST) - That part of the county East and Northeast of a line following Route 31 North to Route 14, northwest to Route 47 north to the Wisconsin State Line.

IRONWORKERS (EAST) - That part of the county East of Rts. 47 and 14.

IRONWORKERS (SOUTH) - That part of the county South of Route 14 and East of Route 47.

IRONWORKERS (WEST) - That part of the county West of Route 47.

The following list is considered as those days for which holiday rates of wages for work performed apply: New Years Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day and Veterans Day in some classifications/counties. Generally, any of these holidays which fall on a Sunday is celebrated on the following Monday. This then makes work performed on that Monday payable at the appropriate overtime rate for holiday pay. Common practice in a given local may alter certain days of celebration. If in doubt, please check with IDOL.

EXPLANATION OF CLASSES

ASBESTOS - GENERAL - removal of asbestos material/mold and hazardous materials from any place in a building, including mechanical systems where those mechanical systems are to be removed. This includes the removal of asbestos materials/mold and hazardous materials from ductwork or pipes in a building when the building is to be demolished at the time or at some close future date.

ASBESTOS - MECHANICAL - removal of asbestos material from mechanical systems, such as pipes, ducts, and boilers, where the mechanical systems are to remain.

CERAMIC TILE FINISHER

The grouting, cleaning, and polishing of all classes of tile, whether for interior or exterior purposes, all burned, glazed or unglazed products; all composition materials, granite tiles, warning detectable tiles, cement tiles, epoxy composite materials, pavers, glass, mosaics, fiberglass, and all substitute materials, for tile made in tile-like units; all mixtures in tile like form of cement, metals, and other materials that are for and intended for use as a finished floor surface, stair treads, promenade roofs, walks, walls, ceilings, swimming pools, and all other places where tile is to form a finished interior or exterior. The mixing of all setting mortars including but not limited to thin-set mortars, epoxies, wall mud, and any other sand and cement mixtures or adhesives when used in the preparation, installation, repair, or maintenance of tile and/or similar materials. The handling and unloading of all sand, cement, lime, tile, fixtures, equipment, adhesives, or any other materials to be used in the preparation, installation, repair, or maintenance of tile and/or similar materials. Ceramic Tile Finishers shall fill all joints and voids regardless of method on all tile work, particularly and especially after installation of said tile work. Application of any and all protective coverings to all types of tile installations including, but not be limited to, all soap compounds, paper products, tapes, and all polyethylene coverings, plywood, masonite, cardboard, and any new type of products that may be used to protect tile installations, Blastrac equipment, and all floor scarifying equipment used in preparing floors to receive tile. The clean up and removal of all waste and materials. All demolition of existing tile floors and walls to be re-tiled.

COMMUNICATIONS TECHNICIAN

Construction, installation, maintenance and removal of telecommunication facilities (voice, sound, data and video), telephone, security systems, fire alarm systems that are a component of a multiplex system and share a common cable, and data inside wire, interconnect, terminal equipment, central offices, PABX and equipment, micro waves, V-SAT, bypass, CATV, WAN (wide area network),

LAN (local area networks), and ISDN (integrated system digital network), pulling of wire in raceways, but not the installation of raceways.

MARBLE FINISHER

Loading and unloading trucks, distribution of all materials (all stone, sand, etc.), stocking of floors with material, performing all rigging for heavy work, the handling of all material that may be needed for the installation of such materials, building of scaffolding, polishing if needed, patching, waxing of material if damaged, pointing up, caulking, grouting and cleaning of marble, holding water on diamond or Carborundum blade or saw for setters cutting, use of tub saw or any other saw needed for preparation of material, drilling of holes for wires that anchor material set by setters, mixing up of molding plaster for installation of material, mixing up thin set for the installation of material, mixing up of sand to cement for the installation of material and such other work as may be required in helping a Marble Setter in the handling of all material in the erection or installation of interior marble, slate, travertine, art marble, serpentine, alberene stone, blue stone, granite and other stones (meaning as to stone any foreign or domestic materials as are specified and used in building interiors and exteriors and customarily known as stone in the trade), carrara, sanionyx, vitrolite and similar opaque glass and the laying of all marble tile, terrazzo tile, slate tile and precast tile, steps, risers treads, base, or any other materials that may be used as substitutes for any of the aforementioned materials and which are used on interior and exterior which are installed in a similar manner.

MATERIAL TESTER I: Hand coring and drilling for testing of materials; field inspection of uncured concrete and asphalt.

MATERIAL TESTER II: Field inspection of welds, structural steel, fireproofing, masonry, soil, facade, reinforcing steel, formwork, cured concrete, and concrete and asphalt batch plants; adjusting proportions of bituminous mixtures.

OPERATING ENGINEER - BUILDING

Class 1. Asphalt Plant; Asphalt Spreader; Autograde; Backhoes with Caisson Attachment; Batch Plant; Benoto (requires Two Engineers); Boiler and Throttle Valve; Caisson Rigs; Central Redi-Mix Plant; Combination Back Hoe Front End-loader Machine; Compressor and Throttle Valve; Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Conveyor (Truck Mounted); Concrete Paver Over 27E cu. ft; Concrete Paver 27E cu. ft. and Under; Concrete Placer; Concrete Placing Boom; Concrete Pump (Truck Mounted); Concrete Tower; Cranes, All; Cranes, Hammerhead; Cranes, (GCI and similar Type); Creter Crane; Spider Crane; Crusher, Stone, etc.; Derricks, All; Derricks, Traveling; Formless Curb and Gutter Machine; Grader, Elevating; Grouting Machines; Heavy Duty Self-Propelled Transporter or Prime Mover; Highlift Shovels or Front Endloader 2-1/4 yd. and over; Hoists, Elevators, outside type rack and pinion and similar machines; Hoists, One, Two and Three Drum; Hoists, Two Tugger One Floor; Hydraulic Backhoes; Hydraulic Boom Trucks; Hydro Vac (and similar equipment); Locomotives, All; Motor Patrol; Lubrication Technician; Manipulators; Pile Drivers and Skid Rig; Post Hole Digger; Pre-Stress Machine; Pump Cretes Dual Ram; Pump Cretes: Squeeze Cretes-Screw Type Pumps; Gypsum Bulker and Pump; Raised and Blind Hole Drill; Roto Mill Grinder; Scoops - Tractor Drawn; Slip-Form Paver; Straddle Buggies; Operation of Tie Back Machine; Tournapull; Tractor with Boom and Side Boom; Trenching Machines.

Class 2. Boilers; Broom, All Power Propelled; Bulldozers; Concrete Mixer (Two Bag and Over); Conveyor, Portable; Forklift Trucks; Highlift Shovels or Front Endloaders under 2-1/4 yd.; Hoists, Automatic; Hoists, Inside Elevators; Hoists, Sewer Dragging Machine; Hoists, Tugger Single Drum; Laser Screed; Rock Drill (Self-Propelled); Rock Drill (Truck Mounted); Rollers, All; Steam Generators; Tractors, All; Tractor Drawn Vibratory Roller; Winch Trucks with "A" Frame.

Class 3. Air Compressor; Combination Small Equipment Operator; Generators; Heaters, Mechanical; Hoists, Inside Elevators (remodeling or renovation work); Hydraulic Power Units (Pile Driving, Extracting, and Drilling); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Low Boys; Pumps, Well Points; Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 4. Bobcats and/or other Skid Steer Loaders; Oilers; and Brick Forklift.

Class 5. Assistant Craft Foreman.

Class 6. Gradall.

Class 7. Mechanics; Welders.

OPERATING ENGINEERS - HIGHWAY CONSTRUCTION

Class 1. Asphalt Plant; Asphalt Heater and Planer Combination; Asphalt Heater Scarfire; Asphalt Spreader; Autograder/GOMACO or other similar type machines: ABG Paver; Backhoes with Caisson Attachment; Ballast Regulator; Belt Loader; Caisson Rigs; Car Dumper; Central Redi-Mix Plant; Combination Backhoe Front Endloader Machine, (1 cu. yd. Backhoe Bucket or over or with attachments); Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Paver over 27E cu. ft.; Concrete Placer; Concrete Tube Float; Cranes, all attachments; Cranes, Tower Cranes of all types: Creter Crane; Spider Crane; Crusher, Stone, etc.; Derricks, All; Derrick Boats; Derricks, Traveling; Dredges; Elevators, Outside type Rack & Pinion and Similar Machines; Formless Curb and Gutter Machine; Grader, Elevating; Grader, Motor Grader, Motor Patrol, Auto Patrol, Form Grader, Pull Grader, Subgrader; Guard Rail Post Driver Truck Mounted; Hoists, One, Two and Three Drum; Heavy Duty Self-Propelled Transporter or Prime Mover; Hydraulic Backhoes; Backhoes with shear attachments up to 40' of boom reach; Lubrication Technician; Manipulators; Mucking Machine; Pile Drivers and Skid Rig; Pre-Stress Machine; Pump Cretes Dual Ram; Rock Drill - Crawler or Skid Rig; Rock Drill - Truck Mounted; Rock/Track Tamper; Roto Mill Grinder; Slip-Form Paver; Snow Melters; Soil Test Drill Rig (Truck Mounted); Straddle Buggies; Hydraulic Telescoping Form (Tunnel); Operation of Tieback Machine; Tractor Drawn Belt Loader; Tractor Drawn Belt Loader (with attached pusher - two engineers); Tractor with Boom; Tractaire with Attachments; Traffic Barrier Transfer Machine; Trenching; Truck Mounted Concrete Pump with Boom; Raised or Blind Hole Drills (Tunnel Shaft); Underground Boring and/or Mining Machines 5 ft. in diameter and over tunnel, etc; Underground Boring and/or Mining Machines under 5 ft. in diameter; Wheel Excavator; Widener (APSCO).

Class 2. Batch Plant; Bituminous Mixer; Boiler and Throttle Valve; Bulldozers; Car Loader Trailing Conveyors; Combination Backhoe Front Endloader Machine (Less than 1 cu. yd. Backhoe Bucket or over or with attachments); Compressor and Throttle Valve; Compressor, Common Receiver (3); Concrete Breaker or Hydro Hammer; Concrete Grinding Machine; Concrete Mixer or Paver 7S Series to and including 27 cu. ft.; Concrete Spreader; Concrete Curing Machine, Burlap Machine, Belting Machine and Sealing Machine; Concrete Wheel Saw; Conveyor Muck Cars (Haglund or Similar Type); Drills, All; Finishing Machine - Concrete; Highlift Shovels or Front Endloader; Hoist - Sewer Dragging Machine; Hydraulic Boom Trucks (All Attachments); Hydro-Blaster; Hydro Excavating (excluding hose work); Laser Screed; All Locomotives, Dinky; Off-Road Hauling Units (including articulating) Non Self-Loading Ejection Dump; Pump Cretes: Squeeze Cretes - Screw Type Pumps, Gypsum Bulker and Pump; Roller, Asphalt; Rotary Snow Plows; Rototiller, Seaman, etc., self-propelled; Self-Propelled Compactor; Spreader - Chip - Stone, etc.; Scraper - Single/Twin Engine/Push and Pull; Scraper - Prime Mover in Tandem (Regardless of Size); Tractors pulling attachments, Sheeps Foot, Disc, Compactor, etc.; Tug Boats.

Class 3. Boilers; Brooms, All Power Propelled; Cement Supply Tender; Compressor, Common Receiver (2); Concrete Mixer (Two Bag and Over); Conveyor, Portable; Farm-Type Tractors Used for Mowing, Seeding, etc.; Forklift Trucks; Grouting Machine; Hoists, Automatic; Hoists, All Elevators; Hoists, Tugger Single Drum; Jeep Diggers; Low Boys; Pipe Jacking Machines; Post-Hole Digger; Power Saw, Concrete Power Driven; Pug Mills; Rollers, other than Asphalt; Seed and Straw Blower; Steam Generators; Stump Machine; Winch Trucks with "A" Frame; Work Boats; Tamper-Form-Motor Driven.

Class 4. Air Compressor; Combination - Small Equipment Operator; Directional Boring Machine; Generators; Heaters, Mechanical; Hydraulic Power Unit (Pile Driving, Extracting, or Drilling); Light Plants, All (1 through 5); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Pumps, Well Points; Vacuum Trucks (excluding hose work); Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 5. SkidSteer Loader (all); Brick Forklifts; Oilers.

Class 6. Field Mechanics and Field Welders

Class 7. Dowell Machine with Air Compressor; Gradall and machines of like nature.

TRAFFIC SAFETY - work associated with barricades, horses and drums used to reduce lane usage on highway work, the installation and removal of temporary lane markings, and the installation and removal of temporary road signs.

TRUCK DRIVER - BUILDING, HEAVY AND HIGHWAY CONSTRUCTION

Class 1. Two or three Axle Trucks. A-frame Truck when used for transportation purposes; Air Compressors and Welding Machines, including those pulled by cars, pick-up trucks and tractors; Ambulances; Batch Gate Lockers; Batch Hopperman; Car and Truck Washers; Carry-alls; Fork Lifts and Hoisters; Helpers; Mechanics Helpers and Greasers; Oil Distributors 2-man operation; Pavement Breakers; Pole Trailer, up to 40 feet; Power Mower Tractors; Self-propelled Chip Spreader; Skipman; Slurry Trucks, 2-man operation; Slurry Truck Conveyor Operation, 2 or 3 man; Teamsters; Unskilled Dumpman; and Truck Drivers hauling warning lights, barricades, and portable toilets on the job site.

Class 2. Four axle trucks; Dump Crets and Adgetors under 7 yards; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnapulls or Turnatrailers when pulling other than self-loading equipment or similar equipment under 16 cubic yards; Mixer Trucks under 7 yards; Ready-mix Plant Hopper Operator, and Winch Trucks, 2 Axles.

Class 3. Five axle trucks; Dump Crets and Adgetors 7 yards and over; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnatrailers or turnapulls when pulling other than self-loading equipment or similar equipment over 16 cubic yards; Explosives and/or Fission Material Trucks; Mixer Trucks 7 yards or over; Mobile Cranes while in transit; Oil Distributors, 1-man operation; Pole Trailer, over 40 feet; Pole and Expandable Trailers hauling material over 50 feet long; Slurry trucks, 1-man operation; Winch trucks, 3 axles or more; Mechanic--Truck Welder and Truck Painter.

Class 4. Six axle trucks; Dual-purpose vehicles, such as mounted crane trucks with hoist and accessories; Foreman; Master Mechanic; Self-loading equipment like P.B. and trucks with scoops on the front.

TERRAZZO FINISHER

The handling of sand, cement, marble chips, and all other materials that may be used by the Mosaic Terrazzo Mechanic, and the mixing, grinding, grouting, cleaning and sealing of all Marble, Mosaic, and Terrazzo work, floors, base, stairs, and wainscoting by hand or machine, and in addition, assisting and aiding Marble, Masonic, and Terrazzo Mechanics.

Other Classifications of Work:

For definitions of classifications not otherwise set out, the Department generally has on file such definitions which are available. If a task to be performed is not subject to one of the classifications of pay set out, the Department will upon being contacted state which neighboring county has such a classification and provide such rate, such rate being deemed to exist by reference in this document. If no neighboring county rate applies to the task, the Department shall undertake a special determination, such special determination being then deemed to have existed under this determination. If a project requires these, or any classification not listed, please contact IDOL at 217-782-1710 for wage rates or clarifications.

LANDSCAPING

Landscaping work falls under the existing classifications for laborer, operating engineer and truck driver. The work performed by landscape plantsman and landscape laborer is covered by the existing classification of laborer. The work performed by landscape operators (regardless of equipment used or its size) is covered by the classifications of operating engineer. The work performed by landscape truck drivers (regardless of size of truck driven) is covered by the classifications of truck driver.

PART 1 - GENERAL

1.01 Section Includes:

- A. General scope of work
- B. Work by Owner
- C. Schedule
- D. Contractor use of site and premises.
- E. General project requirements

1.02 General Scope of Work:

- A. The intent and meaning of the Contract Documents is that the Contractor shall provide labor, plant, service, transportation, materials and appurtenances thereto which are indicated or reasonably implied by the Drawings and Specifications to provide a complete and functional facility.

1.03 Work by Owner:

- A. Any items indicated on the Drawings as NIC (Not in Contract) shall be furnished and installed by the Owner, or by separate Owner-employed contractor.
- B. Work by Others: The Owner reserves the right to let other contracts for additional work that may be required in connection with this project. There shall be complete cooperation between and among contractors as well as between the Contractor and each Subcontractor to ensure satisfactory progress and performance of the work.
- C. The following items will be performed by the Owner directly or by others under separate contracts with the Owner:
 - 1. Disconnection and re-connection of electronic display monitor(s) as indicated on the Drawings.

1.04 Schedule:

- A. Schedule requirements are specified in Section 00 31 13 - Preliminary Schedule.
- B. Alternate Bid 3 - Relaxed Schedule is described in Section 01 23 00 - Alternates.
- C. Quick-ship:
 - 1. Base Bid: include quick-ship option for exhaust fans to facilitate compliance with the specified schedule.
 - 2. Alternate Bid 3 - Relaxed Schedule: quick-ship NOT required.

1.05 Contractor Use of Site and Premises:

- A. Site and exterior of building: non-exclusive use, restricted access.
 - 1. Work can be performed at times lawfully permitted, except that construction activities that may impede vehicle or pedestrian traffic shall be restricted to times of reduced traffic on campus.
 - 2. Space for storage, staging and parking will be restricted to locations designated by the Owner.
 - 3. Work on the roof is permitted while building is occupied, except see Special Time Restrictions below for roofing torch work and other hazardous or potentially disruptive work.

- B. Interior of building: non-exclusive use, restricted access.
 - 1. General time restrictions: see Preliminary Schedules Section 00 31 13 for additional information.
 - 2. Special time restrictions: Hazardous or potentially disruptive work shall be performed on Saturdays, Sunday or weekdays after 10:00 PM and before 7:00 AM. At the Owner's sole discretion, special accommodations may be possible at other times. Hazardous and potentially disruptive work includes, without limitation, the following:
 - a. Welding, torch-applied roofing, and other activities involving open flame in or on the buildings.
 - b. Demolition and construction in public corridors and public spaces, private offices, classrooms, and other normally occupied spaces.
 - c. Electrical and other utility shut-downs.
 - (1) Uninterrupted electrical power must be maintained to Server Rooms, except for momentary shut-downs which must be scheduled and coordinated in advance with the Owner.
 - 3. The site and buildings will be occupied for normal operations during the course of the project. See Preliminary Schedules Section 00 31 13 for additional information.
 - a. Perform work at times to minimize interference with the operation of the College. Determination of the times when work may be performed and the nature and extent of any interference which may be permitted shall be at the sole discretion of the Owner.
 - b. Schedule work in public and occupied spaces and potentially disruptive work with Owner a minimum of seventy-two (72) hours in advance.
 - c. Maintain safe conditions.
 - d. Maintain safe emergency egress from occupied areas of the building
 - e. Maintain fire alarm and fire suppression systems in operation. Exceptions for service on such systems permitted only when the building is unoccupied, subject to written approval of the Owner and approval of the local fire authority having jurisdiction.
 - f. Maintain occupied areas free of fumes, noxious odors, and dust.
 - g. Maintain occupied areas free of excessive noise.
 - h. Clean work areas at the end of each work shift.
 - 4. If the presence of occupants at any time precludes Contractor's performance of hazardous or disruptive work, the Contractor shall perform such work at times when occupants are not present, without additional cost to the Owner.

1.06 Scheduling:

- A. Prepare and maintain a Schedule for the project.
 - 1. Type and Detail:
 - a. Use Critical Path Method (CPM).
 - b. Every line in the Schedule of Values shall be represented by at least one activity.
 - c. Activities with internal dependencies shall be broken down into sub-activities (for example: floor prep, floor finish).
 - d. Include procurement activities for long-lead items

- e. Include activities for Work by Others on which timely completion of the contract is dependent.
 - f. Include activities for service outages and shutdowns, milestones and completion dates required by the Contract Documents.
 - g. Negative float is prohibited. Revise logic and dependencies to prevent negative float
2. Revisions:
- a. Revise monthly or more frequently as required by the conditions of the Work, including, without limitation:
 - (1) Delay in actual or projected completion of any item on the critical path.
 - (2) Change in the critical path.
 - (3) Change in constraints affecting the schedule.
 - (4) When circumstances render previous logic inappropriate.
3. Updates: update at least every two weeks to show actual progress.
4. Distribution:
- a. Submit original schedule in accordance with the General Conditions of the Contract.
 - b. Distribute schedule, revisions and updates to Architect and each subcontractor.
5. Format: provide all of the following:
- a. Printed, page size of 8.5 x 11 or 11 x 17 inches, on white paper.
 - b. Electronic: Adobe PDF (Portable Document Format) file.
- B. Review and Approval: Contractor's initial schedule and each revision shall be submitted for the review and approval of the Architect and Owner.
- C. Schedule with the Owner all potentially hazardous or disruptive activities.
- D. Prosecute the work to maintain progress in accordance with the Schedule and avoid causing delay to other Contractors.
- E. If Contractor fails to maintain progress according to the Schedule it shall furnish such additional labor, services and expedited delivery as may be necessary to bring its operations up to schedule.
- F. Contractor shall provide overtime labor when necessary to maintain or recover its schedule compliance. Such overtime shall be provided without additional cost to the Owner unless the delay is caused by the willful action of the Owner.
- G. If the Contractor or any Subcontractor has installed its work in a manner or at such a time as to prevent an other contractor or subcontractor from installing its work, they shall remove such work and reinstall it at a proper time without additional cost to the Owner.

1.07 Meetings:

A. Contractor shall be responsible for the following:

- B. Owner-Architect-Contractor Meeting: conduct a meeting weekly with the Architect and Owner to review project status, schedule, pending changes change proposals. Project manager and field superintendent shall be present. Payout review will be conducted monthly as part of this meeting. Prepare an agenda for each meeting, to be distributed at the meeting. Prepare minutes of each meeting. Minutes shall be distributed to all attendees, Owner and Architect not later than 7 calendar days following the meeting, and prior to the next meeting.

1. Logs: prepare, maintain and distribute at each meeting the following logs:
 - a. Change Request Log, include at least the following information: CR number, Description, Originating Party, Requested Amount, Requested Time, Date submitted, Status, Executed Change Order Number.
 - b. Submittal Log, include at least the following information: : Reference Number, Trade, Contractor/Subcontractor, Submittal Type, Submittal Description/Title, Date Submitted, Date Requested, Date Received, Action.
 - c. RFI Log, include at least the following information: RFI Number, Title/Description, Originating Party, Date Issued, Date Resolved, Status
- C. Coordination Meeting: conduct a job progress and coordination meeting a minimum of once a week, at which a responsible decision-making representative from each active Contractor and subcontractor must be present. Prepare an agenda for each meeting, to be distributed at the meeting. Prepare minutes of each meeting. Minutes shall be distributed to all attendees, Owner and Architect prior to the next meeting.
- D. Pre-Installation Conferences: Arrange and conduct pre-installation conferences as specified in the individual sections of the Specifications. Prepare and distribute meeting minutes. Report on follow-up activities at subsequent Owner-Architect-Contractor Meetings.

1.08 **Project Communications:**

- A. The following project communications shall be made available electronically in PDF (Portable Document Format) files, in addition to printed copy. Files shall be sent to the Architect by email or web posting as directed by the Architect, not later than four (4) hours following distribution of printed copy:
 1. Schedules
 2. Meeting Minutes
 3. Requests For Information (RFI)
 4. Change Requests
 5. Logs of submittals, RFIs, change requests, etc.

1.09 **Existing Conditions:**

- A. Existing conditions are indicated to the best knowledge of the Architect. Actual conditions encountered during demolition and construction may vary. The Architect will cooperate with the Contractor to make modifications to the construction documents, when necessitated by field conditions, in order to accomplish the design intent.
- B. The Contractor shall verify measurements and existing conditions at the site and shall be responsible for correctness of same; any discrepancies encountered shall be immediately reported to the Architect, prior to proceeding.

1.10 **Locating Utilities and Services:**

- A. Contractor shall make use of public utility locating service (JULIE) prior to excavating.
- B. Contractor shall provided services of a private utility locator to check for private utilities, including but not limited to private electrical, communications, water, and sewer lines prior to excavation.
- C. Contractor shall use portable X-ray or other methods of detecting concealed services in concrete, masonry, stud and drywall, plaster and other materials prior to cutting, coring or demolishing.
- D. Contractor is responsible for cost of repair and restoration of damaged utilities and services, whether concealed or not.

1.11 **Grades, Lines and Levels:**

- A. Lay out the project and establish other lines and levels as necessary for the execution of the Work.

- B. Verify measurements at site before ordering material for doing work. No extra charge or compensation is allowed on account of differences between actual dimensions and measurements indicated on drawings. Submit any difference to Architect for clarification before proceeding.

1.12 Application of Documents:

- A. In the absence of any specific instruction or specification, employ workmanship and material approved by Architect with quality equal to that in the Contract Documents.
- B. It should be noted that the specification sections are not intended to divide work responsibilities among various subcontractors.
- C. The Drawings indicate generally the design and arrangements of equipment, apparatus, fixtures, accessories, etc., necessary to complete the installation of systems. The exact location or arrangement of apparatus and equipment, unless otherwise dimensioned, is subject to minor changes necessitated by field conditions and shall be verified by actual observation at construction site; and Contractor shall be responsible for his work fitting into place in a satisfactory and workmanlike manner and to the approval of the Architect.
- B. Contractor shall be responsible for leaving necessary room for all trades. No extra payments will be allowed to cover the cost of removing and relocating equipment found encroaching on space required by others.
- D. Manufacturers as listed in each Section of the Specifications are considered as acceptable insofar as they meet the requirements of the Specifications.

1.13 Material and Workmanship:

- A. The workmanship of trades shall be the best obtainable, and materials shall be installed true to line, level, plumb, and dimension.
- B. Any materials, manufactured articles, or equipment which may affect the architectural aspect or appearances of the work shall be subject to the express approval of the Architect, and should such work be rejected for appearance reason, the Contractor shall remove and replace at his own expense and replace with materials, etc. to the satisfaction of the Architect.
- C. Any materials, manufactured articles, or equipment which may affect the architectural aspect or appearances of the work shall be subject to the express approval of the Architect, and should such work be rejected for appearance reason, the Contractor shall remove and replace at his own expense and replace with materials, etc. to the satisfaction of the Architect.
- D. Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturers, unless herein specified to the contrary.

1.14 Minimum Work Requirements:

- A. Technical requirements and methods of operation and procedures specified under indexed sections of these construction specifications constitute minimum requirements. Manufacturer's guarantees and agreements shall be observed and shall be in effect and valid.

1.15 Jurisdiction of Work:

- A. The Contractor shall make all appropriate contractual arrangements for proper performance of the Work in accordance with applicable trade jurisdictions and labor agreements. The division of the specifications into various sections does not imply an intent to subdivide the work among subcontracts or trades.

1.16 Acceptance of Preceding Work:

- A. Before starting any operation, the Contractor and each Subcontractors shall examine work performed by others to which his work adjoins or is applied and shall remedy or report to the Architect conditions that will prevent satisfactory accomplishment of his contract. Failure to notify the Architect in writing of deficiencies or faults in preceding work will constitute acceptance thereof and waiver of any claim of its unsuitability.

1.17 Damage to Other Work:

- A. The Contractor shall be responsible for damage caused by the work, the contractor's employees, agents and subcontractors, to adjoining property, existing facilities, present work, and work installed by himself or others.
- B. It is the responsibility of the Contractor and each Subcontractor to make a report immediately to the Architect if a utility line or service or any kind is encountered unexpectedly, and to protect and maintain it until instructions for its disposition can be issued.

1.18 Safety and Health Requirements:

- A. The Contractor and each Subcontractor shall comply with applicable federal, state and local acts and regulations, and without limiting this obligation, and in addition to other indemnities provided for in this contract, shall comply with the Code of Federal Regulations, 29 CFR 1926, Occupational Safety and Health Administration, Safety and Health Regulations for Construction.
- B. Additional requirements are specified in Section 00 73 19.01 - Safety and Health Requirements - Asbestos.

1.19 Clean-up:

- A. The Contractor shall keep the work areas reasonably clean and free of debris and shall obtain and pay for containers and disposal.
- B. The Contractor shall remove dirt and debris from the public way surrounding the site to the satisfaction of the authority having jurisdiction.

1.20 Publicity:

- A. Any publicity giving reference to this project, whether in the form of press releases, brochures, photographic coverage, or verbal announcement shall be only with the general or specific approval of the Owner, and in all instances shall give due mention of the Architect and the Architect's consultants.

PART 2 - PRODUCTS:

Not used.

PART 3 - EXECUTION:

Not used.

End of Section

PART 1 - GENERAL

1.01 Description:

- A. For the purposes of maintaining a safe and effective educational environment for students, faculty, and staff, the Contractor shall enforce compliance with these Rules of Conduct at all times. The Owner may revise the rules from time to time. The Contractor shall instruct employees, each subcontractor's employees, and all delivery personnel to behave in a manner appropriate to the campus environment. This will include, but not be limited to the following:
1. Language, posted materials, publications, and/or actions that might be considered offensive are prohibited. The Contractor shall take all necessary measures to ensure that proper behavior is maintained.
 2. Interaction with students, faculty and staff is prohibited, excepting representatives designated by the College.
 3. Access to school dining facilities or snack areas is prohibited.
 4. Parking outside of the designated construction parking area may result in ticketing and/or towing.
 5. Contractors and workers must use designated toilet facilities.
 6. Smoking or other use of tobacco products is prohibited.
 7. Drinking or possession of alcoholic beverages is prohibited.
 8. Use or possession of drugs, intoxicants or illegal substances is prohibited.
 9. Use or possession of firearms or other weapons is prohibited.
 10. Use or possession of knives with blades longer than 2-3/4" is prohibited.
 11. Use of headphones, ear phones, personal music players, televisions, and similar devices is prohibited.
 12. Compliance with the Owner's security procedures is required.
 13. Food shall be consumed only in designated areas.
 14. Trash shall be disposed properly in designated containers. Littering is prohibited
 15. Appropriate clothing, long or short-sleeved shirts, long pants, work boots shall be worn at all times.
 16. Personal protective equipment, appropriate to the conditions and work, shall be work at all times.
- B. Violation of any of these rules is grounds for immediate removal of the violator from the site and the violator may be barred from returning to the project.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section

PART 1 - GENERAL

1.01 Section Includes:

- A. A description of alternate bids.

1.02 Alternate Bids:

- A. In spaces provided in the bid form for alternate bids, bidders state the amount for each alternate bid to be added to or deducted from the base bid. Each alternate bid is to include all costs necessary for complete performance of the intent of drawings and specifications for the designated portion of work.

1.03 Description of Alternate Bids:

Alternate Bid 1 - Re-Use Existing Exhaust Ductwork

Re-use certain existing exhaust ductwork as indicated on the Drawings for this Alternate, in lieu of furnishing and installing new ductwork as indicated for the base bid.

Alternate Bid 2 - Stainless Steel Closure at Counter

Provide stainless steel angle closure at existing stainless steel counters in Glaze Storage A145c as indicated on the Drawings.

Alternate Bid 3 - Relaxed Schedule

In lieu achieving Substantial Completion on date specified in Section 00 31 13 - Preliminary Schedule, achieve Substantial Completion at a later date as stipulated by bidder on the Bid Form, and achieve Final Completion 60 days thereafter.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section

SUBSTITUTION PROCEDURES
SECTION 01 25 00

PART 1 - GENERAL

1.01 Description:

- A. Procedural requirements for substitutions

1.02 Consideration of Substitutions:

- A. No consideration will be given to substitutions prior to receipt of Bids.
- B. The Owner may choose to consider substitutions proposed by the Contractor when submitted with the bid in the form and manner prescribed by the Section 00 21 00 Instructions To Bidders.
- C. After the Contract is executed substitutions will be considered only under the conditions established by the General Conditions.
- D. The Contractor shall pay the Owner for the cost of the Architect's Additional Services for review of proposed substitutions and for changes in the design and documents to accommodate the proposed substitution.
 - 1. Review cost will not exceed \$500 without written notice to the Contractor and opportunity for the Contractor to withdraw the request from further consideration.
- E. Contractor shall submit all information reasonable requested by the Architect for evaluation of a proposed substitution including, but not limited to, product information, performance data, test results, cost information.
- F. No substitution shall be incorporated in the work unless authorized by a written Change Order properly executed by Owner and Architect.

1.03 Post-Contract Request For Substitution

- A. Submit a complete request using the form provided at the end of this section together with all necessary information.
- B. The cost incurred by the Owner for the Architect's review of the proposed substitution will be deducted from the amount owed the Contractor whether or not the substitution is accepted and authorized by written Change Order.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section
(1 page follows)

REQUEST FOR SUBSTITUTION

INSTRUCTIONS

Complete this form.
Attach additional sheets as necessary.
Attach supporting information
Sign form and submit to the Architect

Project: _____

Project No.: _____

Date: _____

Submitted By _____ (Contractor)

Contact: _____ (Name) _____ (Telephone)

1. Description of Proposed Substitution

(Include reference to Specification Section and Paragraph, and to Drawing Sheet and number where applicable. Attach additional sheets as necessary.)

2. Reason for Proposed Substitution

(Explain why substitution is proposed and what benefit the Owner will derive. Attach additional sheets as necessary)

3. Affect on other Work

(Describe how the proposed substitution will affect other work. Identify what, if any, changes are required to other work or elements of the design to accomodate the proposed substitution)

4. Affect on Cost:

(Detail change in cost. Provide detailed breakdown of labor and material)

5. Affect on Time

(Indicate how the proposed change affects the project schedule)

6. Supporting Information

(Attach all additional data necessary for Architect’s evaluation of the proposed substitution. List all that apply)

Product Data:

Performance Data:

Test Results

Preliminary Submittal Drawings:

Schedule

7. The undersigned

- A. Has researched the proposed substitution and believes it to be equal to or better than the specified products and materials.
- B. Certifies that the information provided is true and accurate.
- C. Agrees to pay all costs incurred by the Owner for the evaluation of this proposed substitution, whether or not accepted and incorporated into the work, however cost will not exceed \$500 without written notice to the Contractor and opportunity for the Contractor to withdraw this request from further consideration.
- D. Agrees to pay all costs necessary for incorporation of the proposed substitution if accepted, including changes to and coordination of other work.

Signature _____

Date _____

Printed Name _____

Title _____

This form shall be signed by the proprietor, partner, or a corporate officer of the Contractor.

PART 1 - GENERAL

1.01 Description:

- A. This section shall govern payment procedures, including, but not necessarily limited to, the following:
 - 1. Schedule of Values
 - 2. Application for payment.
 - 3. Lien waivers
 - 4. Certified payroll
 - 5. Related documentation.
- B. Related sections:
 - 1. Section 00 72 00: General conditions.
 - 2. Section 00 73 00: Supplementary conditions.
 - 3. Section 01 77 00: Closeout procedures.

1.02 Submittals:

- A. Schedule of values, to be submitted within fourteen (14) days of the signing of the Contract.
- B. Cash flow projection: A complete schedule of anticipated pay requests for the duration of the project, to be submitted within fourteen (14) days of the signing of the Contract. This projection is advisory and will neither limit nor assure payment of the amounts indicated.
- C. Payment request package, to be submitted monthly.

1.03 Schedule of Values:

- A. Schedule of Values shall be prepared on Chicago Title Insurance Company form F.3619 "Sworn Statement for Contractor and Subcontractors to Owner", or similar form acceptable to the Architect, in such a manner that each subcontractor is shown as a single line item. In addition, each major portion of the Work being performed by the Contractor shall be listed as a separate line item including supervision, overhead, and profit. Form must be signed, sealed if a corporation, and notarized.

1.04 Payment Procedure:

- A. Monthly progress payments will be made by the Owner. The Contractor shall submit applications for payment in accordance with the procedure established in the General Conditions.
 - 1. The Architect will certify or take other appropriate action on the Application.
 - a. If the amount is appropriate the Architect will certify payment.
 - b. If the amount is not appropriate or if necessary documentation is missing the

Architect may certify payment of a reduced amount or may refuse certification, and shall notify the Owner and Contractor of the reasons therefore.

2. The Architect will forward the payment request package to the Owner.
3. The Board of Trustees will act upon the payment request certified by the Architect at the next regularly scheduled business meeting of the Board of Trustees.
4. The Owner will make payment as provided in the General Conditions.

1.05 Application for Payment:

- A. Application for Payment shall be for work properly completed and materials acceptably stored on site through the date of the payout application and not beyond.
- B. All payments shall be for 90% of the value of work properly completed and materials acceptably stored on site with 10% being held as retention.
- C. At the Owner's sole discretion the Owner may reduce retention and may reinstate retention in accordance with the provisions of the General Conditions.
- D. Retention shall be paid upon final payment after completion of all punch list items from the Certificate of Substantial Completion. An application package is necessary for the final payment.

1.06 Payment Request Packages:

- A. Payment request packages must be complete and accurate. An improperly prepared package in need of correction may cause the contractor to miss the deadline for application resulting in a month delay in payment. A complete payment request package include the following, in triplicate:
 1. Application and Certificate for Payment, AIA Document G702; signed, sealed if a corporation, and notarized.
 2. Sworn Statement for Contractor and Subcontractors to Owner, Chicago Title Insurance Company Form F.3619; signed, sealed if a corporation, and notarized.
 - a. List separately each of the following:
 - (1) General Conditions.
 - (2) Overhead and Profit or Fee.
 - (3) Bonds and project-specific insurance.
 - (4) Each subcontract.
 - b. Line items shall be updated monthly to incorporate approved Change Orders and other subcontract changes. Change Orders shall not be listed as separate line items.
 3. Certification by Contractor and each sub-contractor of any tier, as required by the General Conditions, on the form included at the end of section.
 4. Waiver Submittal Summary Sheet, form included at the end of this section. Form must be signed, sealed if a corporation, and notarized. Final waivers shall be indicated with an asterisk (*).

5. Waivers of Lien:
 - a. Progress Payments: Submit waivers and affidavit from:
 - (1) Contractor, for the amount requested.
 - (2) Subcontractors and suppliers, for the amounts paid on the prior request.
 - b. Final Payment: Submit waivers and affidavit from:
 - (1) Contractor, Subcontractor and suppliers, for the amounts requested.
 - c. Forms:
 - (1) Partial waiver: Chicago Title Co. Form 1722 (pink)
 - (2) Final waiver: Chicago Title Co. Form 3870 (blue)
 - d. Instructions:
 - (1) Waiver and affidavit must be completed in full.
 - (2) The amount waived shall be the actual amount of the payment, not the gross amount before retainage is deducted.
 - (3) Subcontractors and suppliers shall be listed on the affidavit, unless identified on the Contractor's Sworn Statement.
 - (4) The phrase "All material taken from fully paid stock" shall not be used when lien rights are applicable.
6. Certified payroll records as specified herein, accompanied by the form provided at the end of this section.

B. Certified Payroll Records:

1. The Contractor and each subcontractor, shall submit certified payroll records in conformance with Illinois law, Illinois Department of Labor requirements, and the following:
 - a. Certified payroll records shall be included for all laborers, mechanics, and other workers employed by them on the project; the records shall include each worker's name, address, telephone number when available, social security number, classification or classifications, the hourly wages paid in each pay period, the number of hours worked each day, and the starting and ending times of work each day.
 - b. The certified payroll records shall be accompanied by a statement signed by the contractor or subcontractor which avers that: (i) such records are true and accurate; (ii) the hourly rate paid to each worker is not less than the general prevailing rate of hourly wages required by Public Act 94-0515; and (iii) the contractor or subcontractor is aware that filing a certified payroll that he or she knows to be false is a Class B misdemeanor.
2. Certified payroll records shall be submitted with the Application for Payment for the period covered by the Application. Records shall be submitted on forms available from the Illinois Department of Labor or other form as may be directed by the Owner.
3. The Contractor and each subcontractor shall make certified payroll records available for

inspection upon 2 business days notice, in accordance with law.

1.07 Samples:

- A. Samples of all payout documents as well as completed forms are available for viewing at the office of the Architect.

1.08 Accuracy:

- A. Since the payout documents are subject to review by many authorities accuracy is of great importance. Failure of the Contractor to strictly follow these procedures may result in delays of payment.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section
(3 pages follow)

CONTRACTOR'S CERTIFICATION

MCHENRY COUNTY COLLEGE

PROJECT: _____

PROJECT NO. _____

Regarding the Application for Payment for the period of _____ to _____

Submitted by:

CONTRACTOR: _____
(Firm Name)

or

SUBCONTRACTOR: _____ for _____ work.
(Firm Name) (Type of Work)

Firm is a **Sole Proprietorship**, **Partnership**, **Corporation**.
(Check one above)

The Undersigned, certifies that:

- (1) There are no written claims or mechanics' or materialmen's liens with respect to the Work.
- (2) All due and payable bills with respect to the Work have been paid to date or shall be paid from the proceeds of the Application for Payment indicated above.
- (3) There is no known basis for the filing of any mechanics' or materialmen's liens on the Work.
- (4) Waivers submitted by the Undersigned and by Subcontractors and Sub-Subcontractors of the Undersigned constitute an effective waiver of lien under the laws of Illinois to the extent of payments that have been made or with respect to payments that will be made concurrently with Application for Payment indicated above.

Respectfully submitted, this _____ day of _____ 20____

By: _____
(Signature)

(Print Name)

(Title)

STATE OF: _____ COUNTY OF: _____
Subscribed and sworn before me this

_____ day of _____ 20____ (seal)

Notary Public
My commission

expires _____

Instructions: If certification is made by other than the Proprietor, a Partner, or an Executive Officer of the corporation, attach a sworn statement signed by the Proprietor, Partner, or an Executive Officer of the corporation, stating that the individual making this certification is authorized to do so on behalf of the firm.

**CERTIFIED PAYROLL RECORDS for
MCHENRY COUNTY COLLEGE**

PROJECT: _____

PROJECT NO. _____

for the period of _____ to _____

Submitted by:

CONTRACTOR: _____
(Firm Name)

or

SUBCONTRACTOR: _____ for _____ work.
(Firm Name) (Type of Work)

Firm is a **Sole Proprietorship**, **Partnership**, **Corporation**.
(Check one above)

The Undersigned, avers that:

- (i) The attached payroll records are true and accurate;
- (ii) The hourly rate paid to each worker is not less than the general prevailing rate of hourly wages required by this Public Act 94-0515; and
- (iii) The Undersigned is aware that filing a certified payroll that he or she knows to be false is a Class B misdemeanor.

By: _____
(Signature)

(Print Name)

(Title)

STATE OF: _____ COUNTY OF: _____
Subscribed and sworn before me this

_____ day of _____ 20____ (seal)

Notary Public
My commission
expires _____

Instructions: If certification is made by other than the Proprietor, a Partner, or an Executive Officer of the corporation, attach a sworn statement signed by the Proprietor, Partner, or an Executive Officer of the corporation, stating that the individual making this certification is authorized to do so on behalf of the firm.

Waiver Submittal Summary

Project: _____
 Project No. _____
 Contract For: _____

PAY REQUEST NO. _____
 PAY PERIOD ENDING _____

RuckPate Architecture
 22102 N. Pepper Rd Suite 201
 Barrington, IL 60010

CONTRACTOR	TOTAL AMOUNT OF CONTRACT	NET PREVIOUSLY PAID	AMOUNT DUE THIS PAYMENT	AMOUNT OF PREVIOUS WAIVERS	AMOUNT THIS WAIVER	STATUS
1						
SUBCONTRACTORS AND SUPPLIERS						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						

CONTRACTOR'S CERTIFICATION

The undersigned certifies that to the best of his/her knowledge, information and belief the above information is accurate.

By: _____
 Title: _____
 Date: _____

State of _____
 County of _____
 Subscribed and sworn to before me this
 this _____
 day of _____
 Notary Public _____
 My commission expires: _____

(seal)

PART 1 - GENERAL

1.01 Description:

- A. This section regulates the requirements for the submittals required by individual specification sections. The requirements pertain, generally, to the following:
 - 1. Shop drawings, product data, samples and other submittals.
 - 2. Electronic submittals.
 - 3. Duties of Contractor and Architect.
 - 4. Fees for third and subsequent submittal review by the Architect.
 - 5. Requirements for optional BIM use.
- B. Related sections:
 - 1. Section 01 10 00: Log submission requirements.
 - 2. Section 01 78 00: Closeout submittal requirements.
 - 3. Specific shop drawings and submittal requirements are specified in Specifications Sections of Divisions 2 through 49.

1.02 Field and Project Records:

- A. One set of reviewed submittals shall be maintained by the Contractor at the project site, throughout the construction project.
- B. One set of reviewed submittals shall be compiled and maintained by the Contractor for delivery to the Owner prior to Substantial Completions as specified in Section 01 77 00.

1.03 Definitions:

- A. Shop drawings: shop drawings are original drawings prepared by Contractor, Subcontractor, Sub-subcontractor, supplier or distributor, which illustrate some portion of the work, showing fabrication, layout, setting or erection details.
 - 1. Prepare by qualified detailer.
 - 2. Identify details by reference to sheet and detail numbers shown on Contract Drawings.
 - 3. Minimum sheet size: 8½" x 11".
 - 4. Reproduction of Contract Documents, in whole or in part, for submittals is expressly prohibited.
- B. Product data:
 - 1. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts,

illustrations, standard schematic drawings and other standard descriptive data.

- a. Clearly mark each copy to identify pertinent materials, products or models.
- b. Modify to delete information which is not applicable to project.
- c. Supplement standard information to provide additional information applicable to project.
- d. Show dimensions and clearances required.
- e. Show performance characteristics and capacities.
- f. Show wiring diagrams and controls.

C. Samples: physical samples to illustrate materials, equipment or workmanship, and to establish standards by which complete work is judged.

1. Submit two (2) samples, indicate if samples are to be used in construction and should be returned otherwise Architect will retain all samples.
2. Color selection samples: physical samples of actual finish. Reproduced color charts are not acceptable.
3. Office samples: of sufficient size to clearly illustrate:
 - a. Functional characteristics of product or material, with integrally related parts and attachment devices.
 - b. Full range of color samples.
 - c. After review, samples may be used in construction of project.
4. Field samples and mock-ups:
 - a. Erect at project site at location acceptable to Architect.
 - b. Construct each sample or mock-up complete, including work of all trades required in finished work.

D. Other Submittals:

1. Certifications: written certification of facts as specified in individual sections, on the form provided or as acceptable to the Architect, with original signatures.
2. Calculations: written and numeric data to support manufacturer/supplier design decisions. Submit in a form acceptable to the Architect, with original signatures.
3. Waste disposal and recycling records: written data documenting disposal and recycling of demolition debris and construction waste. Submit for record. No review or response by Architect is required
4. Operation and Maintenance Data: manufacturer's data describing procedures for operation and maintenance of equipment and products.
 - a. Operating Manuals for HVAC and electrical equipment:

- (1) Submit for Owner's use upon delivery of equipment to site. Submit in electronic PDF form. No review or response by Architect is required.
 - (2) Submit additional copies with Closeout Documents as required by Section 01 78 00.
- b. Submit all other Operation and Maintenance data with Closeout Documents as required by Section 01 78 00.
5. Material Safety Data Sheets(MSDS): Submit to the Owner MSDS for all materials used in the construction process aor incorporated into the work. Submit for record. No review or response by Owner or Architect is required. MSDS submittals are not specified in individual sections.

1.04 Submittal Requirements:

- A. Electronic submittals: Where submittals are specified in conventional printed format, the Architect will accept electronic submittal in PDF format, subject to the following:
1. Content must be text and vector graphics or high-quality scan, legible on screen and when printed at original sheet size. Provide PDFs generated directly from source documents rather than scans whenever possible. Scans shall retain color when present in original documents.
 2. File must allow electronic markup using Adobe Acrobat. Electronic markups must included editor's firm and identity.
 3. File must allow high-resolution printing.
 4. Electronic submittals are **not acceptable** for certifications and other documents that require original signatures.
 5. Electronic submittals shall be transmitted by email or web posting as directed by the Architect. The Architect may require adherence to file naming conventions and other protocols to facilitate management of electronic submittals.
 6. Upon review, the Architect will return the electronic submittal with notations and/or review action indicated in the PDF file. No printed copies will be returned.
 7. Where submittals are specified to provided in both printed and electronic formats, both shall be provided.
 8. PDF formats shall net be substituted for submittals that are specified to be provided in BIM, CAD or other electronic formats.
- B. Submittal Schedule: within 30 days of execution of the Contract, submit a schedule indicating submittals and rates of submission to the Architect, include special requirements (i.e. specific order dates or critical time lines).
- C. Submittal Log: Log showing the status of all submittals. Update and submit weekly during the course of the project.
- D. Shop Drawings: two (2) copies. Architect will make reproductions and return four (4) copies of reviewed submittals.
- E. Product data: six (6) copies are to be submitted, two (2) copies will be retained by the Architect.
- F. Certifications and Calculations: two (2) copies, unless a greater quantity is specified in individual

sections. All copies will be retained by the Architect.

- G. Accompany submittals with transmittal letter containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. Submittal log number.
 - 5. Notification of deviations from Contract Documents.
 - 6. Supplier and/or manufacturer.
 - 7. Specification section.
- H. Furnish the Owner with one copy of final reviewed shop drawings with table of contents as specified in Section 01 77 00 Closeout Procedures.

1.05 Contractor Duties:

- A. Prepare and submit in a timely manner complete and accurate information for the applicable submittal.
 - 1. Review and approve shop drawings, product data and samples prior to submission, including submittals of subcontractors. Each submittal shall be signed by the Contractor indicating his approval. Failure of the Contractor to review and approve submittals may result in submittals being returned not reviewed.
- B. Coordinate submittals with information contained in related documents and transmit to the Architect.
- C. Verify:
 - 1. Dimensions.
 - 2. Quantities.
 - 3. Field construction criteria.
 - 4. Catalog numbers and similar data.
 - 5. Means and methods of construction.
- D. Coordinate each submittal with requirements of the work and of Contract Documents for other work.
- E. Contractor's responsibility for errors and omissions in submittals is not relieved by the Architect's review.
- F. Notify Architect in writing at time of submission, of deviations in submittals from Contract Documents.
- G. Do not begin any work which requires submittals without having received Architect's approval evidenced by Architect's stamp indicating approval, dated and initialed by the Architect.
- H. Resubmission requirements:
 - 1. Shop drawings:

- a. Revise initial drawings as required and resubmit as specified for initial submittal.
 - b. Indicate on drawings all changes which have been made other than those requested by Architect.
2. Product data and samples: Submit new data and samples as required for initial submittal.
 3. The Contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selection of fabrication process, for techniques of assembly, errors or omissions in the shop drawings or samples, and for performing his work in a safe manner.
 4. For third and subsequent review by the Architect, Contractor shall reimburse the Owner for Architect's services to review the submittal. Architect's time will be billed at the normal hourly rates in increments of 0.5 hour.
- I. Maintain at the site one copy of reviewed submittals.

1.06 Architect's Duties:

- A. Review and act on submittals with reasonable promptness.
- B. Approval is for general conformance with the design concept expressed in the Contract Documents.
- C. Review of separate item does not constitute review of an assembly in which item functions.
- D. The Architect may hold shop drawings in cases where partial submission cannot be reviewed until the complete submission has been received or where shop drawings cannot be reviewed until correlated items affected by them have been received. When such shop drawings are held by the Architect, he will advise the Contractor that the shop drawings submitted will not be reviewed until shop drawings for all related items have been received.
- E. The Architect will hold color selection samples until all color selection samples have been submitted and a complete color board is approved by the Owner. The Contractor is encouraged to submit color samples as soon as possible in order to prevent any delay in the ordering of materials. The Contractor is solely responsible for all delays as a result of failure to submit all color selection samples.
- F. Affix stamp, date and initials or signature indicating review of submittal, and with instructions for Contractor response.
- G. Return submittals to Contractor for response or distribution.
- H. Sample Architect's Review Stamp, shown at right:

<input type="checkbox"/> APPROVED	
<input type="checkbox"/> APPROVED, EXCEPTIONS NOTED	
<input type="checkbox"/> REVISE AND RESUBMIT	
APPROVAL IS FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT EXPRESSED IN THE CONTRACT DOCUMENTS PURSUANT TO THE TERMS OF THE OWNER-ARCHITECT AGREEMENT. APPROVAL DOES NOT RELIEVE CONTRACTOR OF THE OBLIGATION TO CONFORM TO THE CONTRACT DOCUMENTS. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF DIMENSIONS AND QUANTITIES AND FOR COORDINATION WITH FIELD CONDITIONS AND OTHER WORK	
DATE	BY

1.07 Requirements for Optional BIM Use:

- A. The Owner has required certain parts of the project design and documents to be prepared using Building Information Modeling (BIM). The Architect has used Autodesk Revit 2012 software to implement this requirement.
1. The BIM model contains a limited and generalized representation of existing conditions based on the Owner's available records and limited field investigation, and of the proposed construction. Model elements are representational and not an exact depiction of existing or proposed construction. The model does not include all elements of the existing conditions or of the proposed construction.
 2. The BIM model will be provided in electronic form to the Contractor for the Contractor's use subject to the BIM Terms of Use contained in this Section. The BIM model is an instrument of the Architect's service and, as such, the Architect retains ownership and all copyright therein.
 3. The BIM model is not a contract document. The BIM model shall not be relied upon for determining quantities, dimensions or other characteristics of the Work.
- B. BIM Terms of Use: The Contractor, each subcontractor and party that receives the BIM model shall be bound by the following terms:
1. BIM models prepared by the Architect are instruments of professional service intended for one-time use in the construction of this project.
 2. The Contractor shall have a fiduciary responsibility to the Architect to protect the Architect's proprietary information and copyright interest in the BIM model. The Contractor shall have a fiduciary responsibility to the Owner to safeguard and protect the Owner's security interest in the BIM model. The Contractor shall not allow the BIM model to be transmitted to any party without express written approval of the Architect and then only upon said party's acknowledgement and acceptance of these Terms of Use.
 3. Contractor may use the BIM model in conjunction with the the construction of the project, but may not transfer them to any third party other than the Owner. Unauthorized transfer for the purpose of reproducing any or all of the project is expressly prohibited.
 4. The Contractor acknowledges that the BIM model is neither an exact representation of existing conditions, nor of the proposed Work, nor is it an exact facsimile of the Contract Documents.
 5. The Contractor acknowledges that the BIM model is not to be relied upon for dimensional, quantity or other information.
 6. The Contractor acknowledges that the BIM model shall be used only as an additional tool to facilitate the construction of the project and the documentation of completed conditions for the Owner's on-going use and management of the facility. The Contractor acknowledges that use of BIM model will be at Contractor's sole risk and without any liability, obligation, risk by the Architect.
 7. The Contractor, and each subcontractor an party that receives the BIM model, shall to the fullest extent permitted by law defend, indemnify, and hold harmless the Architect and Architect's consultants from all claims, damages, losses, and expenses, including but not limited to attorney's fees, arising out of or resulting from the use of the BIM model prepared by the Architect and Architect's consultants. Each subcontractor or party
- C. Collision Detection and Coordination: **At the Contractor's option**, the Contractor may use the BIM

model and compatible software together with additional models of proposed work prepared by the Contractor and its subcontractors as one means of coordination of the Work, including detection and resolution of potential conflicts in proposed locations and routing of mechanical and electrical elements of the Work. Use of the BIM model shall be in addition to other conventional techniques for coordination and shall not relieve the Contractor of responsibility to thoroughly investigate the existing conditions and coordinate the Work.

- D. Record BIM Model: If the contractor prepares BIM models of proposed work, such models may be submitted to satisfy, in whole or in part, the Record Documents requirements established by Section 3.11 of the General Conditions.
- E. CAD Files: The Architect will not provide CAD plans. The Contractor may use the BIM model to generate CAD base plans for use in preparing submittals, however the Architect's BIM model shall not be used a shop drawing or submittal.
- F. The Contractor is required to provide all necessary software, licensing, and services necessary to implement the optional use of BIM, and to pay all costs thereof.
- G. As a condition of the Contract for Construction the Contractor agrees to the BIM Terms of Use contained in this Section and shall bind all Subcontractors to the same terms.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section

PART 1 - GENERAL

1.01 Description:

- A. Perform alterations in accordance with procedures specified herein when explicit indications are not given elsewhere in the Contract Documents for individual cases. Procedures include, but are not necessarily limited to the following:
 - 1. Alterations to existing spaces and materials.
 - 2. Installation of products removed.
 - 3. Transitions in surfaces, levels, and finishes.
 - 4. Patching, infilling, and extending surfaces.
 - 5. Restoration of existing surfaces affected by demolition and cutting.
 - 6. Alterations to existing mechanical and electrical systems when affected by demolition.
 - 7. Chases for mechanical and electrical systems.
 - 8. Adjustment of operational items.
 - 9. Finishing items not otherwise indicated.
- B. Submittal of proposed solutions is to ensure an acceptable finished appearance. Review of proposed solutions is not an approval of additional costs. Costs for solutions to meet the design intent of the Project and the requirements of this Section are to be included in the Bid.
- C. Related Sections:
 - 1. Section 01 10 00 - Summary
 - 2. Section 01 73 29 - Cutting and Patching
 - 3. Section 07 84 00 - Firestopping

1.02 Submittals:

- A. Shop drawings: proposed solutions, including dimensions, details, and existing and proposed materials. Submit where required in PART 3 - EXECUTION below.
- B. Samples: materials for finish selection. If materials have been reviewed previously for use in other applications resubmittal is not required, reference previous submittal on transmittal, Architect will make selections from previously submitted samples.

PART 2 - PRODUCTS

2.01 Products for Patching and Extending Work:

- A. New materials: as specified in individual Specification Sections and as required to match existing

materials.

- B. Match existing products and work for patching and extending work.
- C. Determine type and quality of existing products by inspection and any necessary testing. Presence of a product, finish, or type of work, requires that patching, extending, or matching shall be performed as necessary to make work complete and consistent, unless otherwise indicated.

PART 3 - EXECUTION

3.01 Inspection:

- A. Verify that demolition is complete, and areas are ready for installation of new work.
- B. Beginning of restoration work means acceptance of existing conditions.

3.02 Preparation:

- A. Cut, move, or remove items as necessary for access to alterations and renovations work.
- B. Remove unsuitable material not marked for salvage, such as rotted wood, rusted metals, and deteriorated masonry and concrete.
- C. Remove debris and abandoned items from area and from concealed spaces.
- D. Prepare surfaces and remove surface finishes to provide for proper installation of new work and new finishes.
- E. Insulate ductwork and piping to prevent condensation in exposed areas.
- F. Perform additional cutting to allow space for patching and infilling and for constructing transitions.

3.03 Installation:

- A. Coordinate work of alterations and renovations to expedite completion sequentially and to accommodate Owner occupancy.
- B. Replace and restore all materials cut moved or removed for alteration and renovation work to proceed.
- C. Replace unsuitable materials, as determined by the Architect, with material matching original condition of the item removed and as specified for finish work.
- D. Project shall be complete in all respects, including operational mechanical and electrical systems.
- E. Remove, cut and patch work in a manner to minimize damage and to provide means of restoring products and finishes to original condition, unless otherwise indicated.
- F. In addition to specified replacement of equipment and fixtures, restore existing plumbing, heating, ventilation, air conditioning and electrical systems to full operational condition.
- G. Install products as specified in individual Specification Sections.

3.04 Transitions:

- A. Where new work abuts or aligns with existing, make a smooth and even transition. Cut back existing construction to allow for adequate thickness of patch and infill construction.

- B. Where finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division. Submit proposed solution to Architect for review prior to execution.
- C. Where removal of partitions results in adjacent spaces becoming one, rework floors, walls, and ceilings create transitions as specified below.
- D. Floor surface transitions shall be smooth and shall be level unless change in elevation is required. If change of elevation is required:
 - 1. Provide sloped transition not exceeding 1:50 for change of 1" or less, 1:16 in other cases. Where a change of elevation of 1/4" or more occurs, submit proposed slope transition to Architect for review before execution.
 - 2. At doorways an offset threshold of up to 1/2" may be used.
- E. Ceiling surface transitions:
 - 1. Separate junctions between dissimilar materials in the same plane with a 1/2" x 1/2" metal reveal.
 - 2. When difference in elevation exists construct soffit to accommodate difference as follows, submit proposed solution to Architect for review prior to executing transition.
 - a. Matching acoustical ceilings: acoustical soffit.
 - b. Differing acoustical ceilings, acoustical and gypsum board ceilings: gypsum board soffit.
 - c. Other unspecified conditions: soffit matching either ceiling surface, or adjacent wall surface, as selected by Architect.
- F. Trim existing doors as necessary to clear new floor finishes; refinish trimmed surfaces.

3.05 Extending and Infilling Surfaces:

- A. Where existing finished surfaces are extended by the addition of area in the same plane, and when openings in existing finished surfaces are infilled, and refinishing of the entire area is not indicated, proceed as follows:
 - 1. Construct extended area and infill to allow subsequent finishing with minimum visual and textural difference.
 - 2. Adjacent concrete masonry: extend and infill surfaces with concrete masonry units having same face dimensions and similar texture. Match bond pattern. Tooth-in units except when adjacent masonry is laid in stack bond. Finish as specified below.
 - 3. Adjacent brick surface: construct extended areas and infill areas with matching brick and mortar, if possible use brick salvaged from areas of demolition and tooth-in new brick. If brick selected for project has noticeable difference in color and texture divide surfaces with full height vertical control joints. Architect may direct either method to be used in individual areas before work on the area is commenced.
 - 4. Adjacent wood surfaces: extend and infill surfaces with wood materials of same species and cut (graining), and jointing as existing. Finish extended area to matching existing appearance. Refinish entire area when infilled to achieve a uniform appearance matching the original.

5. Adjacent plaster surfaces: extend and infill surfaces with plaster matching existing texture.
6. Adjacent gypsum board: extend and infill surfaces without visible joints. Finish as specified below.
7. Adjacent ceramic and quarry tile finish: finish extended areas and infill areas with matching tile and grout. If tile materials cannot be obtained to achieve an exact match submit a range of options for selection by Architect.
8. Adjacent acoustical ceiling: extend ceiling into added area and infill openings with materials matching existing. If possible use materials salvaged from areas of demolition.
 - a. Align grid with existing grid if possible.
 - b. Double grid members and acoustical tiles of less than six inches (6") are not acceptable.
9. Adjacent resilient floor finish: finish extended areas and infill areas with matching resilient floor finish.
10. Adjacent carpeted finish: finish extended areas and infill areas with matching carpet.
11. Adjacent painted surface: prepare surfaces, paint extended areas and infill areas and repaint entire existing surface for uniform appearance.
12. Adjacent vinyl wall covering: remove existing wall covering and finish entire surface with wall covering as selected by Architect.
13. Adjacent resilient base: extend and infill resilient base with matching material. When an exact match cannot be achieved, remove existing base to nearest corner or other break and replace with new resilient base.
14. Other unspecified conditions: patched work shall match existing adjacent work in texture and appearance. When an exact match is not possible submit the range of options for selection by Architect.

3.06 Restoration:

- A. When surfaces affected by demolition and cutting are to remain exposed at completion of the project cut back existing construction to allow patching.
- B. When interior walls and partitions are removed exposing uneven concrete surfaces cut and remove concrete to a depth to allow patching: 1/4" for polymer-modified cementitious patching materials, 2" for concrete and grout patches.
- C. When interior walls and partitions are removed exposing uneven and broken masonry: cut out masonry units to a depth of at least 2", and fill solidly with masonry as specified for infill applications. For bearing walls submit proposed solution to Architect for review prior to executing patching.
 1. Architect may elect to permit patching by grinding and surfacing with rubbed mortar in certain cases where a patched appearance is acceptable.
 2. Architect may elect to allow holes in masonry from removed fasteners to be patched with colored mortar in certain cases where a patched appearance is acceptable.
- D. When interior walls and partitions and other elements are removed leaving gaps in ceiling: patch ceiling as specified for infill applications, construct specified transition if elevation difference exists.

- E. When interior equipment, fixtures or other construction is removed exposing uneven surfaces, residue of mortar, adhesive or uneven surfacing: scrape or grind to remove protrusions, fill and patch substrate to obtain a smooth uniform surface. Minor variations in texture of finished surface are acceptable.

3.07 Mechanical and Electrical Systems:

- A. Where existing mechanical and electrical lines, devices or equipment are located in an area of existing construction indicated to be demolished and disposition of existing items is not indicated:
 - 1. When elements are to remain active: remove and reroute lines, relocate devices and equipment to nearest suitable location.
 - 2. When elements are inactive or unnecessary: remove lines to point of nearest activity and terminate. Remove devices and equipment. Remove abandoned wiring back to electrical panels.
- B. Where existing mechanical and electrical or equipment are located in an area which would be obstructed by new construction: relocate as specified under paragraph 3.07A.
- C. Where existing clearance is not adequate to accommodate installation of new work and work is indicated to be concealed: reroute to allow concealment.
- D. Submit proposed solution to Architect for review prior to executing removal.

3.08 Chases:

- A. Where mechanical and electrical lines (conduits, raceways, pipes, ducts, etc.) are to be run through finished spaces and no means of concealment is indicated.
 - 1. Vertically: construct chases matching adjacent wall construction and finish to provide concealment.
 - 2. Horizontally: construct soffits matching ceiling finish to provide concealment.
 - 3. Lines may remain exposed when space has exposed structure, a predominance of existing exposed mechanical or electrical lines and when explicitly indicated to be exposed.
- B. Conform to requirements specified in Section "Electrical Remodeling" for treatment of electrical conduits and raceways.

3.09 Adjustment of Operational Items:

- A. Operational items include, but are not limited to doors, hardware and equipment, and other items with movable operating parts.
- B. Where operational items are indicated to have any work performed on that item adjust the item for proper operation when the project is complete.
- C. Contractor will **not** be required to replace broken or defective operational equipment on the basis of this Section. Broken and defective items shall be identified by the Contractor in writing to the Architect.
- D. As it may be difficult to determine if broken or defective items were in that condition prior to construction or became broken and defective as a result of the Work, the Contractor's failure to promptly identify broken and defective operational items in writing to the Architect shall constitute an acceptance of the responsibility to return broken and defective items to a fully operational condition, by repair or replacement, as part of the Work.

3.10 **Repair of Damaged Surfaces:**

- A. Patch or replace portions of existing surfaces which are damaged, discolored, or showing other imperfections.
- B. Patch and prepare surfaces to be refinished to achieve finish quality equal to new work.

3.11 **Finishes:**

- A. Finish surfaces as specified in individual Specification Sections.
- B. Finish all new surfaces which will remain exposed when project is complete. Where finishing is not indicated elsewhere in the Contract Documents:
 - 1. Paint interior wall surfaces, apply resilient base.
 - 2. Apply finish to interior floor surfaces to match adjacent rooms or spaces.
 - 3. Paint ceiling or exposed structure.
 - 4. Omit finishing for materials with integral finish such as brick and factory-finished items.
 - 5. Submit proposed solution for finishing to Architect for review prior to execution.
- C. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.12 **Penetrations:**

- A. Provide penetrations of floors, walls, ceilings and roof structure to accommodate installation of other work. When specific requirements for constructing penetrations are not indicated elsewhere in the Documents:
 - 1. Cut penetrations as specified in Section 01 73 29.
 - 2. Reinforce openings in floor and roof structure. If specific reinforcement is not indicated in the Documents use members sizes and details of construction similar to those used in similar applications. Fabricate and install steel reinforcements as specified in Sections 05 12 00 and 05 50 00.
 - 3. Seal penetrations and openings through fire rated walls and floors, whether penetrations and openings were made as part of the Work or discovered during alteration and renovation work, as specified in Section 07 84 00.
 - 4. Seal penetrations of exterior building envelope watertight and weather-tight. Seal and flash penetrations using details similar to those used for similar work.
 - 5. Submit proposed solutions for penetration, reinforcement, and sealing to Architect for review prior fabrication and execution.

End of Section

PART 1 - GENERAL

1.01 Description:

- A. Section includes particular requirements pertaining to building codes, code administration and compliance procedures including, but not limited to, the following:
 - 1. Applicable Building Code.
 - 2. Utilities.
 - 3. Permits, Fees and Notices.
- B. Related sections:
 - 1. Section 01 45 23: Special Inspections performed by Testing Laboratory Service.
 - 2. Section 01 45 23: Testing and Certification to be performed by Testing Laboratory Service. for uncontaminated soil exported for the site.

1.02 Principal Codes:

- A. Applicable Building Code:
 - 1. International Building Code 2012.
- B. Other Codes:
 - 1. International Mechanical Code 2012
 - 2. International Fuel Gas Code 2012
 - 3. National Electrical Code 2011
 - 4. ASHRAE 90.1 2010, as amended by 71 Ill Adm Code 600
 - 5. Fire Prevention and Safety 41 Ill. Adm. Code 100
 - 6. Boiler and Pressure Vessel Safety 41 Ill Adm Code 120
 - 7. Illinois Accessibility Code 71 Ill Adm Code 400
 - 8. Illinois Energy Conservation Code 71 Ill Adm Code 600
 - 9. Illinois Plumbing Code 77 Ill Adm Code 890

1.03 Utilities:

- A. The following is a summary of the primary public utilities serving the project, provided for informational purposes.
 - 1. Electric: Commonwealth Edison Company.
 - 2. Gas: NICOR.
 - 3. Telephone: AT&T.
 - 4. Cable Television: Comcast.

1.04 Permits, Fees and Notices:

- A. Permits:
 - 1. Building Permit: No building permit required.

2. Contractor shall obtain and pay for all other permits legally required for the execution of the Work.
- B. Fees:
1. Contractor shall pay all other fees legally required for the execution of the Work.
 2. Contractor shall give the Owner seven (7) calendar days notice of the amount of any fees to be paid pursuant to applications filed by the Contractor as provided herein.
- C. Notices and Inspections:
1. Contractor shall give all other notices and arrange all inspections legally required for the execution of the Work.
 2. The project is not subject to the jurisdiction of the City of Crystal Lake.

1.05 Recycled Content:

- A. To satisfy the requirements of 415 ILCS 20/3.1 for recycled content, the Contractor is shall select materials to achieve project goals for recycled content of materials incorporated into the project.
- B. Contractor shall compile data showing the value and recycled content of all materials and products incorporated into the project. Recycled content shall be calculated on the basis of Post-Consumer content + ½ Pre-Consumer content, excluding in-house waste and trimmings). Mechanical and electrical equipment and materials shall be included in this calculation.
- C. Project Goal: 15% or greater recycled content.
- D. Deliver records to Owner upon Substantial Completion, and from time to time as may be required by the Architect.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section

PART 1 - GENERAL

1.01 Section Includes:

- A. Definitions
- B. Abbreviations and acronyms
- C. Reference Standards

1.02 Related Sections:

- A. Additional definitions are contained in the General Conditions and in the various Sections of the Project Manual

1.03 Definitions:

- A. As used in the Contract Documents, the terms below shall have the meanings described in this Section. Any definitions given in the General Conditions shall take precedence in the case of a conflict in the definition of the same term:

Addenda: Written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections. For projects performed under a Construction Manager, Addenda include instruments issued by the Construction Manager which modify or interpret those portions of the Bidding Documents prepared by the Construction Manager.

Alternate Bid: An Alternate Bid (or Alternate) is the amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted by the Owner and incorporated into the contract for the Work.

Base Bid: The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

Bid: A Bid is a complete and properly signed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

Bidder: A Bidder is a person or entity who submits a Bid.

Completion Date: The date required by the Contract Documents for Substantial Completion of the Work or of a particular Phase of part of the Work.

Final Completion: Final completion occurs when the contractor has completed the contract requirements, the Architect has certified final payment, and the Owner has made final payment to the contractor in accordance with the provisions of § 9.10 of the General Conditions.

Furnish: To supply and deliver to the project site, ready for installation.

Install: To place in final position and make ready for service or use.

Product: Material(s), equipment, and system(s).

Provide: To furnish and install.

Sub-bidder: A Sub-bidder is a person or entity who submits a quote or bid to a Bidder for materials, equipment or labor for a portion of the Work.

1.04 Abbreviations and Acronyms

<u>A</u>		CEM	Cement
AB	Anchor Bolt	CFM	Cubic feet per minute
ACI	American Concrete Institute	CH	Coat Hook
ACOUST PNL	Acoustic Panel	CHK BD	Chalk Board
ACS DR	Access Door	CI	Cast Iron
ACS PNL	Access Panel	C JT	Control joint
ACT	Acoustic tile	CLKG	Caulking
ADJ	Adjustable, Adjacent	CL	Center Line
AGGR	Aggregate	CLO	Closet
A/C	Air conditioning	CL RM	Class Room
ALT	Alternate	CLG	Ceiling
ALUM	Aluminum	CMU	Concrete Masonry Units (Concrete block)
L	Angle	CO	Clean Out
ARCH	Architectural	COL	Column
ASB	Asbestos	COMP	Composition
ASPH	Asphalt	CONT	Continuous
ASTM	ASTM International	CONC	Concrete
@	At	CONN	Connection
AUTO	Automatic	CONST	Construction
AVG	Average	CONST JT	Construction Joint
		CONTR	Contractor
<u>B</u>		CONV	Convactor
B/B	Back-to-Back	CONT	Continuous
BBD	Bulletin Board	CPT	Carpet
BC	Bottom Curb	CORR	Corridor
BD	Board	CSK	Counter sunk
BIT	Bituminous	CT	Ceramic Tile
BLDG	Building	C - C	Center-to-Center
BLK	Block	CTR	Center
BLKG	Blocking	CU FT	Cubic feet
BLT-IN	Built-In	CW	Cold Water
BM	Beam	<u>D</u>	
BOT	Bottom	DP	Dampproofing
BPL	Base Plate	DL	Dead load
BRDG	Bridging	DET	Detail
BRG	Bearing	DK	Deck
BRKT	Bracket	DIA	Diameter
BRZ	Bronze	DIM	Dimension
BSMT	Basement	DML	Demolish
		DO	Ditto
<u>C</u>		DIV	Division
C	Channel	DR	Door
CAB	Cabinet	DSA	Double strength A grade glass
CB	Catch Basin	DSB	Double strength B grade glass

DS	Down Spout	G	Gutter
DWG	Drawing		
DF	Drinking fountain	<u>H</u>	
DN	Down		
<u>E</u>		HD BD	Hardboard
ELEC	Electrical	HDW	Hardware
ELEV	Elevator	HDWD	Hardwood
EG	Existing	HS	High Strength
EL	Elevation	HD	Head
ENCL	Enclosure	HC	Hollow Core
EQUIP	Equipment	HT	Height
EWC	Electric water cooler	HTR	Heater
EXIST	Existing	HM	Hollow Metal
EXPN BLT	Expansion Bolt	HTG	Heating
EXPN JT	Expansion Joint	HORIZ	Horizontal
EXP	Exposed	HB	Hose bibb
EP	Epoxy	HW	Hot Water
		HWH	Hot Water Heater
		HP	High Point
<u>F</u>		<u>I</u>	
FAB	Fabricate	INCAND	Incandescent
FIN	Finish	INCL	Include
FE	Fire Extinguisher	INSUL	Insulation
FC	Fire Code	INSUL GL	Insulated Glass
FEC	Fire Extinguisher Cabinet	INT	Interior
FHC	Fire Hose Cabinet	INV EL	Invert elevation
FND	Fem. Napkin Dispenser	ID	Inside diameter
FLASH	Flashing		
FHMC	Flat Head Machine Screw	<u>J</u>	
FHWC	Flat Head Wood Screw		
FL	Floor	J	Jamb
FD	Floor Drain	JAN	Janitor
FTG	Footing	JT	Joint
FLG	Flooring	JST	Joist
FND	Foundation	JB	Junction Box
FS	Full Size	JC	Jan Closet
FR	Frame		
FA	Fresh Air	<u>K</u>	
<u>G</u>		KIT	Kitchen
GALV	Galvanized	KD	Knock Down
GI	Galvanized iron	KP	Kick Plate
GRD	Grade	<u>L</u>	
GCB	Glazed Concrete Block		
GA	Gauge	LKR	Locker
GEN CONT	General Contractor	LAB	Laboratory
GEN COND	General Conditions	LAM	Laminate
GFI	Ground Fault Interruption	LIB	Library
GL	Glass, glaze	LAV	Lavatory
GMU	Glazed masonry units	LTG	Lighting
GYP	Gypsum	LP	Low Point
GYP BD	Gypsum Board (Drywall)	LL	Live load
GVL	Gravel	LS	Limestone
GRND	Ground		

M

MH Manhole
MFR Manufacturer
MO Masonry opening
MAT Material
MAX Maximum
MBH 1000 x BTU
MECH Mechanical
MC Medicine cabinet
MEMB Membrane
MET Metal
MTL Material
MET PAN Metal Pan
MIN Minimum
MIR Mirror
MISC Miscellaneous
MLDG Moulding
MOD Module
MED Medium

N

NOM Nominal
NAP Napkin
NIC Not in contract
NTS Not to scale
NO Number
NG New grade

O

OFF Office
OC On Center
OD Outside diameter
OPNG Opening
OPP Opposite
O - O Out to out
OA Overall
OZ Ounce
OH Overhead

P

PTD Paper Towel Dispenser
PART Partition
PLAST Plaster
PLAS Plastic
PLAS LAM Plastic Laminate
PL Plate
PLBG Plumbing
PWD Plywood
PR Pair
PT Paint
PNL Panel
POL Polished
PORC Porcelain

PREC Precast
PREFAB Prefabricated
PREFIN Prefinished
PROP Property

Q

QT Quarry Tile

R

RAD Radiator
R Radius, riser
RA Return air
RB Rubber base
RECP Receptacle
REINF Reinforcing
REQ Require
REQD Required
REG Register
RETG Retaining
REV Revision
RM Room
RFG Roofing
RF Roof
RD Roof drain
RUB Rubber
ROW Right of way

S

SCHED Schedule
SB Splash Block
SCR Screw
SECY Secretary
SECT Section
SLR Sealer
STL Steel
SV Stain and Varnish
SS Service sink
SERV Service
SHT Sheathing
SHT MET Sheet Metal
STD Standard
SHT Sheet
SHR Shower
SH Shelves
SIM Similar
SPEC Specification
SPKLR Sprinkler
SQ FT Square Foot
SST Stainless Steel
SK Sink
STWY Stairway
SLOT Slotted
STOR Storage
SP Stand Pipe

SF	Split Face	<u>V</u>	
STRUCT	Structural		
SGFT	Structural Glazed Facing Tile	VB	Vinyl Base
SUSP CLG	Suspended Ceiling	V	Vinyl
S4S	Smooth four sides	VG	Vertical grain
		VIF	Verify in field
<u>T</u>		VTR	Vent thru roof
		VEST	Vestibule
T	Tread	VERT	Vertical
TEL	Telephone	VWG	Vinyl wall cover
T BD	Tack Board	VCT	Vinyl Composition Tile
TEMP	Tempered	VT	Vinyl Tile
TERR	Terrazzo		
THK	Thick, Thickness	<u>W</u>	
T & G	Tongue & Groove		
TOIL	Toilet	WIND	Window
TC	Top of curb	WAINS	Wainscot
TS	Top of steel	W.D.	Window dimension
TV	Television	WD	Wood
TYP	Typical	WT	Weight
TR	Towel rack	WP	Work Point
TPH	Toilet Paper Holder	WF	Wide flange
THRU	Through	WWF	Welded wire fabric
		W GL	Wire glass
<u>U</u>		WH	Water heater
		WC	Water closet
UNFIN	Unfinished	WCR	Water cooler
UH	Unit Heater	WP	Water proof, weather proof
UR	Urinal	WR	Water
UV	Unit Ventilator	W/O	Without
UL	Underwriters Laboratory	W/	With

1.05 Reference Standards and Industry Specifications:

- A. Any material or operation specified by reference to published specifications of a manufacturer, a society, an association, a code, or other published standard, shall comply with requirements of the listed document which is current sixty (60) days prior to the date of the Project Manual. In case of a conflict between referenced document and the Specifications, the Specifications shall govern.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section

TEMPORARY FACILITIES AND CONTROLS
SECTION 01 50 00

PART 1 - GENERAL

1.01 Description:

- A. Provide all temporary facilities and controls required to properly prosecute the Work in accordance with applicable codes, laws, and regulations and to comply with requirements contained herein including, but not necessarily limited to, the following:
 - 1. Temporary facilities:
 - a. Field office.
 - b. Storage and fabrication sheds.
 - 2. Temporary utilities:
 - a. Sewers and drainage.
 - b. Water.
 - c. Sanitary facilities.
 - d. HVAC
 - e. Electric power.
 - f. Lighting.
 - 3. Support facilities:
 - a. Traffic controls.
 - b. Parking.
 - c. Dewatering facilities and drains.
 - d. Temporary signs:
 - e. Waste disposal facilities.
 - f. Lifts and hoists.
 - g. Temporary elevator use.
 - h. Temporary stairs.
 - i. Scaffolding and runways.
 - j. Shoring and bracing..
 - 4. Security and protection facilities:
 - a. Environmental protection.
 - b. Erosion and sedimentation control.
 - c. Stormwater control.
 - d. Indoor air quality during construction.
 - e. Tree and plant protections.
 - f. Barricades, warning signs and lights.
 - g. Walkways and temporary egress.
 - h. Temporary enclosures.
 - i. Temporary partitions.
 - j. Temporary fire protection.
- B. Related sections:
 - 1. Section 01 41 00: Regulatory requirements.

2. Section 03 30 00: Cold weather requirements for cast-in-place concrete work.
3. Section 07 50 00: Requirements for torch-applied roofing.
4. Divisions 02 - 16: Special environmental requirements are specified in the individual Sections.
5. Division 22: Requirements for plumbing, heating, cooling and ventilating work.
6. Division 26: Requirements for electrical work.
7. Section 31 00 00: Barricade requirements for open excavations, dewatering, other excavation requirements.

1.02 Temporary Facilities and Controls, General:

- A. Design, furnish, install, operate and maintain all temporary facilities and controls necessary for the prosecution of the work and for the safety of workers, the Owner, and the public. Remove temporary facilities and controls when no longer necessary.
- B. Temporary connections to utilities and services shall be acceptable to the Architect, Owner and the Authorities Having Jurisdiction. OSHA standards and regulations shall apply if more restrictive. Make such connections, remove same when no longer required and restore services and sources of supply to proper operating condition.
- C. Temporary utilities shall be installed in accordance applicable codes and regulations.
- D. Pay all costs of temporary facilities and controls.
- E. Maintain strict supervision of use of temporary utilities.
 1. Enforce conformance with applicable codes and standards.
 2. Enforce safe practices.
 3. Prevent abuse of service.
 4. Prevent damage to permanent construction.
- F. The Contractor shall be exclusively responsible for the safe condition and use of temporary facilities and controls.

1.03 Temporary Facilities:

- A. Field Office: none required or provided.
- B. Storage and fabrication sheds: none required or provided. Location subject to Owner's approval if provided by the Contractor.

1.04 Temporary Utilities:

- A. Sewers and drainage: provide temporary sewers and drainage and diversion systems for control and discharge of storm water, ground water and runoff, and to prevent damage to the work in progress, completed work and adjacent facilities.
- B. Water: water may be obtained for construction use from existing sources at the facilities.

- C. Sanitary facilities: provide temporary toilet facilities meeting OSHA and Illinois Department of Labor requirements as to type and quantity per number of workers.
- D. Heating, ventilation and humidity control
 - 1. Permanent building HVAC system will remain in operation during the project. Protect existing system from contamination by the Work.
 - (1) Suitable filters are provided and maintained on all air inlets wherever dust and may be present.
 - (2) Operation is strictly supervised to prevent damage.
 - (3) Equipment is serviced and new filters installed in equipment prior to Substantial Completion.
 - (4) Warranty is extended to provide the specified term of coverage beginning with Substantial Completion.
 - (5) Ductwork and equipment are thoroughly cleaned and restored if contaminated.
 - 2. Protect work in place from damage due to heat, cold and high humidity. Provide insulating materials, heating, ventilation and dehumidification to prevent damage.
 - 3. Take all necessary measures to prevent smoke, fumes, vapors, odors, particulates and other noxious substances entering Owner-occupied areas from the work area. Provide temporary ventilation of work area and temporary modifications to permanent HVAC system and operations to maintain satisfactory environmental quality in Owner-occupied areas.
- E. Electric power: electrical power for construction use not exceeding 120VAC-20A per circuit may be obtained from existing facilities, however caution shall be exercised to avoid overloading existing circuits or interfering with Owner's ongoing operations.
 - 1. Provide portable generation or extend existing services to usable locations, restore existing equipment to original condition when temporary extensions are no longer needed.
- F. Lighting: Existing lighting may be used for work in existing spaces. Provide temporary portable lighting when existing lighting is inadequate for construction purposes and for exterior work between dusk and dawn.

1.05 Support Facilities:

- A. Traffic controls
 - 1. Provide barricades, signage, warning lights flaggers and other controls necessary for traffic control and public safety.
- B. Parking: Park only in locations designated by the Owner.
- C. Dewatering:
 - 1. Provide and operate pumping and bailing equipment, sumps, drains well-points and other measures to
 - a. Create conditions suitable for construction activity.

- b. Remove water from excavations
 - c. Prevent accumulation of water from any source in any location detrimental to stored material, work in progress, completed work, and adjacent facilities.
 - 2. Remove snow and ice as necessary for the protection and prosecution of the work.
- D. Temporary signs:
 - 1. Provide directional and warning signs for vehicles and pedestrians.
 - 2. Provide temporary signs for identification of construction entrances and special-use areas.
 - 3. Provide signage for temporary egress facilities.
- E. Waste disposal facilities:
 - 1. Provide containers and disposal service for safe, prompt and lawful off-site recycling and disposal of all debris and waste produced by the work.
 - 2. Recycle at least 50% of all waste materials by volume. Prepare and implement a construction waste management plan to maximize recycling of eligible materials, including, but not limited to, concrete debris, metals, glass, plastics, paper and cardboard, gypsum products. Provide separate containers for recyclable and non-recyclable materials. Maintain records for recycling and disposal and enforce appropriate waste handling and disposal practices on the job site.
- F. Lifts and hoists:
 - 1. Provide, operate, and maintain construction hoists and derricks, as may be required for execution of work.
 - 2. Provide necessary guards, signals and safety devices required for a safe operation, and suitable runways from the hoists to each floor level and roof. Construction and operation of material hoist shall comply with applicable requirements of ANSI A10.5, and AGC Manual of Accident Prevention in Construction, OSHA, and to applicable state and municipal codes. Prohibit the use of material hoist for transporting personnel.
- G. Temporary elevator use: construction use of permanent elevators is not permitted without Owner's express written permission.
- H. Temporary stairs:
 - 1. Temporary use of permanent stairs is permitted
 - 2. Provide temporary stairs, ladders and ramps necessary for proper execution of the Work.
- I. Scaffolding, runways, work platforms:
 - 1. Provide scaffolding, runways, work platforms, temporary bracing and temporary supports necessary for proper execution of the Work.
- J. Shoring and bracing:
 - 1. Provide shoring and bracing to facilitate the safe and proper execution of the work. Repair damage caused by unsuitable shoring or bracing or lack of adequate support during construction.

1.06 **Security and Protection Facilities:**

- A. Environmental protection:
 - 1. Comply with all applicable requirements for environmental protection including, but not limited to pollutant discharge control, noise control, dust control, and waste disposal.
 - 2. Supervise and enforce measures specified in Section 00 41 00.
- B. Temporary erosion and sedimentation control.
 - 1. Provide all measures necessary to control erosion and sedimentation, and to comply with applicable regulatory requirements including, but not limited to, maintaining water quality in detention basins, wetlands, streams and other watercourses.
- C. Stormwater control
 - 1. Comply with all applicable requirements for stormwater control.
 - 2. Supervise and enforce measures specified in Section 00 41 00 and 31 00 00.
 - 3. Control stormwater and runoff to avoid accumulation of water in excavations, work in progress, completed work, adjacent facilities, and the work area in general.
 - 4. Prevent stormwater from damaging construction, stored materials or existing facilities.
- D. Indoor Air Quality During Construction:
 - 1. Prepare and implement a Construction Indoor Air Quality Plan to minimize contamination of interior building spaces in accordance with SMACNA "IAQ Guidelines For Occupied Buildings Under Construction".
- E. Tree and plant protections
 - 1. Protect trees and plants which are to remain in the vicinity of construction activity.
- F. Barricades, warning signs and lights
 - 1. Provide barricades, warnings, and other protective measures for the protection of workers, visitors, and the public. Such measures installed in the public way shall be satisfactory to local and other authorities having jurisdiction.
 - 2. Provide barricades around all exterior work areas.
 - 3. Barricades and construction aids shall comply with the requirements of OSHA and all other applicable federal, state and local laws, regulations, and requirements.
- G. Walkways and temporary egress
 - 1. When construction will occur in any part of the building or site occupied by the Owner or accessible by the public, provide walkways and temporary egress facilities.
 - a. Maintain permanent exit doorways and paths of travel at all times when building is occupied. Provide temporary exits and egress if permanent facilities are obstructed. Temporary exits and egress facilities are subject to the prior review and approval of the Owner.

- b. Provide safe, smooth, weather-resistant walkways with barricades for travel through exterior work areas.
- c. Provide protective covering where falling-object hazard may exist.
- d. Provide exit and directional signage, illuminated or luminescent for interior egress paths
- e. Provide battery-powered emergency illumination of interior egress paths.
- f. All walkways and temporary egress facilities shall be acceptable to the Authorities Having Jurisdiction.

H. Temporary enclosures

- 1. Provide secure, weathertight, temporary enclosures for exterior openings when required to maintain environmental requirements as required by individual sections of the specifications, and to protect the building from unauthorized access as soon as possible.
- 2. Provide substantial temporary partitions to separate occupied areas from interior work areas, and work area is not separated by completed permanent construction. Temporary partitions shall maintain security of occupied areas.
- 3. Provide dust partitions to limit the spread of dust and when temporary partitions are needed in place for 14 days or less. Dust partitions shall consist of 6 mil or heavier polyethylene film with sufficient framing and attachment to maintain position. Provide fire retardant material in lieu of polyethylene film if work involves sparks, open flame or fire hazard.
- 4. HVAC Protection
 - a. Systems under construction and materials in storage:
 - (1) Cover all duct openings and protect equipment and stored duct materials with tight-fitting plastic film coverings to prevent entrance of dirt or moisture.
 - b. Prior to start-up and during operation for temporary purposes, if and when permitted:
 - (1) Provide temporary filters on all HVAC exhaust and return inlets. Filters shall have a MERV 8 rating or higher per ASHRAE 52.2. Inspect filters weekly and replace when dirty.
 - (2) Provide temporary filters in all HVAC system filter banks as specified for permanent use.

I. Fire Prevention:

- 1. Take adequate precautions against fire; keep flammable material at absolute minimum; and ensure that such material is properly handled and stored.
- 2. Construction practices, including cutting and welding, torches or other open flame during construction, shall be in accordance with the published standards of the National Fire Protection Association (NFPA). Provide a sufficient number of approved portable fire extinguishers distributed about the project. Maintain a fire watch during and for a minimum of 1 hour after completion of such hazardous operations.
- 3. Gasoline and other flammable liquids shall be stored in safety containers and dispensed in accordance with the National Board of Fire Underwriter's recommendations. Flammable

liquids shall not be stored within the building.

4. Tarpaulins used for any purpose during the construction of the work shall be made of materials which are resistant to fire, water, and weather.
5. Do not light fire of any kind in or about the premises.
6. The use of open flame heaters is forbidden without prior written approval.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section

PART 1 - GENERAL

1.01 Description:

- A. This section pertains to the selection and handling of materials and equipment including, but not necessarily limited to, the following:
 - 1. Products.
 - 2. Hazardous materials.
 - 3. Transportation and handling.
 - 4. Storage and protection.
- B. Related sections:
 - 1. Section 01 25 00: Substitution Procedures
 - 2. Section 01 33 00: MSDS submittal requirements.
 - 3. Additional requirements are contained in individual sections of the specifications.

1.02 Products:

- A. Products: means new material, machinery, components, equipment, fixtures, and systems forming the work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the work. Products may also include existing materials or components required for reuse.
- B. Any materials, manufactured articles, or equipment which may affect the architectural aspect or appearances of the Work shall be subject to the express approval of the Architect, and should such work be rejected for appearance reasons, the Contractor shall remove and replace at his own expense to the satisfaction of the Architect.
- C. Provide products which comply with requirements, and which are undamaged and unused at time of installation and which include accessories, trim, finish, safety guards, and other devices and details needed for installation, intended use, and effect.
- D. Comply with capacity size, make, type, and quality specified.
- E. Standard products: where available, provide standard products of types which have been produced and used previously and successfully on other projects and in similar applications.
- F. Products shall be suitable for service conditions.
- G. Continued availability: Where additional amounts of product, by nature of application, are likely to be needed by Owner at later date for maintenance and repair or replacement work, provide standard, domestically produced product which is likely to be available to Owner at such later date.
- H. Manufacture like parts of duplicate units to standard interchangeable sizes and gauges. Two or more items of same kind shall be identical and shall be produced by the same manufacturer.

- I. In the absence of more stringent requirements:
 - 1. Design, fabricate and assemble products in accordance with engineering and shop practices normal to trade.
 - 2. Comply with manufacturer's standards and published specifications.
- J. Do not use material or equipment for any purpose other than that for which it is designed or is specified.
- K. Nameplates:
 - 1. Except for testing laboratory approval labels, and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces or products which will be exposed to view either in occupied spaces or on exterior of work.
 - 2. Locate required labels and stamps on concealed surface or where required for observation after installation on accessible surface which in occupied spaces is not conspicuous.
- L. Equipment nameplates:
 - 1. Provide permanent nameplate on each item of service connected or power operated equipment.
 - 2. Indicate manufacturer, product name, model number, serial number, capacity, speed, ratings and similar essential operating data.
 - 3. Locate nameplates on an easily accessed surface which in occupied spaces is not conspicuous.

1.03 Hazardous Materials:

- A. The Contractor shall review the Contract Document and promptly notify the Owner and the Architect in writing of any materials and systems shown or specified, which, to the best of Contractor's knowledge, contain hazardous materials.
- B. Except with the Owner's prior written consent, the Contractor shall not incorporate into the Work any materials or systems, which to the best of Contractor's knowledge, contain hazardous materials, even if it is shown or specified in the Contract Documents.

1.04 Transportation and Handling:

- A. Deliver, handle, and store products in accordance with manufacturer's recommendations and by methods and means which will prevent damage, deterioration and loss including theft.
- B. Coordinate delivery and installation to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss.
- C. Immediately upon delivery, inspect shipments to assure compliance with requirements of contract documents.
- D. Deliver products in undamaged condition, in manufacturer's original containers and prepackaging, with identifying labels intact and legible.
- E. Promptly remove non-complying materials from site.
- F. Furnish equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.05 **Storage:**

- A. Store products and materials subject to damage from exposure to weather in weathertight storage facilities of suitable size with floors raised above ground. Products or materials not subject to weather damage may be stored on blocks off ground.
- B. When materials such as pipe, fittings, valve, steel fabrications, heavy machinery, and similar items are stored in the building protect floors with plywood or hardboard sheets. Store large items on blocks off floor.
- C. Store fabricated products in accordance with manufacturer's instructions with seals and labels intact and legible. Maintain temperature and humidity within ranges required by manufacturer's instructions.
- D. Cover materials which are subject to deterioration with impervious sheet covering providing adequate ventilation to avoid condensation.
- E. Cover openings of HVAC equipment and ductwork with tight-fitting plastic sheet to prevent contamination of airstream surfaces.
- F. Store loose granular materials in well-drained area on solid surfaces to prevent mixing with foreign matter and cover during inclement weather. Store cementitious and clay products clear of earth or concrete floors away from walls.
- G. Arrange storage in manner to permit access for inspections.
- H. Protect metal from damage, dirt, and dampness. Furnish flat, solid support for sheet products during storage.
- I. Do not use materials in work which have deteriorated, become damaged, or are otherwise unfit for use.
- J. Make periodic inspections of stored materials to verify that products are maintained under specified conditions and are free from damage or deterioration.
- K. Store and mix paints in assigned room or area kept under lock and key.
- L. Remove oil, rags and other combustible materials daily and take precautions to prevent fire hazards.
- M. Do not overload structure during construction by storing materials with load greater than structure is designed to bear. Special attention should be paid to the storage of materials on the roof.

1.06 **Manufacturer's Instructions:**

- A. Review manufacturer's printed instructions prior to start of installation. Distribute copies of instructions to parties involved in installation. Notify Architect in writing of conflict between Manufacturer's instructions and job conditions or requirements of the Contract Documents. Obtain clarification before proceeding with installation.
- B. Maintain one set of complete instructions at jobsite during installation and until completion.
- C. Maintain copies of manufacturers printed instructions for project record documents.
- D. Handle, install, connect, clean, condition, and adjust products in strict accord with manufacturer's instructions and in conformity with specified requirements. Perform work in accordance with manufacturer's instructions. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by contract documents.

- E. Inspect substrate to receive work and conditions under which work is to be performed.
- F. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each item of material or equipment.
- G. Isolate incompatible materials to prevent deterioration.

1.07 Protection:

- A. Protect products against weather.
- B. Maintain work, materials, apparatus, and fixtures free from damage.
- C. Protect items having factory finish to prevent damage to finish and equipment.
- D. At end of day's work, cover new work likely to be damaged or otherwise protect as necessary.
- E. After installation, provide substantial protective coverings as necessary to protect installed products from damage from traffic and subsequent construction operations.
- F. Remove protection when no longer needed. Upon completion of work, remove storage facilities from site.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section

PART 1 - GENERAL

1.01 Description:

- A. Perform cutting and patching required to complete the work and make its several parts fit together properly, as specified herein.
- B. Related Sections:
 - 1. Section 01 35 16: special procedures for alterations projects.

1.02 Submittals:

- A. Submit written request in advance of cutting or alteration which affects:
 - 1. Structural integrity of any element of project.
 - 2. Integrity of weather-exposed or moisture-resistant element.
 - 3. Efficiency, maintenance, of safety of any operational element.
 - 4. Visual qualities of sight-exposed elements.
 - 5. Work of Owner or separate contractor.
- B. Include in request:
 - 1. Identification of project.
 - 2. Location and description of affected work.
 - 3. Necessity for cutting or alteration.
 - 4. Description of proposed work, and products to be used.
 - 5. Alternatives to cutting and patching.
 - 6. Effect on work of Owner or separate contractor.
 - 7. Written permission of affected separate contractor.
 - 8. Date and time work will be executed.

PART 2 - PRODUCTS

2.01 Materials:

- A. Those required for original installation.
- B. For any change in materials, submit request for substitution under provisions of Section 01 60 00.

PART 3 - EXECUTION

3.01 **General:**

- A. Execute cutting, fitting and patching including excavation and fill, to complete work, and to:
 - 1. Fit the several parts together, to integrate with other work.
 - 2. Uncover work to install ill-timed work.
 - 3. Remove and replace defective and non-conforming work.
 - 4. Remove samples of installed work for testing.
 - 5. Provide openings in elements of work for penetrations of mechanical and electrical work.

3.02 **Inspection:**

- A. Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- B. After uncovering, inspect conditions affecting performance of work.
- C. Beginning of cutting or patching means acceptance of existing conditions.

3.03 **Preparation:**

- A. Provide supports to assure structural integrity of surroundings; devices and methods to protect other portions of project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

3.04 **Performance:**

- A. Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
- B. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- C. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- D. Restore work with new products in accordance with requirements of contract documents.
- E. Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- F. At penetrations of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-resistant material, full thickness of the construction element, to maintain rating.
- G. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

End of Section

PART 1 - GENERAL

1.01 Description:

- A. This section governs the required procedures for closing out the construction contract, including, but not necessarily limited to, the following:
 - 1. Closeout procedures.
 - 2. Final cleaning.
 - 3. Adjusting.
 - 4. Project record documents.
 - 5. Operation and Maintenance Data.
 - 6. Warranties.
 - 7. Spare parts and maintenance materials.
- B. Related sections:
 - 1. Section 01 10 00: Summary
 - 2. Section 01 33 00: Submittal Procedures
 - 3. Section 01 78 00: Closeout Submittals

1.02 Definition:

- A. Closeout is defined to include general requirements near the end of Contract Time, in preparation for Substantial Completion, final completion, final payment, normal termination of Contract, occupancy by Owner and similar actions evidencing completion of the Work.
- B. Time of closeout may be a series of time periods for individual parts of the work which have been certified as complete at different dates. That time variation shall be applicable to other provisions of this Section, regardless of whether resulting from "phased completion" originally specified by the Contract Documents or subsequently agreed upon by Owner and Contractor.

1.03 Quality Assurance:

- A. Contractor is responsible to complete the project in accordance with the Contract Documents and enforce the requirements on employees, suppliers and subcontractors.

1.04 Prerequisites to Substantial Completion:

- A. Submit a listing of incomplete work with the monetary value of each item, the reason each item is incomplete, and the expected date of completion.
- B. Advise Owner of insurance change-over requirements.

- C. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.
- D. Submit record drawings, maintenance manuals, test and balance reports, damage or settlement survey, and similar final record information.
- E. Submit one copy of all shop drawings.
- F. Complete start-up testing of systems, and schedule instructions to Owner's operating/maintenance personnel. Discontinue and remove from work site temporary facilities and services, along with construction tools and facilities, mock-ups and similar elements.
- G. Complete keying schedule and make final changes to lock cylinders and plan for shifting responsibility for security to Owner.
- H. Deliver replacement and maintenance stock of material.
- I. Complete final cleaning requirements and restore all damaged finishes.
- J. Submit written request for Architect's inspection on the form provided herein.

1.05 Substantial Completion:

- A. In order to act upon the Contractor's request for Substantial Completion, the Architect will inspect the work.
- B. If the work is found to be substantially complete, the Architect will issue a Certificate of Substantial, AIA Document G704, completion and a "punch list" inspection report indicating items, in addition to the Contractor's list, required for completion and acceptance.
- C. Any non-conforming or incomplete work detected during this period will be added to the list.
- D. The Contractor will proceed immediately to complete all items and will transmit to the Architect every other week a report of the progress on or completion of each item on the "punch list" and the Contractor's list. Any non-conforming or incomplete work detected during this period will be added to the list.
- E. If the work is found not to be substantially complete, the Architect will notify the Contractor of work that must be performed prior to issuance of a Certificate of Substantial Completion.
- F. Should Architect be required to perform additional substantial completion inspections because the work or portion of the work is not substantially complete, or because of failure of work to comply with original certifications of Contractor, Owner will compensate Architect for additional services and deduct amount paid from final payment to Contractor.

1.06 Final Cleaning:

- A. Execute final cleaning prior to Substantial Completion inspection.
- B. Clean interior and exterior floors to a broom-clean condition; remove temporary labels, stains and foreign substances. Replace damaged, broken or scratched glass.
 - 1. The following will be performed by Owner:
 - a. Vacuuming carpet

- b. Moping and waxing resilient and hard-surface flooring
 - c. Cleaning glass, doors, frames and hardware, counters, casework, plumbing fixtures, toilet accessories.
- C. Replace filters of operating equipment.
 - D. Clean debris from roofs, gutters, downspouts, and drainage systems.
 - E. Clean site; sweep paved areas, rake clean landscaped surfaces.
 - F. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.07 **Adjusting:**

- A. Adjust operating products and equipment to ensure smooth unhindered operation.

1.08 **Project Records Documents:**

- A. Regulatory Submittals:
 - 1. Structural members fabricated off-site:
 - a. Without fabricator approval: final inspection reports for off-site *special inspections*.
 - b. With fabricator approval: Certification of Compliance by Approved Fabricator
- B. Record Drawings: each trade shall keep current a marked set of Contract Documents indicating accurately in words and dimensioned drawings any deviations from the Contract Documents and final location of concealed items or items indicated schematically in the Contract Documents, including but not limited to:
 - 1. Significant changes in schedules, plans, sections, elevations and details, such as shifts in location of walls, doors, stairs, etc., made during construction.
 - 2. Significant changes in foundations, columns, beams, openings, concrete reinforcing, lintels, concealed anchorages and knockout panels made during construction.
 - 3. Final location of electric panels, final arrangement of electric circuits, conduits, and significant changes made in electrical design as a result of job conditions.
 - 4. Final location and arrangement of mechanical equipment and major concealed mechanical work items, including, but not limited to, supply and circulating mains, vent stacks, drainage lines, control and shut-off valves, dampers, and diverters.
 - 5. Final location and arrangement of all connections and routing of utilities, including, but not limited to, sanitary, storm, heating, electric, gas, water, and telephone.
 - 6. All points of control or adjustment.
 - 7. All work as a result of change order or clarifications.
- C. At the end of the project the Owner will provide the Contractor with a set of reproducible transparencies of the Contract Documents onto which all changes of each trade shall be transferred.
- D. Control diagrams:

1. Control and zone valve lists and diagrams for plumbing and heating systems shall be framed under glass and mounted on the wall of the Mechanical Room.
 2. Wiring and control schematic drawings for each major system and piece of equipment shall be mounted under glass adjacent each piece of equipment, including but not limited to air handlers, boilers, and elevator.
- E. Record Specifications: submit a copy of the Project Manual annotated to designate the actual manufacturer or system used when multiple manufacturers or systems are specified.

1.09 Regulatory Submittals:

- A. Submit reports, documents and certifications as specified including, but not limited to:
1. Section 00 73 19.01: Asbestos-Free Construction Certification
 2. Section 01 45 26: Certifications and reports for off-site fabricated structural items.
- B. Submit other reports, documents and certifications as required by Authorities Having Jurisdiction.

1.010 Operation and Maintenance Data:

- A. Submit in accordance with Section 01 78 00.

1.11 Warranties and Bonds:

- A. Submit in accordance with Section 01 78 00.

1.12 Attic Stock:

- A. Provide extra materials as specified in individual Sections. Deliver to Owner and submit to the Architect a written description of materials and quantities.

1.13 Closeout Procedures:

- A. Submit written certification on the form provided that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with contract documents and ready for the Architect's final inspection.
- B. Submit a final application for payment complete with all final waivers of lien.
1. Submit Consent of Surety to Final Payment, AIA Document G706.
 2. Submit "Contractor's Affidavit of Payment of Debts and Claims", AIA Document G706.
 3. Submit "Contractor's Affidavit of Payment of Release of Liens", AIA Document G706A.

1.14 Final Inspection:

- A. The Architect will, make the final inspection.
- B. Should Architect consider that work is finally complete in accordance with requirements of Contract Documents, he shall indicate final completion.
- C. Should Architect consider that work is not finally complete: he shall notify Contractor, in writing, stating reasons. Contractor shall take immediate steps to remedy the stated deficiencies, and send

additional written notice to the Architect. This procedure shall continue until the work is finally complete.

- D. Should Architect be required to perform additional final completion inspections because of failure of work to comply with original certifications of contractor, Owner will compensate Architect for additional services and deduct amount paid from final payment to contractor.

1.15 Final Payment:

- A. After final inspection is complete, liquidated damages and other costs to be deducted from Contractor's final payment, if any, shall be included in a final change order.
- B. The Contractor shall submit a final pay request package to the Architect who will certify final payment.
- C. The Contractor shall submit Consent of Surety to final payment with the final pay request.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section
(3 pages follows)

CONTRACTOR'S REQUEST FOR SUBSTANTIAL COMPLETION INSPECTION

Project: _____

Architect's Project Number: _____

Date: _____

From Contractor: _____

To: RuckPate Architecture
22102 North Pepper Road, Suite 201
Barrington, Illinois 60010

Please be advised that the _____ entire project _____ part of the project _____ is substantially complete. We hereby request your inspection of the work.

The following documents are attached: *(all are required)*

- ___ A listing of all incomplete work, including the monetary value of each item, the reason each item is incomplete, and the expected date of completion.
- ___ Instructions to the Owner regarding insurance change-over requirements.
- ___ Contractor's Certification Regarding Final Completion.

The following items have been submitted previously: *(check all that apply)*

- ___ All warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.
- ___ Record drawings, maintenance manuals, test and balance reports, and other final record information.
- ___ One record copy of all shop drawings for Owner's use.
- ___ Final keying schedule.

The following items have been completed: *(check all that apply)*

- ___ Start-up testing of all systems, instructions to Owner's operating/maintenance personnel.
- ___ Removal of temporary facilities and services.
- ___ Installation of final lock cylinders.
- ___ Final cleaning.
- ___ Delivery of replacement and maintenance stock material to Owner.
- ___ Delivery of permanent keys to Owner.

By: _____
signature

_____ name

CONTRACTOR'S CERTIFICATION REGARDING FINAL COMPLETION

Project: _____

Architect's Project Number: _____

Date: _____

From Contractor: _____

To: RuckPate Architecture
22102 North Pepper Road, Suite 201
Barrington, Illinois 60010

In accordance with the requirements of SECTION 9.8.1 of the General Conditions, I hereby certify that:

ALL REMAINING WORK WILL BE COMPLETED WITHIN 30 CALENDAR DAYS
or as may agreed upon following the Date of Substantial Completion, upon the Owner's written consent.

By: signature _____

name _____

title _____

Instructions: Submit this completed certification with the Contractor's Request for Substantial Completion Inspection.

CONTRACTOR'S CERTIFICATION OF FINAL COMPLETION AND REQUEST FOR INSPECTION

Project: _____

Architect's Project Number: _____

Date: _____

From Contractor: _____

To: RuckPate Architecture
22102 North Pepper Road, Suite 201
Barrington, Illinois 60010

I hereby certify that:

I have reviewed the Contract Documents, and

I have inspected the work and found it to be complete and in accordance with the contract documents,

The work is ready for final inspection.

I therefore request the Architect's final inspection.

The following documents are attached: *(check all that apply)*

___ Final Application for Payment.

___ All final waivers of lien.

___ Consent of Surety to Final Payment.

___ "Contractor's Affidavit of Payment of Debts and Claims", AIA Document G706.

___ "Contractor's Affidavit of Payment of Release of Liens", AIA Document G706A.

By: _____
signature

name

title

that all remaining Work will be completed within thirty (30) calendar days

PART 1 - GENERAL

1.01 Description:

- A. This section contains requirements for submittals in connection with closing out the construction contract, including, but not necessarily limited to, the following:
- :
1. Project record documents.
 2. Operation and Maintenance Data.
 3. Warranties, bonds and maintenance contracts.
 4. Spare parts and maintenance materials.
 5. Regulatory submittals.
 6. Submittals Required for Final Payment.
- B. Related sections:
1. Various specification sections with requirements for extended warranties, bonds and maintenance contracts.

1.02 Project Record Documents:

- A. Record Drawings:
1. Contractor and each subcontractor shall keep current a marked set of Contract Documents comprising a complete and exact record of "as-built" conditions, in words and dimensioned drawings including, but not limited to:
 - a. Deviations from the Contract Documents.
 - b. Changes in schedules, plans, sections, elevations and details, such as location of walls, doors, stairs, etc.
 - c. Changes in foundations, columns, beams, openings, concrete reinforcing, lintels, concealed anchorages and knockout panels made during construction.
 - d. Final location of electric panels, final arrangement of electric circuits, locations of conduits, and changes to electrical circuiting.
 - e. Final location and arrangement of mechanical equipment, fixtures, piping, vents, drainage lines, valves, dampers, control devices and equipment.
 - f. Final location and arrangement of all connections and routing of utilities, including, but not limited to, sanitary, storm, heating, electric, gas, water, and telephone.
 - g. All points of control or adjustment.
 - h. All work as a result of change order, minor change or clarifications.

- h. All work as a result of change order, minor change or clarifications.
 - 2. At the end of the project the Contractor shall transfer all markings to a single clean set of Contract Documents .
 - 3. Contractor shall submit the record drawings with a transmittal enumerating the documents and a certification, in accordance with Section 3.11 of the General Conditions, that the documents show a complete and exact representation of “as-built” conditions.
- B. Control diagrams:
 - 1. Control and zone valve lists and diagrams for plumbing and heating systems shall be framed in a plastic box frame and mounted on the wall of the Mechanical Room.
 - 2. Wiring and control schematic drawings for each major system and piece of equipment shall be mounted in a plastic box frame adjacent each piece of equipment, including but not limited to air handlers, boilers, and elevator.
- C. Record Specifications: submit a copy of the Project Manual annotated to designate the actual manufacturer or system used when multiple manufacturers or systems are specified.
- D. Record Shop drawings:
 - 1. One set of final reviewed shop drawings shall be compiled and maintained by the Contractor.
 - 2. Submit record shop drawings prior to Substantial Completion.

1.03 Operation and Maintenance Data:

- A. Compile product data and related information for Owner's maintenance and operation of products furnished under contract.
 - 1. Prepare operating and maintenance data as specified in this section, as referenced in other pertinent sections and as necessary to operate the completed work.
 - 2. Include copies of control diagrams provided as specified for Project Record Documents.
 - 3. Operations and maintenance data shall be available to the Owner at time of Substantial Completion.
- B. Demonstrate operation of equipment when required by individual specifications.
- C. Instruct Owner's personnel in the maintenance of products and in the operation of equipment and systems.

1.04 Warranties, Bonds and Maintenance Contracts:

- A. No submittal is required for the contractual correction-period established by the General Conditions.
- B. Assemble warranties, bonds and maintenance contracts, executed by each of the respective manufacturers, suppliers and subcontractors, co-executed when so specified. Review submittals to verify compliance with contract documents.

1.05 Spare Parts and Maintenance Materials:

- A. Provide extra materials as specified in individual Sections. Deliver to Owner with listing of materials

and quantities. Obtain signed receipt. Submit copy of list and receipt to Architect.

1.06 Format of Submittals:

A. Record Documents:

1. Record Drawings: submit one (1) set, rolled.
2. Shop Drawings:
 - a. Submit one (1) set.
 - b. Fold submittals and place in covered file storage boxes, in sequence by submittal specification Division and submittal number. Include copy of Log or Table of Contents listing indicating contents of each box.
3. Record BIM and CAD Files:
 - a. Shop drawings and models prepared using BIM or CAD backgrounds furnished by the Architect shall be submitted in electronic format in accordance with the requirements of Section 01 33 00.
 - b. Submit 1 set, on CDROM, standard (ISO 9660) format.
 - (1) CDROM shall contain a text file, named README.txt, in ASCII text format, listing each file with a brief description of the contents.
 - (2) CAD files shall be in AutoCad .dwg or .dxf format. BIM files in native format.
 - (3) Label CDROM, printed or handwritten, indicating Project, Contractor Name, content.
 - c. Place CDROM(s) in punched clear plastic pocket(s), inserted in three ring binder with other O&M data.

B. Operating and Maintenance Data:

1. Submit
 - a. Draft: one (1) copy
 - b. Final: one (1) copy and one (1) PDF.
2. Prepare data in the form of an instructional manual for use by Owner's personnel.
3. Manual format:
 - a. Three-ring binders, "Vue" type with transparent covers, maximum ring size of 2-1/2". When multiple binders are used, correlate the data into related consistent groupings. Use one or more separate binders for each category of submittal.
 - b. Sheets: 8-1/2" x 11", 20 pound white paper, printed, typed or legible xerographic copies.
 - c. Cover and Spine: identification inserted in binder cover, similar to sample at end of Section.

- d. Index tabs and Table of Contents:
 - (1) Provide tabs for each piece of operating equipment or system.
 - (2) Table of Contents for each volume, arranged in a systematic order. listing contents of each tab with subcontractor and supplier names, addresses and phone numbers, similar to sample at end of this Section.
- 4. Large format drawings and booklets:
 - a. Fold oversize drawings.
 - b. Insert in plastic file pockets in 3-ring binders.
- 5. Product data:
 - a. Include only those sheets which are pertinent to the specific product.
 - b. Annotate each sheet to:
 - (1) Clearly identify the specific product or part.
 - (2) Clearly identify the data applicable to the installation.
 - (3) Delete references to inapplicable information.
- 6. Drawings:
 - a. Supplement product data with drawings as necessary to clearly illustrate:
 - (1) Relations of component parts of equipment and systems.
 - (2) Control and flow diagrams.
 - b. Coordinate drawings with information on Record Documents to assure correct depiction of completed installation.
 - c. Do not use Record Documents as maintenance drawings.
- 7. Written text, as required to supplement product data for the particular installation:
 - a. Organize in a consistent format under separate headings for different procedures.
 - b. Provide a logical sequence of procedure instructions.
- 8. Warranties, bonds and maintenance contracts:
 - a. Original warranty, bond or maintenance contract.
 - b. Provide complete information for each bond or maintenance contract.
 - (1) Product or work item.
 - (2) Firm, with name of principal, address and telephone number.
 - (3) Scope.

- (4) Date of beginning of warranty, bond or maintenance contract.
- (5) Duration.
- (6) Provide information for Owner's personnel:
 - (a) Proper procedure in case of failure.
 - (b) Instances which might affect the validity of warranty or bond.
- (7) Contractor, name of responsible principal, address and telephone number.

1.07 Quality Assurance:

- A. Preparation of Closeout Submittals shall be done by personnel:
 - 1. Completely familiar with requirements of this section.
 - 2. Skilled as a technical writer to the extent required to communicate essential data.
 - 3. Skilled as a draftsman competent to prepare drawings.
 - 4. Operation and Maintenance Data: Trained and experienced in maintenance and operation of the described products.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section
(sample forms - three pages follow)

OPERATIONS AND MAINTENANCE DATA

PROJECTNAME

CONTRACT

**CONTRACTOR NAME
CONTRACTOR ADDRESS
CONTRACTOR PHONE**

(sample binder cover insert)

PROJECTNAME

O & M DATA

CONTRACT

(sample binder spine insert)

OPERATIONS & MAINTENANCE DATA

TABLE OF CONTENTS

PROJECTNAME
CONTRACT
CONTRACTOR

TAB 1	ITEM	SUBCONTRACTOR/SUPPLIER NAME ADDRESS PHONE NUMBER
	APPROVED SUBMITTAL DOCUMENTS CAPACITIES/RATINGS/UTILITY CONSUMPTION OPERATING DATA MAINTENANCE DATA MAINTENANCE SCHEDULE PARTS LISTS WIRING DIAGRAMS INSPECTION & TEST REPORTS INSTRUCTION BOOKS, CARDS & MANUALS FURNISHED WITH THE EQUIPMENT WARRANTY or BOND MAINTENANCE CONTRACT	

TAB 2	ITEM	SUBCONTRACTOR/SUPPLIER NAME ADDRESS PHONE NUMBER
	APPROVED SUBMITTAL DOCUMENTS CAPACITIES/RATINGS/UTILITY CONSUMPTION OPERATING DATA MAINTENANCE DATA MAINTENANCE SCHEDULE PARTS LISTS WIRING DIAGRAMS INSPECTION & TEST REPORTS INSTRUCTION BOOKS, CARDS & MANUALS FURNISHED WITH THE EQUIPMENT WARRANTY or BOND MAINTENANCE CONTRACT	

(CONTINUE FOR EACH ITEM)

(sample Table of Contents)

PART 1 - GENERAL

1.01 Description:

- A. Provide all necessary labor, material, equipment and disposal service to perform demolition as indicated on the Drawings, specified herein and as required for complete performance of other work. The work includes but is not necessarily limited to the following:
 - 1. Remove designated building equipment and fixtures.
 - 2. Remove existing construction as required for completion of other work.
 - 3. Remove and salvage other items designated for reuse.
 - 4. Separate and recycle all recyclable debris including metals, concrete, asphalt pavement, gypsum board, wood, glass, plastic, and carpet.
- B. Work Not Included:
 - 1. Demolition of asbestos-containing materials (ACM), if any, will be performed under a separate contract.
- C. Related Sections:
 - 1. Section 01 35 16: Alteration Project Procedures
 - 2. Section 01 50 00: Construction facilities and temporary controls: temporary barriers and enclosures, security, cleaning during construction.
- D. Application of Documents: the Drawings depict demolition in a schematic manner and are intended to describe only the general nature and extent of demolition work required. Perform demolition, whether or not specifically indicated on the Drawings, which can reasonably be inferred from examination of all Contract Documents and of existing site conditions.

1.02 References:

- A. ANSI A10.6 - Safety requirements for demolition.
- B. NFPA 241 - Safeguarding building construction and demolition operations.

1.03 Submittals:

- A. Submit record drawings under provisions of section 01 77 00.
- B. Submit disposal and recycling records under provisions of section 01 33 00.

1.04 Existing Conditions:

- A. Owner reserves the right to retain ownership of items removed from the building.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 Preparation:

- A. Inspect existing conditions prior to start of demolition.
- B. Coordinate demolition with temporary partitions, weatherproof closures, and other temporary facilities specified in section 01 50 00 to protect the remaining construction and to prevent spread of dust, fumes, noise, and smoke to provide for Owner occupancy or Owner's on going operations.
- C. Verify that temporary barriers are in place to separate and protect occupied areas from work areas.
- D. Protect existing items which are not indicated to be altered.
- E. Disconnect, remove, and cap designated utility services within demolition areas.
- F. Mark location of disconnected utilities. Identify and indicate capping locations on project record documents.

3.02 Lead:

- A. Paint and other elements of the existing construction are likely to contain lead. Prevent the discharge of lead-containing dust and debris into the air and upon the site. Remove, handle and properly dispose of all lead-containing material in accordance with applicable regulations and in accordance with USEPA recommended practice.
- B. Portions of the project area may be occupied by children. Comply with USEPA RRP rules.

3.03 Mercury:

- A. Remove intact and recycle items containing mercury:
 - 1. Fluorescent, mercury vapor, and metal halide lamps.
 - 2. Thermostats with mercury vial switching elements.
 - 3. Switches with mercury switching elements.
 - 4. Other items containing mercury.

3.04 Chlorofluorocarbon (CFC) and Hydrochlorofluorocarbon (HCFC) Hydrofluorocarbon (HFC) Refrigerants:

- A. Evacuate CFC, HCFC, and HFC refrigerants from HVAC and other refrigeration systems prior to demolition.
- B. Recycle CFC, HCFC, and HFC refrigerants.
- C. Do NOT vent refrigerants to the atmosphere.

3.05 Execution:

- A. Conduct demolition to minimize interference with adjacent building areas. Maintain protected egress and access at all times for occupied areas.

- B. Conduct demolition operations in accordance with ANSI A10.6, NFPA 241 and applicable codes and regulations.
- C. Demolish in an orderly and careful manner. Protect existing structural members and construction to maintain structural stability and integrity.
- D. Except where noted otherwise, immediately remove demolished materials from site.
- E. Food service equipment: remove all existing food service equipment other than items identified to be reused.
- F. Remove materials to be re-installed or retained in manner to prevent damage. Store and protect under provisions of section 01 60 00.
- G. Remove, store, and protect for re-installation designated materials and equipment.
- H. Remove designated material and equipment to be retained by Owner. Deliver to location agreed upon.
- I. Remove and promptly dispose of contaminated, vermin infested, or dangerous materials encountered.

3.06 Recycling and Disposal:

- A. Do not burn or bury materials on site.
- B. Recycle refrigerants and items containing mercury.
- C. Separate and recycle all recyclable materials including metals, concrete, gypsum board, acoustical tile, wood, plastic, glass and carpet.
- D. Remove demolished materials from site as work progresses. Upon completion of work, leave areas of work in clean condition.
- E. Record keeping:
 - 1. Maintain records of material type, quantity (by weight or volume), name of recycling or disposal firm, date and time of pick-up for every load of material removed from site.
 - 2. Maintain copies of load tickets.
 - 3. Summarize and total quantities of waste recycled and disposed of by other means. Deliver records to Architect upon request, or at completion of demolition.

End of Section

ROOF PATCHING AND ACCESSORIES
SECTION 07 50 01

PART 1 - GENERAL

1.01 Description:

- A. Furnish and install roofing system and accessories as indicated on the Drawings and as specified. The work includes, but is not necessarily limited to:
 - 1. Building A: Cutting and patching of existing built-up roofing and insulation on insulated gypsum deck with APP Modified Bitumen Membrane heat welded roofing and flashing.
 - 2. Modified bitumen flashings.
 - 3. Sheet Metal counterflashing.
 - 4. Roof Curbs
- B. Related Sections:
 - 1. Division 23: Prefabricated metal curbs and supports.
 - 2. Division 23: Disconnection, extension, and reconnection of existing mechanical services, removal and reinstallation of mechanical equipment.
 - 3. Division 26: Disconnection, extension, and reconnection of existing electrical services, removal and reinstallation of electrical fixtures and equipment.

1.02 Submittals:

- A. Product Data: Manufacturer's data for all products to be incorporated into roof and flashing.
- B. Shop Drawings: Flashing details.
- C. Required certifications.
- D. Manufacturer's installation instructions: remove portions that do not apply, indicate manufacturer and trade name of products manufactured by other than system manufacturer. Clearly identify materials and procedures, if any, at variance with these specifications.

1.03 Certifications:

- A. System manufacturer:
 - 1. Installer is authorized to install the specified modified bitumen products on built-up roof.
 - 2. Manufacturer is supplying all materials, or if materials are supplied by others, manufacturer approves the use of such materials (list each) in the specific application.

1.04 **Quality Assurance:**

- A. Installer: authorized by system manufacturer to install the specific products with a minimum of five (5) years experience.
- B. Mechanics involved in heat-welding shall be torch-certified.
- C. Products: all products shall be furnished by the system manufacturer, or approved by the system manufacturer for use in the specific application.
- D. Prerroof Conference: conduct conference prior to start of roofing operations. Schedule conference and notify attendees 7 days in advance. Review schedule, required preparation, and performance expected of each party. Conference shall be attended by Contractor, Installer, manufacturer's representative, representatives of each trade performing related work, Architect. Intent of conference is to resolve potential problems prior to start of roofing operations.
- E. NRCA: National Roofing Contractors Association "Roofing and Waterproofing Manual" 1989 edition.
- F. SMACNA: Sheet Metal and Air Conditioning Contractors National Association "Architectural Sheet Metal Manual" 4th edition.

1.05 **Delivery, Storage, and Handling:**

- A. Deliver materials to jobsite on pallets. Pallet label shall indicate material name, production date or product code.
- B. Store materials in dry, protected areas. Control temperature of storage areas in accordance with manufacturer's instructions. Protect materials from freezing.
- C. Store roll materials in an upright position on platforms above ground or deck. Store roofing membrane rolls above 50 degrees F. for a minimum period of 24 hours before application.
- D. Locate stored materials to avoid exceeding safe load capacity of structure.

1.06 **Project Conditions:**

- A. Existing roof conditions are shown on Drawings based on available information. Visit the project site prior to submission of bid and verify existing project conditions. No allowances will be made for failure to ascertain existing conditions.
- B. Comply with local, state and federal regulations, safety standards and codes. When a conflict exists use the stricter document.
- C. Follow system manufacturer's instructions and insurance underwriter's requirements for torch application methods.
- D. Designate one mechanic trained in fire safety to inspect the work area and torch-applied membrane for smoke, shouldering, hot-spots and fire. Maintain a fire watch for a minimum of 1 hour after torch work has been completed. Use infra-red thermal imaging equipment to inspect work area for hot spots before terminating the fire watch. Maintain a daily log which shall be signed by the designated individual prior to departure from the jobsite.
- E. Ensure roof deck is structurally sound to support the live and dead load requirements of roofing system and sufficiently rigid to support construction traffic.

1.07 **Sequence:**

- A. Schedule work to coordinate with other work such as installation of nailers and curbs, sheet metal work and modifications to mechanical and electrical equipment and systems.
- B. Patch and make watertight all cuts and penetrations the same day. Complete all patching at one time. Phased repairs are not acceptable.

1.8 **Warranty:**

- A. Building A: Installer shall warrant the weathertightness of patching and repairs for 2 years.

PART 2 - PRODUCTS

2.01 **General:**

- A. Building A: The existing built-up roof is not under warranty. Use materials that are compatible with the existing roof.

2.02 **Manufacturers/Systems:**

- A. APP Modified Bitumen Flashing and Membrane.
 - 1. Documents **for the APP** system are based on roofing system manufactured by Firestone Building Products Co. Other equal systems **for the APP** by Johns-Manville or Tamko, Soprema are acceptable. Flashing details for other systems shall conform to the intent of the Drawings and be executed in strict accordance with system manufacturer's recommendations. Installation procedures at variance with these specifications require Architect's review.
 - 2. 2-ply APP Modified Bituminous Membrane Flashing, heat welded.
 - a. Base: Firestone APP 160 or J-M APPeX 4S
 - b. Granular Surface Cap: Firestone APP 180 FR or J-M APPeX 4M FR
 - c. Class A fire rating for the assembly.
 - d. Ancillary materials as recommended by flashing manufacturer

2.03 **Insulation Materials:**

- A. Rigid board roof insulation, isocyanurate.
 - 1. For crickets, provide factory tapered board, 1/4" per foot taper.
 - 2. Closed cell polyisocyanurate foam with thermal resistance (R-value) at 75 Degrees F of 5.6 per inch per NRCA/MRCA Technical Bulletin, bearing RIC/TIMA label; with facers compatible with built-up and modified bitumen roofing systems.
 - 3. Conform to Federal Specification HH-I-1972.
 - 4. Firestone ISO95+ GL, or equal product of Johns-Manville, Atlas Energy Products, or product of membrane manufacturer.

2.04 **Miscellaneous Materials:**

- A. Mechanical fasteners for insulation attachment to metal deck:
 - 1. Corrosion-resistant screws with 3" dia. galvanized metal plates. Conform to the recommendations of the insulation manufacturer. Provide pull-out resistance meeting requirements of Factory Mutual Approval Standard 4550. Provide type and size to suit insulation thickness and deck type.
2. Bolts: plain steel threaded fasteners, 1/2" diameter unless indicated otherwise, with suitable washers and nuts..
- B. Adhesive for insulation on gypsum deck substrates:
 - 1. Firestone ISO Twin-Pack Insulation Adhesive, or approved equal.
 - C. Flashing nails:
 - 1. Wood nailer applications: galvanized, 11 gage ring-barbed or spiral-threaded shank, 5/8" minimum head, length to allow penetration of nailer.
 - D. Other materials as recommended by system flashing membrane manufacturer.
 - E. Pipe Portals: Alumi-Flash Extra-tall Base with Prefabricated curb with EPDM cap and pipe boots, stainless steel band clamp; or prefabricated curb with cover and pipe boots as specified below.

2.05 Sheet Metal Counter Flashing:

- A. Prefinished, zinc-coated (galvanized) steel: ASTM A-525, commercial quality, G90 zinc coating, 24 gauge minimum, Kynar 500 fluoropolymer coating: 0.2 mil base coat and 0.8 mil finish coat on face. Epoxy washcoat on reverse. Face color as selected by Architect from manufacturer's standard color range.
- B. Fabrication - General:
 - 1. Hem all exposed edges. Form angled drip in bottom edge of copings, fascias, counterflashings and similar items.
 - 2. Comply in all respects with SMACNA. Provide profiles and details as follows: Plate 55D. 4" Exposed coverplate or lap at splices.

2.06 Roof Curbs and Accessories:

- A. Acceptable Curb Manufacturers:
 - 1. Curbs, Inc.
 - 2. Roof Products and Systems Corporation; Bensenville, Illinois.
 - 3. Pate Company; Broadview, Illinois.
 - 4. Thy Curb Div., Thybar Corporation; Addison, Illinois.
- B. Style: straight Sides, with bottom flange for surface mounting.
- C. Size: 14" height, inside dimension as indicated or as required by specific application.

- D. Construction: 18 gauge galvanized steel shell and base, welded, factory installed 3-1/2 inch by 1-1/2 inch treated wood nailer, sides insulated with 1-1/2 inch thick 3 lb density fiberglass insulation.
- E. Covers: galvanized steel, with integral drip edge, reinforced to support 40 psf minimum or weight of indicated equipment, whichever is greater.
- F. Pipe boots: molded EPDM sized to suite specific application.

PART 3 - EXECUTION

3.01 General:

- A. For APP Modified Bbitumen flashing and roofing on existing built-up roofing install flashing and membrane in accordance with flashing manufacturer's recocommended procedures to achieve a durable and weathertight installation.

3.02 Roof Removal:

- A. As necessary, remove existing roof membrane within area of new curb and wood blocking.
- B. Take precautions for the protection of the building, occupants, contents and grounds during removal and prior to restoration of permanent weathertight enclosure.
 - 1. Provide dust protection at interior spaces below roof removal area.
 - 2. Maintain adequate supply of materials to provide emergency weather protection in case of unforeseen inclement weather. Provide temporary weathertight enclosure if sudden change prevents completion of permanent weathertight enclosure.
 - 3. Protect building and grounds from damage due to traffic, falling debris, soiling and other hazards.
- C. Exercise caution when removing existing roofing; if a vapor barrier is present on the deck, leave it intact. If more than one complete roof system exists, flash the lowest membrane independently.
- D. Properly dispose of debris from removal operations.

3.03 Preparation:

- A. Inspect substrates prior to start of application. Verify surfaces are dry and reasonably smooth. Verify nailers, curbs and wood cants are securely attached, properly aligned and at the correct height. Beginning application constitutes acceptance of conditions.
- B. Remove trash, debris, grease, oil, water, moisture and contaminates which may affect bond of asphalt to deck or insulation surface.

C.Prepare surfaces according to manufacturer's instructions.

- D. Use compatible materials on voids and joints so finished deck surface will be even and smooth.
- E. Protect adjacent areas from damage with tarpaulin or other durable materials. Take particular caution to protect building and site from asphalt drip, splash or spill.

- F. Where membrane or flashings are tied-into existing membrane remove all traces of existing gravel and roof coating, if any, from areas to receive membrane or flashing. Remove and replace damaged, deteriorated and otherwise unsuitable membrane to achieve satisfactory long-term watertight performance.

3.04 Installation - General:

- A. Install materials and systems in accordance with manufacturer's printed instructions and these specifications.
- B. Take precautions to protect building during heat weld:
 - 1. All applicators shall be torch certified.
 - 2. Perform heat welding weekends, holidays, or weekdays between 10:00 PM and 7:00 AM when building is not fully occupied.
 - 3. Maintain fire watch for minimum 1 hour after completion of all work.
 - 4. Use infrared imaging to locate any hot spots.

3.05 Installation - Insulation:

- A. General:
 - 1. Comply with insulation manufacturer's instructions for the particular conditions of installation, and roof membrane manufacturer's instructions.
 - 2. Maintain insulation and substrate in dry condition. Install only as much insulation as can be covered by roofing immediately thereafter.
 - 3. For Modified Bitumen flashing, install insulation cants at intersections with vertical surfaces. Cut edges of insulation to match slope of cant.
 - 4. Install factory tapered insulation crickets, on high sides of curbs to insure a positive drainage pattern on the roof.
- B. Gypsum Decks: Install insulation using adhesive to prepared membrane surface, in accordance with adhesive manufacturer's instructions. .
- C. Metal Decks: Mechanically attach insulation to deck, fastenting through existing roof insulation Secure in accordance with manufacturers instructions.

3.06 Roofing Membrane:

- A. Install membrane materials in accordance with Manufacturer's current published application instructions.
- B. Begin installation at lowest point. Overlap sheets in direction of slope so that water will never lie against a lap.
- C. Observe manufacturer's requirements for application cold weather when ambient temperature is below 50 degrees F.

- D. APP Modified bitumen flashings and membrane:
 - 1. Extend base ply a minimum of 4" onto prepared existing roof surface. Extend top ply 4" beyond base ply onto prepared existing roof surface.
 - 2. Heat weld modified bitumen flashings by torching with hand torch and sealing with heated trowel.
 - 3. Nail top edge of flashing at 8" maximum on center.
- E. Phased application is prohibited.
- F. Provide sheet metal counter flashing over all base flashings..

3.07 **Field Quality Control:**

- A. Inspect all seams continuously for complete and proper bond.
 - 1. APP inspect for proper flow-out at edge.
- B. Inspect work area and torch-applied membrane for evidence of fire. Inspect all work areas within 1/2 hour of torching and not less than 1 hour after completion of torch work each day torches are used.
- C. Finished roof membrane must be solid and tight. Inspect roof and make necessary corrections and repairs as work progresses to ensure proper adhesion and watertightness.

3.8 **Cleaning:**

- A. Remove trash, debris, equipment and parts from jobsite.
- B. Repair damage and remove stains caused by work of this section.

3.9 **Protection:**

- A. Protect existing construction from damage due to asphalt spill, splash, drip and any other potential hazards.
- B. Protect finished roof areas from damage during construction.

End of Section

PART 1 - GENERAL

1.01 Description:

- A. Furnish and install foamed silicone, silicone sealants, intumescent putties and tapes, mortars, and other firestopping products, systems and related materials to stop the passage of fire, smoke and water through openings in fire-rated walls and floors, as shown on the Drawings and hereinafter specified. Materials and application shall be coordinated with requirements as described in other Sections and as noted on the Drawings. The work includes penetrations, openings, joints and voids created in connection with the Work, but not necessary limited to the following:
1. Penetrations through floor slabs, both empty holes and holes accommodating items such as cables, pipes, ducts and conduit.
 2. Penetrations through walls and partitions, both empty holes and holes accommodating items such as cables, pipes, ducts and conduit.
 3. Construction gaps, including gaps, joints, and other openings between walls and floors, between walls and roof decks, between walls and walls, and any linear breach in fire rated barriers and smoke barriers.
 4. Openings and/or penetrations through smoke barriers, or special compartmentalized areas.

1.02 System Description:

- A. Technical requirements:
1. Designs selected for installation shall provide a fire resistance rating at least equal to the hourly resistance rating of the floor, wall or partition into which the firestop design will be installed. For installation in non-fire-rated construction provide a minimum of 1-hour rated firestop assembly.
 2. Systems and materials shall not require special tools for installation and shall not emit hazardous, combustible or irritating fumes during installation, curing or use.
 3. When more than one firestop design is applicable, individual product characteristics shall be evaluated for secondary benefits in performance, e.g. environmental/water sealing, or ease of installation/modification.
- B. General Considerations:
1. Firestop systems do not re-establish the structural integrity of load bearing partitions. consult Architect prior to drilling or coring operations in any load bearing assembly.
 2. Firestop systems are not intended to support live loads and traffic. Curbs or steel plates may be required to restrict or accommodate potential traffic. Notify Architect if there is reason to believe these limitations may be violated.

1.03 Submittals:

- A. Manufacturer's Literature: provide Manufacturer's product information, including product description, limitations and performance characteristics; delete inapplicable portions.

1. Provide certified test reports of:
 - a. Fire test reports of sealant and foam application to substrate materials similar to project conditions.
 - b. Reports from reputable independent testing agencies, of product proposed for use, which indicate conformance to ASTM E814-83.
- B. Record Documents:
 1. Certification: stating that firestopping has been completed in full accordance with the Contract Documents to provide necessary fire-resistance ratings.

1.04 **Quality Assurance:**

- A. Firestopping materials shall conform to Flame (F) and Temperature (T) ratings as required by applicable building code and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire tests. The F rating shall be a minimum of one (1) hour but not less than the fire resistance rating of the assembly being penetrated. T rating, when required by code authority, shall be based on measurement of the temperature rise on the penetrating item(s) on the non-fire side of the penetration. The fire test shall be conducted with a minimum positive pressure differential of 0.01 inches of water column.
- B. Installer Qualifications: minimum of two (2) years experience on comparable projects. Firestopping work shall be performed by a single subcontractor to maintain consistency and accountability on the project.
- C. Compatibility: investigate sealant and foamed elastomer's compatibility with the joint surfaces, joint fillers and other materials in the joint system. Provide only materials (manufacturer's recommended variation of the specified materials) which are known to be fully compatible with the actual installation condition, as shown by manufacturer's published data or certification.
- D. Definitions:
 1. Fire Rated: having the ability to withstand the effects of fire for a specified time period, as determined by qualified testing.
 2. Fire Rated Assembly: a floor, wall or other partitions able to withstand a design fire and hose stream test without failure.
 3. Fire resistance rating: the time, in hours, for which the rated assembly can withstand the effects of fire without burn-through or structural failure.
 4. Firestop: a means of sealing openings in fire rated assemblies to preserve or restore the fire resistance rating.
 5. Firestop System: the combination of materials and/or devices, including the penetrating items, required to make up a complete firestop.
 6. Penetrating Item: a pipe duct, conduit, cable tray, cable, or other element passing through an opening in a fire rated assembly.

1.05 **Delivery, Storage and Handling:**

- A. All materials shall be delivered on the job in original unopened labeled containers of bundles, and

stored in a place protected from damage, moisture and exposure to the elements in exact accordance with manufacturer's instructions.

- B. Store materials in original containers, out of the weather at a temperature below 90°.
- C. Foam: store unmixed liquid components in their original, unopened containers at temperature of 65°F. to 80°F. for a minimum of 12 hours before use.
- D. In the event of damage, immediately make all repairs and replacements necessary to the approval of, and at no additional cost to, the Owner.

1.06 Project Conditions:

- A. Do not apply sealants or foamed elastomers when temperature of substrate material and surrounding air is below 40°F.
- B. Maintain sealant and foamed elastomers at a minimum of 70°F. for best workability.
- C. Use forced air ventilation when installing foam in areas having less than two (2) cubic feet of free air for each 1 pound of liquid mixture being foamed.
- D. Firestopping requirements may be created under related sections of the Project Specification. Contractor shall:
 - 1. Identify all locations requiring firestopping.
 - 2. Schedule installation of firestopping after completion of duct, piping, electrical runs, but prior to covering or concealing of openings or eliminating access thereto.

PART 2 - PRODUCTS

2.01 Manufacturers:

- A. Provide products complying with requirements of the contract Documents and make by one of the following:
 - 1. Specified Technologies, Inc. (STI)
 - 2. 3M Fire Protection Products (3M)
 - 3. Grace Construction Products
 - 4. Hilti Firestop Systems
 - 5. International Protective Coatings Corp. (IPC)
 - 6. Nelson Firestop Products
 - 7. Tremco

2.02 Materials:

- A. General: provide firestopping materials that expand to fill cavities or provide adhesion to substrates, and that will maintain seal under normal expected movements of substrates.
- B. UL Classification: provide firestopping materials that are currently classified with UL as "Fill, Void

or Cavity Materials", and "Through Penetration Firestop Systems".

- C. Fire Test: provide firestopping materials that have been tested in accordance with ASTM E814-83 "Methods for Fire Tests of Through-Penetration Fire Stops" and UL 1479 "Fire Tests of Through-Penetration Firestops."
- D. Intumescent Firestop Sealants and Caulks: "SpecSeal S100 and S500 Sealant" (STI), "Fire Barrier Caulk CP25WB+" (3M).
- E. Latex Firestop Sealant: "SpecSeal LC150" (STI)
- F. Silicone Firestop Sealants and Caulks: "SpecSeal Pensil 100 and 300" (STI), "Fire Barrier Silicone Sealants" (3M), "FlameSafe FS1900" (IPC), "CLK non-sag Firestop Sealant" (Nelson), "FYRE-SIL" (Tremco).
- G. Sealant, self-leveling silicone: "FYRE-SIL S/L" (Tremco), "CLK self-leveling Fire Stop Sealant" (Nelson).
- G. 2-Part Silicone Firestop Foam: "SpecSeal Pensil 200" (STI), "Fire Barrier 2001 Silicone Foam" (3M).
- H. Firestop Putty: "SpecSeal Firestop Putty Bars and Pads" (STI), "Fire Barrier Moldable Putty" (3M), "FSP1000, FSP1100 Non-hardening Putty and FSP1077 Putty Pads" (IPC), "FSP Firestop Putty" (Nelson).
- I. Intumescent Firestop Collars: "SpecSeal Firestop Collars SSC" (STI), "Fire Barrier PPD's" (3M), "Flamesafe firestop Device FSD" (IPC), "Pipe Choke System PCS" (Nelson).
- J. Intumescent Wrap Strips: "SpecSeal Wrap Strip SSW" (STI), "Fire Barrier FS195 Wrap Strip" (3M).
- K. Firestop Mortar: "SpecSeal Mortar SSM" (STI), "Firestop Compound CMP" (Nelson), "FlameSafe Mortar Seal" (IPC).
- L. Sheet: "CS-195 Composite Sheet" (3M), CPS Composite Sheet (Nelson).
- M. Damming Materials: alumina silicate fire board, mineral fiberboard, mineral fiber matting, mineral fiber putty as listed by UL in the assembly.
- N. Primer: as recommended by the respective manufacturer.
- O. Masking Tape: pressure-sensitive adhesive tape.

PART 3 - EXECUTION

3.01 Examination:

- A. Examine the areas and condition under which sealants and foams are to be applied. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Confirm compatibility of surfaces to receive sealant materials.
- C. Verify that surfaces of openings are sound, clean, dry and ready to receive application of sealants.
- D. Verify the penetration elements are securely fixed and properly located; with a minimum of 1/2 inch space between penetrations and surfaces of openings.
- E. Starting of work will be construed as acceptance of the surfaces and conditions within any particular area.

3.02 **Preparation:**

- A. Provide drop cloths or other satisfactory covering for protection of adjacent areas in accordance with good work practices.
- B. Clean substrate of dirt, dust, grease, oil, loose material and other mater that may affect bond of firestopping material.
- C. Clean metal and glass surfaces with non-alcohol solvent.
- D. If necessary, install damming material to hold the firestopping material in place.
- E. If necessary, apply primer in accordance with manufacturer's instructions. Test sealant adhesion to each substrate material. Apply primer to any surface showing poor adhesion.

3.03 **Application:**

- A. Sealant: use sealant for simple fire-rated wall and floor penetrations, including plumbing fixtures, simple cable systems, conduit or pipe through sleeves, and fire-rated expansion joints.
 - 1. Apply sealant from cartridge by pushing ahead of the nozzle and against the sides of the penetration opening. If bulk sealant is used, using a trowel, putty knife or spatula, work it into the penetration opening. Ensure sealant is in contact with all surfaces.
 - 2. Apply sealant to a minimum depth of 1½" and with a uniform density and texture or, at Contractor's option, install a minimum of 3" of fire-resistant mineral fiber as damming material and seal with 1½" of firestopping sealant with a uniform density and texture.
- B. Foam: use foam for complex fire-rated wall and floor penetrations, including multiple cables, multiple cables in trays, multiple conduit and pipes and mixtures of cables, conduits and pipes.
 - 1. Follow the manufacturer's installation instructions for damming penetrations.
 - 2. All gaps or cracks left after damming materials are in place shall be sealed.
 - 3. Immediately after mixing, dispense liquid foam into the penetration opening, in accordance with manufacturer's installation instructions.
 - 4. Do not overfill penetration openings with liquid foam. Make proper allowance for foam expansion during curing. Follow the guidelines provided below.
 - a. When dispensing liquid foam continuously, be sure the thickness of the liquid foam does not exceed one inch at any given spot.
 - b. If the opening is not filled when the cured foam has completed its expansion, repeat the injection and cure procedure until the opening is filled to the desired level. Allow 10 minutes between application of each shot.
 - 5. Leave dam in place for 24 hours to allow foam to fully cure.
- C. Intumescent Tape: where plastic pipes pass through fire-rated floors and walls, they shall be wrapped with intumescent tape. Wrap the tape as close to the wall or floor as possible; secure in place with wire ties or foil tape.

3.04 **Field Quality Control:**

- A. Examine penetration seals for proper installation, adhesion and curing as may be appropriate for the respective seal materials.
- B. Keep areas of work accessible and notify code authorities or designated inspectors of work released for inspection.
- C. Document completion and inspection as required.
- D. Perform manufacturer's in-line quality control check at least once daily and upon changing to new lot of material, in order to ensure performance of both dispensing equipment and foam product prior to installing penetration seals.
- E. Inspect cured penetration seal after 24-hour cure by removing damming materials to examine seal.
- F. Identify damaged or re-entered seals requiring repair or modification.
- G. Remove loose or damaged materials.
- H. If penetrating elements are to be added, remove enough material to insert new elements being careful not to cause damage to the balance of the seal.
- I. Insure that surfaces to be sealed are clean and dry.
- J. Re-install materials as required. Use only materials approved by manufacturer as suitable for repair of original seal.
- K. Damming materials required to achieve a fire rating shall be returned to the penetration.
- L. Cutting and patching and repairing of damaged or unsatisfactory material shall be provided by the Contractor.
- M. All areas from which samples have been removed shall be patched to provide the specified rating and thicknesses.

3.05 **Adjusting and Cleaning - Exposed Areas:**

- A. Clean up spills of liquid components with high-flash mineral spirit solvent, following manufacturer's instructions and precautions on container label.
- B. If necessary, trim excess cured foam and sealant with a sharp knife or blade.
- C. Remove foam and sealant from materials and surfaces not specifically required to be sealed.
- D. Remove equipment, materials, and debris, leaving area in undamaged, clean condition.
- E. If support aids or forms are installed they shall be removed after the designated cure time unless the support materials used are of a fire resistant or noncombustible nature.

End of Section

PART 1 - GENERAL

1.01 Description:

- A. Furnish and install all gypsum drywall and metal framing as indicated on the Drawings and Specified herein. The work includes, but is not necessarily limited to the following:
 - 1. Metal framework for drywall including framing and furring of interior walls, partitions, columns, ceilings and interior soffits.
 - 2. Gypsum board exposed facing for interior metal framing.
 - 3. Casings, control joints, and beads.
 - 4. Access panels.
 - 5. Tape, finishing cements, and adhesives.
 - 6. Anchors, fastenings and accessories.
 - 7. Acoustic caulking and sound insulation within drywall partitions.
- B. Related Sections:
 - 1. Section 09 90 00: Painting.

1.02 Submittals:

- A. Product data: manufacturer's data and specifications for all products, standard details for installation.
- B. Shop drawings: submit detailed shop drawings of all non-standard conditions in connection with metal stud construction. Include plans and elevations at not less than 1/4" to 1'-0" scale, and details at not less than 3" to 1'-0" scale.

1.03 Quality Assurance:

- A. Installer: company specializing in gypsum board systems work with minimum five (5) years experience.
- B. Regulatory requirements:
 - 1. Work shall conform to the requirements of state, county, city laws, rules, and regulations, and shall pass all inspections by authorities having jurisdiction.
 - 2. Conform to the requirements of the applicable building code.
 - 3. Wherever fire resistance classifications (2hr., 1hr., and similar designations) are indicated on the Drawings, or required by codes for ceilings, walls and partitions, install materials, accessories, and use application procedures which have been listed by UL or tested in excess of requirements of ASTM E119-88 for the type of construction shown and local building code and fire regulations. Wherever specific UL construction classifications are indicated on the drawings, follow those requirements precisely.

- C. Reference Standards: all work shall conform to or exceed the applicable requirements of "Using Gypsum Board for Walls and Ceilings, GA-201 "Recommended Specifications for the Application and Finishing of Gypsum Board, GA-216" published by the Gypsum Association, hereinafter referred to as "Standard Specifications".
- D. Framing shall be selected and installed to comply with manufacturer's recommendations, including limiting height of walls and partitions.

1.04 Delivery, Storage, and Handling:

- A. All materials shall be delivered on the job in the original packages containers or bundles bearing the brand name and the name of the manufacturer or the supplier for whom the product is manufactured.
- B. All materials shall be kept dry, preferably by being stored inside the building under roof. Where necessary to store gypsum board outside, it shall be stacked off the ground, properly supported on a level platform and fully protected from the weather.
- C. Gypsum board shall be neatly stacked flat with care taken to avoid undue sagging or damage to edges, ends, and surfaces. Do not overload floor by concentration of stacked materials.
- D. Protect metal studs and channels from rusting and damage.

1.05 Project Conditions:

- A. In cold weather, the building shall be heated during the application of the gypsum board and joint treatment to maintain a uniform temperature in the range of 55°F. to 75°F. Ventilation shall be provided to eliminate excessive moisture.

PART 2 - PRODUCTS

2.01 Manufacturers:

- A. Gypsum board construction with related metal components and accessories as required shall be products and materials supplied or manufactured by the following.
 - 1. United States Gypsum Corporation.
 - 2. Gold Bond Building Products, National Gypsum Corporation.
 - 3. Georgia-Pacific Corporation.
 - 4. CertainTeed Gypsum, Inc.
- B. Steel framing: Dietrich, Dale/Incor, Bailey Metal Products, or equal.

2.02 Metal Framework:

- A. Studs, runners and tracks: steel, with stud flanges not less than 1¼" wide, x width shown on the Drawings, screw type, knurled on outside faces.
 - 1. Interior use, ASTM C645, galvanized: gauge as required by height or span, not less than 25 gauge.
 - a. Use 20 gauge or greater immediately adjacent to hollow metal door jambs and where indicated.

- b. Use 20 gauge or greater behind cement backer board.
 - c. Top runners for all partitions shall be 20 gauge or greater. Where runners are attached to underside of roof deck, provide deep leg runners or slotted deflection track.
- B. Hangar wire: No. 8 gauge galvanized annealed wire.
- C. Tie wire: No. 16 and 18 gauge galvanized and annealed wire.
- D. Carrying channels: cold rolled, No. 16 gauge, 1½" deep, (475lbs./M.lin.ft.) painted for interior.
- E. Zee Furring channels: ASTM C645, 25 gauge, galvanized steel, "Z" shaped, 1½" projection.
- F. Drywall Furring channels: ASTM C645, 25 gauge, galvanized steel, 7/8" projection, DWC type.
- G. Framing and accessories: ASTM C645.
- H. Field curvable track:
 - 1. "Flex-C Track" Flexibility Concepts, Oklahoma City, OK
 - 2. "Ready-Track" Radius-Track, Blaine, MN
 - 3. At *Contractor's Option* straight track may field-formed to required radius using suitable forming equipment or factory pre-curved track may be furnished in lieu of field-curvable track.
- I. Framing accessories:
 - 1. Interior use: ASTM C645
 - 2. Sliptrack Systems - Slotted Deflection Track, 2 1/2 inches minimum leg with 1 1/2 inches slot in leg, or greater depth as required to suit deflection requirements.
- J. Fasteners:
 - 1. Metal-to-metal, metal-to-wood: self-drilling, self tapping screws:
 - a. Head style:
 - (1) Attachment of gypsum board to steel framing: bugle head; ASTM C954 or ASTM C1002.
 - (2) Attachment of framing components to steel: pan, wafer or hex head.
 - b. Point style:
 - (1) Attachment to wood, or 20 gauge or thinner metal material: gimlet point.
 - (2) Attachment to material heavier than 20 gauge: drill point, hardened.
 - c. Coating:
 - (1) Exterior applications: corrosion resistance, per ASTM B117, providing salt spray resistance of 720 hours with maximum of 10% red rust. Acceptable coating products: ITW-Buildex "Climaseal" or approved equal.

- (2) Interior application: oil-phosphate coating complying with ASTM B 633.
- 2. Metal-to-concrete or structural steel: low-velocity, powder-driven fasteners, 0.3" dia head, 0.140" dia shaft, austempered hardened steel, manufactured by ITWRamset/Redhead, or equal.
 - (1) For overhead inverted fastening (fastener in tension) drive fastener through 7/8" dia steel washer.

K. Adhesive: ASTM C557.

2.03 Gypsum Board:

- A. Standard gypsum board: ASTM C36-85; 5/8" thick unless indicated otherwise, maximum permissible lengths, long edges tapered on face side to form shallow channel for joint reinforcement.
 - 1. Use 1/4" thick panels in 2-layer construction for curved surfaces.
- B. Impact-resistant board: 5/8" thickness,
 - 1. Certaineed ProRoc Extra Abuse Type X with M2Tech
 - 2. Georgia-Pacific DensArmor Plus Impact-Resistant Interior Panels
 - 3. Gold Bond Hi-Impact BRAND XP Gypsum Board
 - 4. USG Fiberock VHI.
- C. Sag-Resistant Ceiling board: ASTM C36, C1395, C1396; 1/2" thick, 8' or 12' lengths, edges tapered; USG, or equal.
 - 1. CertainTeed Pro-Roc Interior Ceiling Gypsum Board
 - 2. Georgia-Pacific Tough Rock CD Ceiling Board
 - 3. Gold Bond High Strength Ceiling Board
 - 4. USG Sheetrock Interior Ceiling Panel Sag Resistant
- D. Fire rated gypsum board: ASTM C36; fire resistive type, UL rated, type X, 1/2" or 5/8" thick and regular or premium grades as required for UL assembly or specific detail, maximum permissible lengths.
- E. Moisture resistant gypsum board: proprietary, moisture and mold resistant, 5/8" thick, maximum permissible lengths, long edges tapered on face side to form shallow channel for joint reinforcement.
 - 1. Certaineed ProRoc Moisture & Mold Resistant Gypsum Board with M2Tech
 - 2. Georgia-Pacific DensArmor Plus High Performance Interior Panel
 - 3. Gold Bond e2XP Extended Exposure Interior Extreme
 - 4. USG Fiberock Aqua-Tough Interior Panels
- F. Gypsum tile backing board: ASTM C 1178 fiberglass mat water-resistant gypsum backing panel; or ASTM C1278 water-resistant fiber-reinforced gypsum backing panels, 5/8" thick, standard or fire rated (type X) as required, maximum permissible lengths, square edges, ends square cut.
 - 1. CertainTeed Glass-Roc Tile Backer

2. Georgia-Pacific DensShield Tile Backer
 3. Gold Bond e2XP Tile Backer
 4. USG Fiberock Aqua-Tough Tile Backerboard
- G. Flexible gypsum board: ASTM C36; 1/4" thick, maximum permissible lengths, long edges tapered on face side to form shallow channel for joint reinforcement.

2.04 Accessories:

- A. Fasteners:
1. Gypsum board, metal stud construction: Phillips head, self drilling drywall screws, length as recommended by manufacturer for use intended.
 - a. Provide corrosion-resistant coated type for attachment of sheathing to exterior metal framing.
 2. Gypsum board, wood stud construction: drywall nails, ASTM C514, length and type as recommended by manufacturer for use intended.
 3. Fiberglass reinforced cement board: Phillips head, self drilling, hot-dipped galvanized screws, or proper length.
- B. Joint reinforcing tape: 2" nominal width, conforming to ASTM C475
1. Paper tape, unless indicated otherwise.
 2. Alkalai-resistant, polymer-coated fiberglass mesh tape, for tile-backer board and moisture-resistant board.
- C. Joint compounds and adhesives, conforming to ASTM C475:
1. Joint compound (first coat) and laminating adhesive: setting type; 20, 45 or 9 minute formulations to suit working conditions, regular or sandable types.
 2. Joint compound (second and subsequent coats): ready-mixed, or field-mixed, drying type, regular or light-weight types.
- D. Beads and trim: rigid PVC or combination rigid/flexible PVC unless indicated otherwise, maximum practical lengths, conventional staple/adhesive attachment or mud-set types, manufactured by Trim-Text or approved equal, types to suit applications, including but not limited to:
1. Corner bead, archway corner bead, splayed corner bead, adjustable inside corner bead
 2. Control joint #093V
 3. J-Bead
 4. Tear-away L-Bead and Super-Seal Tear-Away L-Bead
- E. Water: clean, fresh and suitable for domestic consumption.

2.05 Insulation and Sealant:

- A. Sound control batt insulation: unfaced glass fiber, conforming to ASTM C665, Type I. Insulation shall

be 3-1/2" thick, unless indicated otherwise, with minimum overall STC rating in system of 48 with gypsum board on both sides of a metal stud.

- B. Safing insulation: 4 PCF, 2" thick by width of runner track USG's "Thermafibre Safing" or equal.
- C. Acoustical sealant: USG "Acoustical Sealant", Tremco "Acoustical Sealant", Pecora BA98 Acoustical Sealant, non-skinning, non-bleeding, non-hardening material.
- D. Exterior sheathing sealant: Dow 795 silicone sealant, or equal recommended by board manufacturer.
- E. Preformed filler: sponge neoprene or PVC, rectangular, 1" less than width of wall, 3/8" thick before compressing.

2.06 Access Panels:

- A. Flush steel access door, 16 gauge frame, 14 gauge face, galvanized textured flange to accept finishing compound, screw-slot latch, concealed continuous hinge, primed finish; Karp Model KDW, Milcor Model DW, Nystrom Model NW or approved equal.
- B. Provide one access panels to be located as directed by Architect, size 12"x 12",

PART 3 - EXECUTION

3.01 Preparation:

- A. Pr-installation Conference for Moisture-Resistant Barrier: Conduct a pre-installation conference attended by Contractor, installer, Moisture-Resistant Barrier Manufacturer's technical representative, and Architect. Review conditions of installation, details, sequence and schedule. Prepare and distribute minutes of meeting to all attendees

3.02 Examination:

- A. Verify the site conditions are ready to receive work. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Beginning installation means acceptance of existing conditions.
- C. Provisions for heavy fixture anchorage shall be provided where required.
- D. Directions for installation and application of all materials shall be in accordance with the latest printed directions of the manufacturer and these specifications.

3.03 Partition and Suspension Performance:

- A. Partitions shall be erected in a straight line, free of contact with pipes or bending to avoid contact with pipes. In applying face layers of gypsum, board to backing, face layers shall be free of any rubbish, grit, pebbles or other foreign materials which would misalign face layer of gypsum board.
- B. Deflection: studs shall not deflect more than 0.10" when subjected to bending in a plane parallel long axis of section by center loading of 100 PSF on 5 ft. clear span using 6 ft. test samples.
- C. In absence of specific size or load requirements, partitions shall be sized to resist a minimum 5 PSF. Follow recommendations of USG for sizing partition framing.

3.04 Interior Non-Bearing Metal Framework Installation:

- A. Install metal framework in accordance with ASTM C754 and manufacturer's instructions. In general, runners for partitions shall be aligned accurately at floor and ceiling and securely anchored with suitable fasteners spaced not more than 16" O.C. For smooth curvature and curved surfaces, spacing shall be 12" O.C. or less as required.
- B. Floor and ceiling runner tracks: provide continuous tracks sized to match studs. Secure runner tracks for floor and ceiling construction involved at 24" O.C. spacing for screw or powder-driven fasteners or 16" O.C. for other types of attachment. Provide fasteners at all corners and ends of runner tracks. Isolation of partitions from structure: where partitions abut horizontal or vertical structural elements, isolate to prevent transfer of structural loads or movements to partition. At roof deck install deep leg runners to accommodate deflection. Do not fasten studs at roof deck runners.
 - 1. Where runners are attached to overhead construction and support suspended loads, reduce fastener spacing to comply with fastener manufacturer's recommended working loads for the specific substrate and conditions.
- C. Studs shall be positioned vertically in the runners. Anchor all studs located adjacent to door, partition intersections, and corners to runner flange. When necessary, studs shall be securely spliced with a minimum 8" nested lap in which one screw per stud flange is required. Terminate top of partitions at roof or floor construction above, unless otherwise shown or specified.
- D. Studs in back-to-back, singles faced partitions shall be braced at third points with metal studding or 16" wide gypsum board gussets.
- E. Blocking: secure wood blocking or steel reinforcing to studs where shown or required to support doors, windows, plumbing fixtures, toilet partitions & accessories, wall cabinets, and hardware. Coordinate installation of bucks, anchors, and blocking for electrical and mechanical work.
- F. Brace stud system and make rigid. At intersections, form corner with three studs. Locate studs no more than 2" from all abutting partitions, partition corners and other construction.
- G. The framing behind control joints shall not be continuous. In partitions, place two studs spaced approximately 1/4" to 3/8" apart, where the joint occurs. Place preformed fire safing or acoustical insulation between studs, as appropriate.
- H. At all sound partitions, set top and bottom runners in two 1/4 inch diameter continuous beads of sealant.

3.05 **Wall Furring Installation:**

- A. Install furring in accordance with ASTM C754 and manufacturer's instructions. Erect furring for direct attachment to masonry and concrete walls.
- B. Erect furring channels horizontally or vertically. Secure in place on alternate flanges a maximum 24" O.C. Space furring channel maximum 24" O.C., not more than 4" from floor and ceiling lines and abutting walls.

3.06 **Ceiling and Soffit Framing Installation:**

- A. Install interior and exterior soffits in accordance with ASTM C754 and manufacturer's instructions. Coordinate location of hangers with other work. Soffits shall be prepared to receive gypsum drywall or other finishing as indicated on the Drawings. Space supports 24" O.C. maximum.
- B. **At Contractor's option** ceiling and soffit framing may be accomplished with modular drywall suspension system or with traditional studs, cold-rolled channels and furring channels.
- C. Carrying channels for metal framed gypsum drywall ceiling and soffits shall be suspended with No. 8

hanger wires not over 4'-0" O.C. and within 6" of perimeter walls, Hanger wires shall be of sufficient length to wrap around channels.

- D. Attaching hangers to concrete: Embed wire loops, hooks, wire hairpins, or hanger inserts in concrete and attach hangers in accordance with manufacturer's instructions.
- E. Attaching hangers to steel: hanger wire shall be looped around bottom chord of open web steel joists and shall then receive three full turns around vertical portion of hanger. Hanger wire shall be saddle-tied to main runner channels and shall then receive three full turns around vertical portion of hanger.
- F. Hangers shall not contact insulation covering pipes or ducts. Splay hangers only where obstructions or conditions prevent plumb installation. Offset horizontal forces of splayed hangers by counter-splaying, bracing or other suitable method. Provide independent framing below duct work.
- G. Install ceiling framing independent of walls, columns, and above ceiling work.
- H. Furring channels positioned at right angles to carrying channels shall be spaced 12" O.C. and shall be double strand wire tied at each intersection. Additional lengths of furring channels shall be located where ends of gypsum board panels occur between primary carrying channels and shall be secured thereto in the same manner. The furring channels shall extend at least 4" beyond the joint on each end but not in contact with abutting masonry walls.
- I. Framing shall be installed to properly provide for opening such as electrical fixtures. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral bracing. Extend bracing minimum 24 inches past end of openings. Install metal rings or strips for recessed lights and other finished openings.
- J. Laterally brace entire suspension system.

3.07 **Insulation Installation:**

- A. Where indicated, place acoustical insulation.
- B. Walls, general:
 - 1. Batts shall be friction fit in place until the interior finish is applied.
 - 2. Install batts to fill entire width and height of stud cavity. If stud cavity is less than 96" in height, cut lengths to friction fit against floor and ceiling tracks. Carefully cut insulation at penetrations so that insulation fits tightly around penetrating item. Provide continuous insulation behind outlets, junction boxes and other recessed items.
 - 3. Where gypsum board is installed on only one side of studs provide wire, metal strapping, stapling, or other supplementary support to retain insulation in place.

3.08 **Gypsum Board Installation:**

- A. Minimum temperature in space shall be 50°F., preferable minimum is 79°F. Provide ventilation and heat as required to remove excess moisture.
- B. Install board vertically in maximum practical lengths to span walls without end (butt) joints. If butt joints do occur, stagger joints and locate as far as possible from center of walls. Support joints on framing members. Joints on opposite sides of partitions shall be arranged to occur on different studs.
- C. Gypsum board on non-fire-rated partitions shall extend to construction above, unless otherwise noted. All fire-rated partitions shall have all plies extending to construction above.

- D. Provide openings in non-rated partitions above ceiling where shown on mechanical drawings or required to insure proper return air flow.
- E. Space between gypsum board and ducts, piping, oversized holes, etc:
1. Fire-rated partitions: leave open for fire penetration sealant.
 2. Non-fire-rated partitions: fill with safing insulation.
- F. In 1-ply construction, apply gypsum board vertically with edges at approximate centers of the studs or furring channels. Attach gypsum board by fasteners specified, spaced 12" O.C. in the field of the board and 8" O.C. along the edges. Use screws for fastening boards to metal framing and nails for fastening to wood framing. Screws shall be power drive and screw and nail head shall provide a slight depression below surface of the board. Fasteners shall not be driven closer than 3/8" to the edge of the board.
- G. In 2-ply construction, apply the first layer of gypsum board as specified in 1-ply construction above. Joints in the second layer shall offset at least 10" from parallel joints in the first layer. Apply the second layer of gypsum board vertically using adhesive or fasteners. spread adhesive over the first layer or over the back of the second layer by means of mechanical spreader, forming ridges of 1/4" x 1/4" spaced 2" O.C. Apply second layer in position and hold with temporary bracing or fastening. If mechanical fasteners are used, follow direction in 1-ply construction.
- H. Partitions with acoustical insulation: Set first layer of board in bead of acoustical sealant at floor line. Cutouts in gypsum board for electrical boxes and other recessed and penetrating items shall be close fitting. Provide acoustical sealant around electrical boxes and other recessed or penetrating items
- I. On ceilings and soffits, apply gypsum board with bound edges at right angles to the furring channels and attached by fasteners specified, spaced 12" O.C. in the field of the board and 8" O.C. at the edges. Use screws for fastening boards to metal framing and nails for fastening to wood framing. Screws shall be power drive and screw and nail head shall provide a slight depression below surface of the board. Fasteners shall not be driven closer than 3/8" to the edge of the board.
- J. Treat cut edges and holes in moisture resistant gypsum board with sealant.
- K. Install specified metal trim at corners, edges, doors, and windows according to manufacturer's instructions and recommendation.
1. Corner bead: reinforce all vertical and horizontal exterior corners with corner bead.
 2. Edge and opening trim: where assembly terminates against a masonry or other dissimilar material, apply trim with tear-off strip over panel edge.
- L. Control Joints:
1. Locate control joints in exposed interior surfaces at a maximum spacing of 24 feet on center in each direction, or less if so indicated on the Drawings.
 2. A space 1/4" to 3/8" shall be left in the gypsum board for centering and aligning the pre-formed control joint.
 3. The preformed control joint shall be applied with 1/2" to 9/16" staples. Staples shall be spaced not to exceed 6" O.C. Staples shall be driven either between or across holes with crown at a 45° angle from the long dimension of the joint. When butting two pieces of the joint, the crown of the staple shall run parallel to the joint with one leg piercing each piece of materials. The control joint shall fit snug against the gypsum board.
- M. Install metal access panels in gypsum board. Securely fasten metal panel frames to wall construction

and set level with gypsum board surface.

- N. No vertical joints shall occur within eight (8) inches of corners, windows, doors or other such openings, except at control and expansion joints.
- O. Reinforce outside angle with metal corner trim anchored as recommended by manufacturer. Provide casing beads at exposed edges of all gypsum board where corner reinforcement is not provided and/or where edge of board is held away other material to form a reveal.
- P. Erect pre-decorated gypsum board vertically using colored fasteners to match vinyl covering.

3.09 Finish Levels:

- A. Surfaces shall be finished to the following Levels:
 - 1. Unless indicated otherwise: Level 4.
 - 2. Surfaces to receive Wood Wall Covering: Level 5.
 - 3. Surfaces to receive ceramic tile: Level 2, with setting-type compound.
 - 4. Surfaces to receive FRP Wall Surfacing: Level 1, with setting-type compound.
 - 5. Concealed areas above ceilings: Level 1.
- B. The following descriptions are excerpted from "Recommended Specifications: Levels of Gypsum Board Finish".
 - 1. Level 1 (fire-taping): All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable..
 - 2. Level 2: All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
 - 3. Level 4: All joints and interior angles shall have tape imbedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free from tool marks and ridges.
 - 4. Level 5: All joints and interior angles shall have tape imbedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free from tool marks and ridges. A thin skim coat o joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.

3.10 Sealants:

- A. Acoustic or thermal insulated assemblies, caulk with acoustical sealant, all of the following:
 - 1. Perimeter
 - 2. Penetrations, except those receiving fire penetration sealants.

3. Openings in electrical boxes, and other built-in elements.
- B. Exterior sheathing: caulk with exterior sheathing sealant, all of the following:
1. Perimeter
 2. Penetrations, except those receiving fire penetration sealants.
 3. Openings in electrical boxes, and other built-in elements.
- C. Caulk visible voids between gypsum board and adjacent construction.

3.11 Glass Reinforced Gypsum (GRG) Fabrications:

- A. Install Glass Reinforced Gypsum (GRG) fabrications in accordance ASTM C1467 and manufacturer's recommendations. Provide concealed steel stud framing and bracing to rigidly connect GRG fabrications to building structure. Mechanically attach GRG sections to concealed framing. Finish joints with joint compound.

3.12 Adjust and Clean:

- A. Protect all finished work, particularly wood, aluminum, painted metal, and glass, and make good any damage done to such work.
- B. All rubbish and debris, combustible or not, shall be discarded to covered metal containers daily and removed from the premises at least weekly and legally disposed of.
- C. All excess gypsum board cement at junction of wall and ceiling, and floor shall be removed. Excess gypsum board cement at location of base board shall be removed to afford a closer contact of base and wall.

3.13 Patching:

- A. After trim has been applied, and prior to decoration, correct all surface damage and defects as required to leave work smooth and without observable blemishes which will show through the decoration.
- B. Replace damaged pre-decorated gypsum board with new matching sheets. Patching may only occur with approval of architect. Provide manufacturer's standard patching kit for owner's use at completion of the project.

3.14 Tolerances:

- A. Maximum variation from true flatness: 1/8" in 8 feet in any direction from required plane nor vary more than 1/16"/foot. Ceiling and soffits shall be level within 1/8" in 12 feet.

3.15 Schedule:

- A. Provide Type X regular and premium, fire rated gypsum products where noted or required in fire rated assembly, provide number of plies and thickness to achieve indicated fire resistance rating.
- B. Provide 5/8" gypsum tile backer board where panels will receive ceramic tile finish.
- C. Provide 5/8" impact-resistant board where indicated on the 4 Drawings.
- D. Provide 5/8" moisture resistant gypsum board for:

1. First 4 feet above floor of all walls in Production Kitchen, Warewash, Cullinary Arts Lab, and Servery areas.
 2. Walls in toilet rooms and janitor's closets which do not receive ceramic tile finish.
- E. Provide 5/8" standard grade, gypsum board for all other walls not fire rated.
- F. Provide 1/2", sag resistant ceiling board for all interior ceilings not fire rated.

End of Section

PART 1 - GENERAL

1.01 Description:

- A. Perform all work necessary to complete all painting and related work as shown on the Drawings and as specified herein. Work includes furnishing all required labor and materials including, but not necessarily limited to, the following principal items:
 - 1. Surface preparation.
 - 2. Painting new interior gypsum board surfaces.
 - 3. Painting existing surfaces affected by cutting and patching.
- B. Painting not included:
 - 1. Brick and tile.
 - 2. Wood doors and wood trim with transparent finish.
 - 3. Acoustical ceilings
 - 4. Pre-finished items: do not paint existing factory-finishing items such as (but not limited to) finished mechanical and electrical equipment including light fixtures, switchgear and distribution cabinets, electrical device plates, fire alarm devices.
 - 5. Concealed surfaces: unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, and duct shafts.
 - 6. Finished metal surfaces: metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.
 - 7. Operating parts and labels:
 - a. Do not paint any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts, unless otherwise indicated.
 - b. Do not paint over any code-required labels, such as underwriters' laboratories and factory mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.02 Definitions:

- A. Conform to ANSI/ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
- B. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- C. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface

treatment specified under other sections.

D. DFT

1. Dry Film Thickness.
2. The thickness of the dry film of a coating measured either in mils or microns.

E. Mil

1. One one-thousandth of an inch.
2. Used to measure the thickness of coating films.

F. Gloss or Sheen Levels: Percentage reflection as measured on a 60 degree Gloss Meter.

1. Flat: Up to 5% reflection
2. Eggshell / Low Lustre: 5% to 15% reflection
3. Pearl / Low Lustre: 15% to 25% reflection
4. Satin / Soft Gloss: 35% to 55% reflection
5. Semi-Gloss: 35% to 60% reflection
6. Gloss: 60% or greater reflection

1.03 **Submittals:**

- A. Submit a list of proposed materials including manufacturer's name and trade names. Provide a listing of material and application for each coat of each finish sample. Include manufacturer's installation instructions.
- B. Samples: Submit draw-down samples for Architect's review of color and texture only. Compliance with all other requirements is exclusive responsibility of the Contractor.
- C. Project Record Documents: submit in accordance with the Project Manual; material list, paint schedule, complete information including color number and color mixing data for custom colors.

1.04 **Quality Assurance:**

- A. Applicator Qualifications: company specializing in commercial painting and finishing with minimum five years experience on comparable projects.
- B. The current edition of "A Modern Guide to Painting Specifications", shall hereby be made part of this specification insofar as applicable.
- C. Manufacturer's standard specifications and recommendations for preparation and application of his products are hereby made a part of this specification and shall be adhered to in all cases. Diluting or thinning of materials is absolutely prohibited except when specified, or approved by manufacturer.
- D. Product compatibility:
 1. Provide barrier coats over incompatible primers or remove and reprime as required. Notify the architect in writing of any anticipated problems using the coating systems as specified with

substrates primed by others.

2. Provide finish coats which are compatible with the prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Upon requests from other subcontractors, furnish information on the characteristics of the specified finish materials, to ensure that compatible prime coats are used.

1.05 Regulatory Requirements:

- A. Use only materials meeting current Volatile Organic Compound (VOC) regulations for the project location.
- B. In the event that specified products exceed the allowable VOC limits provide alternative VOC compliant products with equivalent appearance and durability characteristics.

1.06 Environmental Requirements:

- A. Do not use hydrocarbon or volatile organic solvents inside the building..
- B. Use only materials which:
 1. Meet current Volatile Organic Compound (VOC) regulations for the project location.
 2. Meet the performance and environmental requirements, including Volatile Organic Compound (VOC) content limits established in Green Seal Standard GS-11, Paints, 3rd Edition, August 17, 2011.

1.07 Delivery, Storage, and Handling:

- A. Deliver paints and enamels ready-mixed to job site.
- B. Deliver all materials to the job site in original, new and unopened containers bearing manufacturer's name and label.
- C. All materials used on the job shall be stored in a single place. Storage place shall be kept neat and clean and all damage thereto or to its surroundings shall be made good. All oily rags, waste, etc., must be removed from the building every night and every precaution taken to avoid danger of fire. Paints shall not be stored, mixed or applied in any room having finished floor installed without taking approved methods of protection. Used containers shall have labels cancelled and shall be clearly marked as contents.
- D. Do not bring gasoline, benzine or other flammable materials into the buildings.

1.08 Site Conditions:

- A. Environmental conditions:
 1. Do not apply water-base paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 50°F., unless otherwise permitted by paint manufacturer's printed instructions.
 2. Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 45°F., unless otherwise permitted by paint manufacturer's printed instructions.

3. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by paint manufacturer's printed instructions. Painting may be continued during inclement weather only if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.
- B. Maintain uniform temperatures of minimum 60 degrees F, and humidity of 20 to 40 percent prior to, during and after installation.
- C. Maintain adequate illumination in work areas during application of coatings and for review of mock-ups.
- D. Provide ventilation as necessary eliminate fumes and odors. Ensure building ventilation system is in continuous operation for a period of two weeks following completion of interior finish coats, with not less than 10% outdoor air supply.

1.09 Maintenance:

- A. Extra stock: provide a one gallon container of each color and surface texture to the owner. Label each container with color, texture, room locations, in addition to manufacturer's label.

PART 2 - PRODUCTS

2.01 Manufacturers:

- A. Sherwin Williams (no substitution).

2.02 Colors and Finishes:

- A. Prior to start of work the Architect will provide chips or color numbers for preliminary color selection. Provide custom colors as necessary to match the chips and identified colors of other paint manufacturers.
- B. Final acceptance of colors will be from samples applied on the job.
- C. It is understood and agreed that the various rooms and spaces may have certain walls painted a different color than other walls in the same room and that ceiling and trim may be a different color or colors than the walls.

2.03 Material Quality:

- A. Provide the best quality of the various types of coatings as regularly manufactured by the paint materials manufacturers listed. Materials not displaying the manufacturer's identification as a standard, best-grade product will not be acceptable.
- B. Provide undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits. Base coats and undercoats of paints shall be tinted or shaded differently than the finish coats.

PART 3 - EXECUTION

3.01 Examination:

- A. Examine the areas and environmental conditions under which painting work is to be applied. Do not proceed with work until unsatisfactory conditions have been established.
- B. Examine surfaces scheduled to receive paint and finishes for condition that will adversely affect

execution, permanence or quality of work and which cannot be put into an acceptable condition through preparatory work. Report in writing to the Architect all unsatisfactory conditions, errors, or deficiencies prior to proceeding with work.

- C. Starting of painting work will be construed as acceptance of the surfaces and conditions within any particular area.

3.02 **Surface Preparation:**

A. General:

1. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film.
2. Perform preparation and cleaning procedures in strict accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
3. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of each space or area, reinstall removed items by workmen skilled in trades involved.
4. Remove all loose coatings, oil, dust, grease, dirt, loose rust, and other foreign material from surfaces to be finished.
5. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.

B. Previously painted surfaces:

1. Wash as applicable with detergent and clean water rinse to remove grease, dirt and surface contaminants.
2. Remove loose and flaking existing coatings. Test existing paint film for adhesion.
3. Apply compatible barrier coat or adhesion primer if necessary for proper adhesion of finish, or for hiding and color uniformity of finish coat.

C. Gypsum board:

1. Fill narrow, shallow cracks and small holes with spackling compound.
2. Rake deep, wide cracks and deep holes. Patch with setting-type compound and finish with spackling compound.
3. Allow to dry then sand smooth. Do not raise nap of paper or wallboard.

D. Cementitious materials:

1. Prepare surfaces of concrete and concrete block to be painted by removing all efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.
2. Fill minor cracks and irregularities with spackling compound to provide uniform surface texture.

- E. Wood:
1. Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth finished surfaces exposed to view, and dust. Scrape and clean small, dry, seasoned knots and apply thin coat of white shellac or other approved sealer, before application of priming coat.
 2. Fill minor cracks and holes with paste wood filler, sand smooth and dust.
- F. Ferrous metals:
1. Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
 2. Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with the same type shop primer.
- G. Aluminum and galvanized metal:
1. Clean surfaces with non-solvent degreaser and water to remove residue.
 2. Dry with a clean cloth.
- H. Existing Structure to be exposed:
1. Blow-off accumulated dust with air blast. Coordinated cleaning sequence with cleaning of existing ductwork to be exposed exposed.
 2. Remove loose paint and remaining foreign material and surface contaminants by hand scraping, brush and vacuum and other methods appropriate to the surface conditions.
- I. Existing Ductwork to be exposed:
1. Blow-off accumulated dust with air blast. Blow-off unexposed surfaces (such as top) as well as exposed surfaces (such as sides and bottoms). Coordinated cleaning sequence with cleaning of exposed structure.
 2. Exposed surfaces of metal ductwork: clean as specified for aluminum or galvanized metal
 3. Exposed surfaces of insulated ductwork:
 - a. Test cleaning method before full-scale use.
 - b. For moisture-resistant foil-covering: clean with damp sponge and detergent, wipe clean with damp sponge and clean water. Dry with a clean cloth.
 - c. For fabric or other moisture-sensitive covering: remove dust with vacuum and soft brush.

3.03 Materials Preparation:

- A. Mix and prepare painting materials in accordance with manufacturer's directions.
- B. Stir materials before application to produce a mixture of uniform density, and stir as required during application of materials. Do not stir surface film into the material. Remove film and if necessary, strain the material before using.

3.04 Prime Coats:

- A. Apply prime coat to material to be painted or finished, and which has not been previously primed or painted. Omit the primer on metal surfaces which have been shop-primed and touch-up painted, unless otherwise directed.
- B. Recoat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- C. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, face, undersides, and backsides of such wood, including cabinets, counters, cases, etc. When transparent finish is required, use spar varnish for backpriming
- D. After priming wood, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

3.05 Application:

- A. Paint all exposed surfaces whether or not colors are designated in "schedules", except where the natural finish of the material is obviously intended and/or specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas.
- B. Method of application:
 - 1. Apply paint in accordance with the manufacturer's directions. Use applicators and techniques best suited for the type of material being applied.
 - 2. Apply paint with suitable brushes, rollers, or spraying equipment.
 - 3. Apply stain and varnish with brushes.
 - 4. The provision under which spraying paint will be allowed include, but are not necessarily limited to, the following:
 - a. Airless spray shall be used.
 - b. No thinning of paints or coatings allowed.
 - c. Same separate, adequately dried, number of coats shall be applied as specified for brush or roller application. Passes with spray gun will not be accepted as separate coats.
 - d. Same mill thickness shall be applied as brush or roller would provide.
 - 5. Rate of application shall not exceed average rate-of-coverage recommended by paint manufacturer for type of surface involved, less 10 percent allowance for losses.
- C. Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance.
- D. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
- E. Paint the back sides of access panels, and removable or hinged covers to match the exposed surfaces.

- F. On wood or metal surfaces thoroughly and uniformly sand each coat, except final coat with #00 sandpaper, or other equal abrasive, removing all surface defects and providing a smooth, even surface for subsequent coats.
- G. First application of stain shall provide desired result. "Second-coating" will not be permitted. Materials that are not properly stained with first application shall be replaced with new materials at no additional cost.
- H. Completely finish each coat in an area or space and obtain architect's approval thereof before proceeding with following coat. In multi-coat paint work, tint each coat for easy identification by using varying degrees of required finish color for tinting of undercoats.
- I. When applying latex coatings, the product has to be "hung-up" and "laid-off" to get good flow which is necessary to good hiding quality.
- J. If, for whatever cause, there is a lack of proper coverage, Contractor shall apply additional coats of paint or finish as required to cover surfaces completely to provide uniform color and appearance.
- K. Whenever necessary to obtain required results, a whole wall shall be refinished rather than "spot-finishing" where a portion of finish is unsatisfactory.
- L. Minimum drying time shall comply with that recommended by paint manufacturer. Each coat shall be thoroughly dry before application of succeeding coats.
- M. Make edges of paint adjoining other materials or colors sharp and clean, and without overlapping.
- N. For window frames that are required to be painted, apply primer before glazing is executed.
- O. Change colors at outside corner of door stop where colors differ between adjoining spaces or rooms and where door frames match wall colors.
- P. Closets shall be finished the same as adjoining rooms unless otherwise specified.
- Q. Where ferrous metal panels, boxes, access doors, registers, louvers or grilles occur in finished doors, walls or ceilings, paint in with surrounding surfaces unless otherwise directed.
- R. Pigmented (opaque) finishes: completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, roughness or other surface imperfections will not be acceptable.
- S. Completed work: match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.06 Minimum Coating Thickness:

- A. Apply each material at not less than the manufacturer's recommended spreading rate, to provide a total dry film thickness of not less than 5.0 Mils for the entire coating system of prime and finish coats for 3-coat work.
- B. Provide a total dry film thickness of not less than 3.5 Mils for the entire coating system of prime and finish coat for two (2)-coat work, for non-epoxy coating.

3.07 Clean-up and Protection:

- A. Clean-up: during progress of the work, remove from project daily all discarded paint materials, rubbish, cans and rags.

- B. Protection: protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damages by cleaning, repairing or replacing, and repainting, as directed by the Architect.
- C. Provide "wet paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings after completion of painting operations.

3.08 **Paint Schedule:**

- A. Interior finishes:
 - 1. Gypsum board ceilings and soffits, Latex, Flat:
 - a. Prime: S-W Prep-Rite 200 Interior Latex Primer B28W200, 1.1 mils DFT.
 - b. Finish: two (2) coats S-W Pro-Mar 200 Zero VOC Interior Latex Flat B30W2600 Series, 1.6 mils DFT/coat.
 - 2. Gypsum board walls, Latex, Eggshell:
 - a. Prime: S-W Prep-Rite 200 Interior Latex Primer B28W200, 1.1 mils DFT.
 - b. Finish: two (2) coats S-W ProMar 200 Interior Latex Eg-Shel Enamel B20W2200 Series, 1.3 mils DFT/coat.
 - 3. Concrete block, Latex, Semi-Gloss:
 - a. Prime: S-W Loxon Block Surfacer A24W200, 8 mils DFT.
 - b. Finish: two (2) coats S-W ProMar 200 Interior Latex Semi-Gloss Enamel B31W2200 Series, 1.5 mils DFT/coat.
 - 4. Ferrous metals (steel doors and frames, etc): Acrylic, Semi-Gloss:
 - a. Prime: bare surfaces and abraded areas of previously primed surfaces S-W Pro-Cryl Primer, B66-310 Series, 3 mils DFT.
 - b. Finish: two (2) coats S-W Zero VOC Acrylic, Semi-Gloss Enamel B66-600 Series, 1.5 mils DFT/coat.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Requirements applicable to all Division 23 Sections. Also refer to Division 1 - General Requirements.
- B. All materials and installation methods shall conform to the applicable standards, guidelines and codes referenced in the specification section.

1.2 SCOPE OF WORK

- A. This Specification and the associated drawings govern the furnishing, installing, testing and placing into satisfactory operation the Mechanical Systems.
- B. Each Contractor shall provide all new materials indicated on the drawings and/or in these specifications, and all items required to make his portion of the Mechanical Work a finished and working system.
- C. All work will be awarded under a single General Contract. The division of work listed below is for the Contractor's convenience and lists normal breakdown of the work.

1.3 QUALITY ASSURANCE

- A. Contractor's Responsibility Prior to Submitting Pricing Data:
 - 1. The Contractor is responsible for constructing complete and operating systems. The Contractor acknowledges and understands that the Contract Documents are a two-dimensional representation of a three-dimensional object, subject to human interpretation. This representation may include imperfect data, interpreted codes, utility guidelines, three-dimensional conflicts, and required field coordination items. Such deficiencies can be corrected when identified prior to ordering material and starting installation. The Contractor agrees to carefully study and compare the individual Contract Documents and report at once in writing to the Design Team any deficiencies the Contractor may discover. The Contractor further agrees to require each subcontractor to likewise study the documents and report at once any deficiencies discovered.
 - 2. The Contractor shall resolve all reported deficiencies with the Architect/Engineer prior to awarding any subcontracts, ordering material, or starting any work with the Contractor's own employees. Any work performed prior to receipt of instructions from the Design Team will be done at the Contractor's risk.
- B. Qualifications:
 - 1. Only products of reputable manufacturers are acceptable.
 - 2. All Contractors and subcontractors shall employ only workers skilled in their trades.
- C. Compliance with Codes, Laws, Ordinances:
 - 1. Conform to all requirements of the City of Crystal Lake Codes, Laws, Ordinances and other regulations having jurisdiction.

2. Conform to all published standards of McHenry County College.
3. Conform to all State Codes.
4. If there is a discrepancy between the codes and regulations and these specifications, the Engineer shall determine the method or equipment used.
5. If the Contractor notes, at the time of bidding, any parts of the drawings or specifications that do not comply with the codes or regulations, he shall inform the Architect/Engineer in writing, requesting a clarification. If there is insufficient time for this procedure, he shall submit with his proposal a separate price to make the system comply with the codes and regulations.
6. All changes to the system made after letting of the contract, to comply with codes or requirements of Inspectors, shall be made by the Contractor without cost to the Owner.
7. If there is a discrepancy between manufacturer's recommendations and these specifications, the manufacturer's recommendations shall govern.
8. All rotating shafts and/or equipment shall be completely guarded from all contact. Partial guards and/or guards that do not meet all applicable OSHA standards are not acceptable. Contractor is responsible for providing this guarding if it is not provided with the equipment supplied.

D. Permits, Fees, Taxes, Inspections:

1. Procure all applicable permits and licenses.
2. Abide by all laws, regulations, ordinances, and other rules of the State or Political Subdivision where the work is done, or as required by any duly constituted public authority.
3. Pay all charges for permits or licenses.
4. Pay all fees and taxes imposed by the State, Municipal and/or other regulatory bodies.
5. Pay all charges arising out of required inspections by an authorized body.
6. Pay all charges arising out of required contract document reviews associated with the project and as initiated by the Owner or authorized agency/consultant.
7. Where applicable, all fixtures, equipment and materials shall be approved or listed by Underwriter's Laboratories, Inc.

E. Examination of Drawings:

1. The drawings for the mechanical work are completely diagrammatic, intended to convey the scope of the work and to indicate the general arrangements and locations of equipment, outlets, etc., and the approximate sizes of equipment.
2. Contractor shall determine the exact locations of equipment and rough-ins, and the exact routing of pipes and ducts to best fit the layout of the job.
3. Scaling of the drawings is not sufficient or accurate for determining these locations.

4. Where job conditions require reasonable changes in indicated arrangements and locations, such changes shall be made by the Contractor at no additional cost to the Owner.
5. Because of the scale of the drawings, certain basic items, such as fittings, boxes, valves, unions, etc., may not be shown, but where required by other sections of the specifications or required for proper installation of the work, such items shall be furnished and installed.
6. If an item is either on the drawings or in the specifications, it shall be included in this contract.
7. Determination of quantities of material and equipment required shall be made by the Contractor from the documents. Where discrepancies arise between drawings, schedules and/or specifications, the greater number shall govern.
8. Where used in mechanical documents, the word "furnish" shall mean supply for use, the word "install" shall mean connect complete and ready for operation, and the word "provide" shall mean to supply for use and connect complete and ready for operation.
 - a. Any item listed as furnished shall also be installed, unless otherwise noted.
 - b. Any item listed as installed shall also be furnished, unless otherwise noted.

F. Field Measurements:

1. Verify all pertinent dimensions at the job site before ordering any materials or fabricating any supports, pipes or ducts.

G. Electronic Media/Files:

1. Construction drawings for this project have been prepared utilizing AutoCAD MEP.
2. Contractors and Subcontractors may request electronic media files of the contract drawings and/or copies of the specifications. Specifications will be provided in PDF format.
3. Upon request for electronic media, the Contractor shall complete and return a signed "Electronic File Transmittal" form provided by KJWW.
4. If the information requested includes floor plans prepared by others, the Contractor will be responsible for obtaining approval from the appropriate Design Professional for use of that part of the document.
5. The electronic contract documents can be used for preparation of shop drawings and as-built drawings only. The information may not be used in whole or in part for any other project.
6. The drawings prepared by KJWW for bidding purposes may not be used directly for ductwork layout drawings or coordination drawings.
7. The use of these CAD documents by the Contractor does not relieve them from their responsibility for coordination of work with other trades and verification of space available for the installation.

8. The information is provided to expedite the project and assist the Contractor with no guarantee by KJWW as to the accuracy or correctness of the information provided. KJWW accepts no responsibility or liability for the Contractor's use of these documents.

1.4 SUBMITTALS

- A. Submittals shall be required for the following items, and for additional items where required elsewhere in the specifications or on the drawings.

1. Submittals list:

<u>Referenced Specification Section</u>	<u>Submittal Item</u>
23 05 00	Owner Training Agenda
23 05 13	Motors
23 05 93	Testing, Adjusting, and Balancing
23 09 00	Controls
23 31 00	Ductwork
23 34 16	Centrifugal Fans
23 34 23	Power Ventilators
23 35 14	Dust Collection Systems
23 37 00	Grilles, Registers, and Diffusers

- B. In addition to the provisions of Division 1, the following provisions are required:

1. Submittals shall include all fabrication, erection, layout, and setting drawings; manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment or systems and the location thereof conform to the requirements of the contract documents.
2. The Contractor shall submit either one electronic copy or four (4) paper copies of each shop drawing for review by the Architect/Engineer BEFORE releasing any equipment for manufacture or shipment.
3. Shop drawings which are larger than 11"x 17" or are plan size layout or erection drawings such as ductwork layout drawings shall be submitted on reproducible media. Submit one reproducible and one print of each drawing or plan. All Contractor approval stamps shall be made on the reproducible.
4. The Contractor shall thoroughly review and approve all shop drawings before submitting them to the Architect/Engineer. **CONTRACTOR'S APPROVAL STAMP IS REQUIRED ON ALL SUBMITTALS. APPROVAL WILL INDICATE THE CONTRACTOR'S REVIEW of all material and a COMPLETE UNDERSTANDING OF EXACTLY WHAT IS TO BE FURNISHED.** Contractor shall clearly mark all deviations from the contract documents on all submittals. **IF DEVIATIONS ARE NOT MARKED BY THE CONTRACTOR, THEN THE ITEM SHALL BE REQUIRED TO MEET ALL DRAWING AND SPECIFICATION REQUIREMENTS.**
5. The Contractor shall clearly mark each item with the same nomenclature applied on the drawings or in the specifications.
6. The Contractor shall clearly indicate the size, finish, material, etc.

7. Assemble and submit by specification section numbers for all submittals. All sets shall be identical and contain an index of the items enclosed with a general topic description on the cover.
 8. Each set shall be bound in a manufacturer's folder or inside of a manila file folder.
 9. Where more than one model is shown on a manufacturer's sheet, the Contractor shall clearly indicate exactly which item and which data is relevant to the work.
 10. Failure to comply with the above shall be reason to resubmit all shop drawing submittals.
 11. The Engineer's responsibility shall be to review one set of shop drawing submittals for each product. If the first submittal is incomplete or does not comply with the drawings and/or specifications, the Contractor shall be responsible to bear the cost for the Engineer to recheck and handle the additional shop drawing submittals.
- C. Provide Schedule of Values:
1. Application forms: Use AIA Document Continuation Sheets G703 (or similar) as the form for application.
 2. Provide line items on the Schedule of Values including:
 - a. Mechanical Contractor General Conditions (mobilization, bonds, insurance, etc.)
 - b. Piping (refrigerant, heating, cooling, pipe insulation, etc.)
 - c. HVAC (equipment, ductwork, exhaust, fans, etc.)
 - d. Temperature Controls
 - e. Central Plant
 - f. Site Utilities (from 5 feet outside of building)
 3. Change orders shall have schedule of values broken out as listed above submitted with each change order.
 4. Coordinate with the Project Engineer the items included in the Schedule of Values. The intent is to not create schedules in addition to those the Mechanical Contractor normally submits to the General Contractor for payment.

1.5 **EQUIPMENT SUPPLIERS' INSPECTION**

- A. The following equipment shall not be placed in operation until a competent installation and service representative of the manufacturer has inspected the installation and certified that the equipment is properly installed, adjusted and lubricated; that preliminary operating instructions have been given; and that the equipment is ready for operation:
 1. Fire Seal Systems
- B. Contractor shall arrange for and obtain supplier's on-site inspection(s) at proper time(s) to assure each phase of equipment installation and/or connection is in accordance with the manufacturer's instructions.
- C. Submit copies of start-up reports to the Architect/Engineer and include copies of Owner's Operation and Maintenance Manuals.

1.6 **PRODUCT DELIVERY, STORAGE, HANDLING & MAINTENANCE**

- A. Exercise care in transporting and handling to avoid damage to materials. Store materials on the site to prevent damage. Keep materials clean, dry and free from harmful conditions. Immediately remove any materials that become wet or that are suspected of becoming contaminated with mold or other organisms.
- B. Keep all bearings properly lubricated and all belts properly tensioned and aligned.
- C. Coordinate the installation of heavy and large equipment with the General Contractor and/or Owner. If the Mechanical Contractor does not have prior documented experience in rigging and lifting similar equipment, he/she shall contract with a qualified lifting and rigging service that has similar documented experience. Follow all equipment lifting and support guidelines for handling and moving.
- D. Contractor is responsible for moving equipment into the building and/or site. Contractor shall review site prior to bid for path locations and any required building modifications to allow movement of equipment. Contractor shall coordinate his/her work with other trades.

1.7 **WARRANTY**

- A. Provide one-year warranty, unless otherwise noted, to the Owner for all fixtures, equipment, materials, and workmanship.
- B. The warranty period for all work in this Division of the specifications shall commence on the date of final acceptance, unless a whole or partial system or any separate piece of equipment or component is put into use for the benefit of any party other than the installing contractor with prior written authorization. In this instance, the warranty period shall commence on the date when such whole system, partial system or separate piece of equipment or component is placed in operation and accepted in writing by the Owner.
- C. Warranty requirements shall extend to correction, without cost to the Owner, of all Work found to be defective or nonconforming to the contract documents. The Contractor shall bear the cost of correcting all damage resulting from defects or nonconformance with contract documents.

1.8 **INSURANCE**

- A. Contractor shall maintain insurance coverage as set forth in Division 0 of these specifications.

1.9 **MATERIAL SUBSTITUTION**

- A. Where several manufacturers' names are given, the manufacturer for which a catalog number is given is the basis for job design and establishes the quality required.
- B. Equivalent equipment manufactured by the other named manufacturers may be used. Contractor shall ensure that all items submitted by these other manufacturers meet all requirements of the drawings and specifications, and fits in the allocated space.
- C. Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured in writing from the Architect/Engineer not later than ten days prior to the bid opening.
- D. This Contractor assumes all costs incurred as a result of using the offered material, article or equipment, on his part or on the part of other Contractors whose work is affected.

- E. This Contractor may list voluntary add or deduct prices for alternate materials on the bid form. These items will not be used in determining the low bidder.
- F. All material substitutions requested later than ten (10) days prior to bid opening must be listed as voluntary changes on the bid form.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 JOBSITE SAFETY

- A. Neither the professional activities of the Engineer, nor the presence of the Engineer or his or her employee and subconsultants at a construction site, shall relieve the Contractor and other entity of their obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending or coordinating all portions of the work of construction in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. The Engineer and his or her personnel have no authority to exercise any control over any construction contractor or other entity or their employees in connection with their work or any health or safety precautions. The Contractor is solely responsible for jobsite safety. The Engineer and the Engineer's consultants shall be indemnified and shall be made additional insureds under the Contractor's general liability insurance policy.

3.2 ENGINEER OBSERVATION OF WORK

- A. The Contractor shall provide seven (7) calendar days' notice to the Engineer prior to:
 - 1. Covering exterior walls, interior partitions and chases.
 - 2. Installing hard or suspended ceilings and soffits.
- B. The Engineer will have the opportunity to review the installation and provide a written report noting deficiencies requiring correction. The Contractor's schedule shall account for these reviews and show them as line items in the approved schedule.
- C. Above-Ceiling Final Observation
 - 1. All work above the ceilings must be complete prior to the Engineer's review. This includes, but is not limited to:
 - a. Pipe and duct wall penetrations are sealed.
 - b. Main, branch and flexible ducts are installed.
 - c. Diffusers, registers and grilles are installed and connected to ductwork.
 - 2. In order to prevent the Above-Ceiling Final Observation from occurring too early, the Contractor shall review the status of the work and certify, in writing, that the work is ready for the Above-Ceiling Final Observation.
 - 3. It is understood that if the Engineer finds the ceilings have been installed prior to this review and prior to 7 days elapsing, the Engineer may not recommend further payments to the contractor until such time as full access has been provided.

3.3 **PROJECT CLOSEOUT**

- A. The following paragraphs supplement the requirements of Division 1.
- B. Final Jobsite Observation:
 - 1. In order to prevent the Final Jobsite Observation from occurring too early, the Contractor is required to review the completion status of the project and certify that the job is ready for the final jobsite observation.
 - 2. Attached to the end of this section is a typical list of items that represent the degree of job completeness expected prior to requesting a review.
 - 3. Upon Contractor certification that the project is complete and ready for a final punch, the Contractor shall sign the attached certification and return it to the Architect/Engineer so that the final observation can be scheduled.
 - 4. It is understood that if the Engineer finds the job not ready for the final observation and that additional trips and observations are required to bring the project to completion, the costs incurred by the Engineers additional time and expenses will be deducted from the Contractor's contract retainage prior to final payment at the completion of the job.
- C. Before final payment is authorized, This Contractor must submit the following:
 - 1. Operation and maintenance manuals with copies of approved shop drawings.
 - 2. Record documents including marked-up or reproducible drawings and specifications.
 - 3. A report documenting the instructions given to the Owner's representatives complete with the number of hours spent in the instruction. The report shall bear the signature of an authorized agent of This Contractor and shall be signed by the Owner's representatives.
 - 4. Start-up reports on all equipment requiring a factory installation inspection or start-up.
 - 5. Provide spare parts, maintenance, and extra materials in quantities specified in individual specification sections. Deliver to project site and place in location as directed; receipt by Architect/Engineer required prior to final payment approval.

3.4 **OPERATION AND MAINTENANCE INSTRUCTIONS**

- A. Submit three properly indexed and bound copies, in 'D' Ring style notebooks, of the Operations and Maintenance Instructions to the Architect/Engineer. Make all corrections or additions required.
- B. Manuals shall be completed and in the Owner's possession prior to Owner's acceptance and at least 10 days prior to instruction of operating personnel.
- C. Operation and maintenance data shall consist of written instructions for the care, maintenance, and operation of all equipment and systems. Include all instruction books, cards, and manuals furnished with the equipment.

3.5 **INSTRUCTING THE OWNER'S REPRESENTATIVES**

- A. Adequately instruct the Owner's designated representatives in the maintenance, care, and operation of all systems installed under this contract.

- B. Provide verbal and written instructions to the Owner's representatives by FACTORY PERSONNEL in the care, maintenance, and operation of the equipment and systems.
- C. The Owner has the option to make a video recording of all instructions. Coordinate schedule of instructions to facilitate this recording.
- D. The instructions shall include:
 - 1. Explanation of all system flow diagrams.
 - 2. Explanation of all air handling systems.
 - 3. Maintenance of equipment.
 - 4. Description of emergency system operation.
- E. The Architect/Engineer shall be notified of the time and place instructions will be given to the Owner's representatives so he or his representative can attend if desired.
- F. Minimum hours of instruction for each item shall be:
 - 1. Air Handling System(s) - 2 hours.
 - 2. Exhaust System(s) - 2 hours.
- G. The Contractor shall prepare a detailed, written training agenda and submit it to the Architect/Engineer a minimum of two weeks prior to the formal training for approval. The written agenda shall include specific training points within the items described above. For example: how to adjust setpoints, troubleshooting, proper start-up, proper shut-down, seasonal changes, draining, venting, changing filters, changing belts, etc. Failure to provide and follow an approved training agenda may result in additional training required at the expense of the Contractor.
- H. Operating Instructions:
 - 1. Contractor is responsible for all instructions to the Owner's representatives for the mechanical and control systems.
 - 2. If the Contractor does not have staff that can adequately provide the required instructions he shall include in his bid an adequate amount to reimburse the Owner for the Engineer to perform these services.

3.6 **SYSTEM COMMISSIONING**

- A. The mechanical systems shall be complete and operating. System start-up, testing, balancing, and satisfactory system performance is the responsibility of the Contractor. This includes calibration and adjustments of all controls, noise level adjustments and final comfort adjustments as required.
- B. Operate all HVAC systems continuously for at least one week prior to occupancy to bring construction materials to suitable moisture levels. Areas with mechanical cooling shall be maintained below 60% RH.
- C. Contractor shall adjust the mechanical systems and controls at season changes during the one year warranty period, as required, to provide satisfactory operation and to prove performance of all systems in all seasons.
- D. All operating conditions and control sequences shall be tested during the start-up period. Test all interlocks, safety shutdowns, controls, and alarms.
- E. The Contractor, subcontractors, and equipment suppliers shall have skilled technicians to ensure that all systems perform properly. If the Architect/Engineer is requested to visit the job site for

trouble shooting, assisting in start-up, obtaining satisfactory equipment operation, resolving installation and/or workmanship problems, equipment substitution issues or unsatisfactory system performance, including call backs during the warranty period, through no fault of the design; the Contractor shall reimburse the Owner on a time and materials basis for services rendered at the Architect/Engineer's standard hourly rates in effect when the services are requested. The Contractor shall pay the Owner for services required that are product, installation or workmanship related. Payment is due within 30 days after services are rendered.

3.7 **RECORD DOCUMENTS**

- A. The following paragraph supplements Division 1 requirements:

Contractor shall maintain at the job site a separate and complete set of mechanical drawings and specifications on which he shall clearly and permanently mark in complete detail all changes made to the mechanical systems.

- B. Mark drawings to indicate revisions to piping and ductwork, size and location, both exterior and interior; including locations of coils, dampers, other control devices, filters, and other units requiring periodic maintenance or repair; actual equipment locations, dimensioned from column lines; actual inverts and locations of underground piping; concealed equipment, dimensioned from column lines; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (e.g., traps, strainers, expansion compensators, tanks, etc.); Change Orders; concealed control system devices.
- C. Refer to Section 23 09 00 for additional requirements for Temperature Control documents.
- D. Mark specifications to show approved substitutions; Change Orders, and actual equipment and materials used.
- E. Record changes daily and keep the marked drawings available for the Architect/Engineer's examination at any normal work time.
- F. Upon completing the job, and before final payment is made, give the marked-up drawings to the Architect/Engineer.

3.8 **PAINTING**

- A. Paint all equipment that is marred or damaged prior to the Owner's acceptance. Paint and color shall match original equipment paint and shall be obtained from the equipment supplier if available.
- B. Equipment in finished areas that will be painted to match the room decor will be painted by others. Should this Contractor install equipment in a finished area after the area has been painted, he shall have the equipment and all its supports, hangers, etc., painted to match the room decor.
- C. Equipment cabinets, casings, covers, metal jackets, etc., in equipment rooms or concealed spaces, shall be furnished in standard or prime finish, free from scratches, abrasions, chips, etc.
- D. Equipment in occupied spaces, or if standard to the unit, shall have a baked primer with baked enamel finish coat free from scratches, abrasions, chips, etc. If color option is specified or is standard to the unit, this Contractor shall, before ordering, verify with the Architect/Engineer his color preference and furnish this color.
- E. Paint all equipment in unfinished areas such as boiler room, mechanical spaces, storage room, etc., furnished by this Contractor. Equipment furnished with a factory coat of paint and enamel need

not be painted, provided the factory applied finish is not marred or spattered. If so, equipment shall be refinished with the same paint as was factory applied.

- F. Paint all outdoor uninsulated steel piping the color selected by Owner or Architect/Engineer.
- G. After surfaces have been thoroughly cleaned and are free of oil, dirt, and other foreign matter; paint all pipes and equipment with the following:
 - 1. Bare Metal Surfaces - Apply one coat of primer suitable for the metal being painted. Finish with two coats of Alkyd base enamel paint.
 - 2. Insulated Surfaces - Paint insulation jackets with two coats of semi-gloss acrylic latex paint.

3.9 ADJUST AND CLEAN

- A. Thoroughly clean all equipment and systems prior to the Owner's final acceptance of the project. Clean all foreign paint, grease, oil, dirt, labels, stickers, and other foreign material from all equipment.
- B. Clean all drain pans and areas where moisture is present. Immediately report any mold, biological growth, or water damage.
- C. Remove all rubbish, debris, etc., accumulated during construction from the premises.

3.10 SPECIAL REQUIREMENTS

- A. Contractor shall coordinate the installation of all equipment, valves, dampers, operators, etc., with other trades to maintain clear access area for servicing.
- B. All equipment shall be installed in such a way to maximize access to parts needing service or maintenance. Review the final field location, placement, and orientation of equipment with the Owner's designated representative prior to setting equipment.
- C. Installation of equipment or devices without regard to coordination of access requirements and confirmation with the Owner's designated representative will result in removal and reinstallation of the equipment at the Contractor's expense.

3.11 IAQ MAINTENANCE FOR OCCUPIED FACILITIES UNDER CONSTRUCTION

- A. Contractors shall make all reasonable efforts to prevent construction activities from affecting the air quality of the occupied areas of the building or outdoor areas near the building. These measures shall include, but not be limited to:
 - 1. All contractors shall endeavor to minimize the amount of contaminants generated during construction. Methods to be employed shall include, but not be limited to:
 - a. Minimizing the amount of dust generated.
 - b. Reducing solvent fumes and VOC emissions.
 - c. Maintain good housekeeping practices, including sweeping and periodic dust and debris removal. There should be no visible haze in the air.
 - d. Protect stored on-site and installed absorptive materials from moisture damage.
 - 2. Request that the Owner designate an IAQ representative.

3. Review and receive approval from the Owner's IAQ representative for all IAQ-related construction activities and negative pressure containment plans.
4. Inform the IAQ representative of all conditions that could adversely impact IAQ, including operations that will produce higher than normal dust production or odors.
5. Schedule activities that may cause IAQ conditions that are not acceptable to the Owner's IAQ representative during unoccupied periods.
6. Request copies of and follow all of the Owner's IAQ and infection control policies.
7. Unless no other access is possible, the entrance to construction site shall not be through the existing facility.
8. To minimize growth of infectious organisms, do not permit damp areas in or near the construction area to remain for over 24 hours.
9. In addition to the criteria above, provide measures as recommended in the SMACNA "IAQ Guidelines for Occupied Buildings Under Construction".
10. If permanently installed air handlers are used during construction, MERV 8 filtration media must be used to protect each return air grille or opening. The intent of this will be to prevent construction dust and debris from entering any return or supply air ductwork in the facility. All filtration media must be replaced immediately prior to occupancy.

End of Section

READINESS CERTIFICATION PRIOR TO FINAL JOBSITE OBSERVATION

In order to prevent the final job observation from occurring too early, we require that the Contractor review the completion status of the project and, by copy of this document, certify that the job is indeed ready for the final job observation. The following is a typical list of items that represent the degree of job completeness expected prior to your requesting a final job observation.

1. Penetrations fire sealed and labeled in accordance with specifications.
2. All air handling units operating and balanced.
3. All fans shall be operating and balanced.
4. All pumps, boilers and chillers operating and balanced.
5. All miscellaneous mechanical systems (unit heaters, fan coil units, cabinet heaters, etc.) operating.
6. All temperature control systems operating, programmed and calibrated.
7. Pipe insulation complete, pipes labeled and valves tagged.
8. Fire damper and fire/smoke damper access doors labeled in accordance with specifications.

Accepted by:

Prime Contractor _____

By _____ Date _____

Upon Contractor certification that the project is complete and ready for a final job observation, we require the Contractor to sign this agreement and return it to the Engineer so that the final observation can be scheduled.

It is understood that if the Engineer finds the job not ready for the final observation and that additional trips and observations are required to bring the project to completion, the costs incurred by the Engineers for additional time and expenses will be deducted from the Contractor's contract retainage prior to final payment at the completion of the job.

* * * * *

**THROUGH PENETRATION FIRESTOPPING
SECTION 23 05 03**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Through-Penetration Firestopping.

1.2 REFERENCES

- A. UL 723 - Surface Burning Characteristics of Building Materials
- B. ANSI/UL 1479 - Fire Tests of Through Penetration Firestops
- C. UL Fire Resistance Directory Through Penetration Firestop Systems (XHEZ)
- D. Warnock Hersey - Directory of Listed Products
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
- F. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Firestops
- G. The Building Officials and Code Administrators National Building Code
- H. 1997 Uniform Building Code
- I. 2006 International Building Code
- J. NFPA 5000 – Building Construction Safety Code

1.3 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through the following fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
 - 1. Fire-resistance-rated walls including fire partitions, fire barriers, and smoke barriers.
 - 2. Fire-resistance-rated horizontal assemblies including floors, floor/ceiling assemblies, and ceiling membranes of roof/ceiling assemblies.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per UL 1479:
 - 1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
 - 2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings:
 - a. Floor penetrations located outside wall cavities.
 - b. Floor penetrations located outside fire-resistance-rated shaft enclosures.
- C. For through-penetration firestop systems exposed to light, traffic, moisture, or physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- E. For through-penetration firestop systems in air plenums, provide products with flame-spread and smoke-developed indexes of less than 25 and 50, respectively, as determined per ASTM E 84.

1.4 **SUBMITTALS**

- A. Submit under provisions of Section 23 05 00.
- B. Submit Firestopping Installers Certification for all installers on the project.
- C. Shop Drawings: Submit for each condition requiring firestopping. Include descriptions of the specific penetrating item, actual wall/floor construction, manufacturer's installation instructions, and UL or Warnock Hersey Assembly number.
- D. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
 - 1. Types of penetrating items.
 - 2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
 - 3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.
 - 4. F and T ratings for each firestop system.
- E. Maintain a notebook on the job site at all times that contains copies of approved submittals for all through penetration firestopping to be installed. Notebook shall be made available to the Authority Having Jurisdiction at their request and turned over to the Owner at the end of construction as part of the O&M Manuals.

1.5 **QUALITY ASSURANCE**

- A. Manufacturer: Company specializing in manufacturing products specified in this Section.
- B. Installer: Individuals performing work shall be certified by the manufacturer of the system selected for installation.

1.6 **MEETINGS**

- A. Pre-installation meeting: A pre-installation meeting shall be scheduled and shall include the General Contractor, all Subcontractors associated with the installation of systems penetrating fire barriers, Firestopping Manufacturer's Representative, and the Owner.
 - 1. Review foreseeable methods related to firestopping work.
 - 2. Tour representative areas where firestopping is to be installed; inspect and discuss each type of condition and each type of substrate that will be encountered, and preparation to be performed by other trades.

1.7 **DELIVERY, STORAGE, AND HANDLING**

- A. Store, protect and handle products on site. Accept material on site in factory containers and packing. Inspect for damage. Protect from deterioration or damage due to moisture, temperature changes, contaminants, or other causes. Follow manufacturer's instructions for storage.
- B. Install material prior to expiration of product shelf life.

1.8 **WARRANTY**

- A. Provide one year warranty on parts and labor.

- B. Warranty shall cover repair or replacement of firestop systems which fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, general durability, or appear to deteriorate in any manner not clearly specified by the manufacturer as an inherent quality of the material.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application that are produced by one of the following manufacturers. All firestopping systems installed shall be provided by a single manufacturer.
 1. 3M; Fire Protection Products Division.
 2. Hilti, Inc.
 3. RectorSeal Corporation, Metacaulk.
 4. Tremco; Sealant/Weatherproofing Division.
 5. Johns-Manville.
 6. Specified Technologies Inc. (S.T.I.)
 7. Spec Seal Firestop Products
 8. AD Firebarrier Protection Systems

2.2 THROUGH PENETRATION FIRESTOP SYSTEMS

- A. Provide materials and systems classified by or listed by Warnock Hersey to provide firestopping equal to time rating of construction being penetrated.
- B. All firestopping materials shall be free of asbestos, lead, PCB's, and other materials that would require hazardous waste removal.
- C. Firestopping shall be flexible to allow for normal penetrating item movement due to expansion and contraction.
- D. Firestopping systems for plumbing and wet pipe sprinkler piping shall be moisture resistant.
- E. Provide firestopping systems capable of supporting floor loads where systems are exposed to possible floor loading or traffic.
- F. Provide firestopping systems allowing continuous insulation for all insulated pipes.
- G. Provide firestopping systems classified by UL or listed by Warnock Hersey for penetrations through all fire rated construction. Firestopping systems shall be selected from the UL or listed by Warnock Hersey Fire Resistance Directory Category XHEZ based on substrate construction and penetrating item size and material and shall fall within the range of numbers listed:
 1. Non-Combustible Framed Walls - 1 or 2 Hour Rated
 F Rating = Wall Rating
 T Rating = 0

<u>Penetrating Item</u>	<u>UL System No.</u>
No Penetrating Item	WL 0000-0999*
Metallic Pipe or Conduit	WL 1000-1999
Non-Metallic Pipe or Conduit	WL 2000-2999

<u>Penetrating Item</u>	<u>UL System No.</u>
Electrical Cables	WL 3000-3999
Cable Trays	WL 4000-4999
Insulated Pipes	WL 5000-5999
Bus Duct and Misc. Electrical	WL 6000-6999
Duct without Damper and Misc. Mechanical	WL 7000-7999
Multiple Penetrations	WL 8000-8999

2. Concrete or Masonry Floors and Walls - 1 or 2 Hour Rated
 F Rating = Wall/Floor Rating
 T Rating (Walls) = 0 or Wall Rating
 T Rating (Floors) = Floor Rating

<u>Penetrating Item</u>	<u>UL System No.</u>
No Penetrating Item	CAJ 0000-0999*
Metallic Pipe or Conduit	CAJ 1000-1999
Non-Metallic Pipe or Conduit	CAJ 2000-2999
Electrical Cables	CAJ 3000-3999
Cable Trays	CAJ 4000-4999
Insulated Pipes	CAJ 5000-5999
Bus Duct and Misc. Electrical	CAJ 6000-6999
Duct without Damper and Misc. Mechanical	CAJ 7000-7999
Multiple Penetrations	CAJ 8000-8999

*Alternate method of firestopping is patching opening to match original rated construction.

- H. Any opening in walls or floors not covered by the listed series of numbers shall be coordinated with the firestopping manufacturer.
- I. Any openings in floors or walls not described in the UL or listed by Warnock Hersey Fire Resistance Directory, or outlined in manufacturer's information shall be sealed in a manner agreed upon by the Firestopping Manufacturer, Owner, and the Authority Having Jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Ensure all surfaces that contact seal materials are free of dirt, dust, grease, oil, rust, or loose materials. Clean and repair surfaces as required. Remove laitance and form-release agents from concrete.
- B. Ensure substrate and penetrating items have been permanently installed prior to installing firestopping systems. Ensure penetrating items have been properly spaced and have proper clearance prior to installing firestopping systems.
- C. Surfaces to which sealing materials are to be installed must meet the selected UL or Warnock Hersey system substrate criteria.
- D. Prime substrates where recommended in writing by through-penetration firestop system manufacturer. Confine primer to area of bond.

3.2 **INSTALLATION**

- A. In existing construction, provide firestopping of openings prior to and after installation of penetrating items. Remove any existing coatings on surfaces prior to firestopping installation. Temporary firestopping shall consist of packing openings with fire resistant mineral wool for the full thickness of substrate, or an alternate method approved by the Authority Having Jurisdiction. All openings shall be temporarily firestopped immediately upon their installation and shall remain so until the permanent UL or listed by Warnock Hersey listed firestopping system is installed.
- B. Install penetration seal materials in accordance with printed instructions of the UL or Warnock Hersey Fire Resistance Directory and with the manufacturer's printed application instructions.
- C. Install dams as required to properly contain firestopping materials within openings and as required to achieve required fire resistance rating. Remove combustible damming after appropriate curing.

3.3 **CLEANING AND PROTECTING**

- A. Clean excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not cause damage.
- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

3.4 **INSPECTION**

- A. All penetrations shall be inspected by the manufacturer's representative to ensure proper installation.
- B. Access to firestop systems shall be maintained for examination by the Authority Having Jurisdiction at their request.
- C. Proceed with enclosing through-penetration firestop system with other construction only after inspection reports are issued and firestop installations comply with requirements.
- D. The contractor shall allow for visual destructive review of 5% of installed firestop systems (minimum of one) to prove compliance with specifications and manufacturer's instructions and details. Destructive system removal shall be performed by the contractor and witnessed by the engineer and manufacturer's factory representative. The engineer shall have sole discretion of which firestop system installations will be reviewed. The contractor is responsible for all costs associated with this requirement including labor and material for removing and replacing the installed firestop system. If any firestop system is found to not be installed per manufacturer's specific instructions and details, all firestop systems are subject to destructive review and replacement at the engineer's discretion and the contractor's expense.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Mechanical demolition.
- B. Cutting and Patching.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be as specified in individual Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. THE DRAWINGS ARE INTENDED TO INDICATE THE GENERAL SCOPE OF WORK AND DO NOT SHOW EVERY PIPE, DUCT, OR PIECE OF EQUIPMENT THAT MUST BE REMOVED. THE CONTRACTOR SHALL VISIT THE SITE AND VERIFY CONDITIONS PRIOR TO SUBMITTING A BID.
- B. Where walls, ceilings, etc., are shown as being removed on general drawings, the Contractor shall remove all mechanical equipment, devices, fixtures, piping, ducts, systems, etc., from the removed area.
- C. Where ceilings, walls, partitions, etc., are temporarily removed and replaced by others, This Contractor shall remove, store, and replace equipment, devices, fixtures, pipes, ducts, systems, etc.
- D. Verify that abandoned utilities serve only abandoned equipment or facilities. Extend services to facilities or equipment that shall remain in operation following demolition.
- E. Coordinate work with all other Contractors and the Owner. Schedule removal of equipment to avoid conflicts.
- F. This Contractor shall verify all existing equipment sizes and capacities where equipment is scheduled to be replaced or modified, prior to ordering new equipment.
- G. Bid submittal shall mean the Contractor has visited the project site and verified existing conditions and scope of work.

3.2 PREPARATION

- A. Disconnect mechanical systems in walls, floors, and ceilings scheduled for removal.
- B. Provide temporary connections to maintain existing systems in service during construction. When work must be performed on operating equipment, use personnel experienced in such operations.

3.3 **DEMOLITION AND EXTENSION OF EXISTING MECHANICAL WORK**

- A. Demolish and extend existing mechanical work under provisions of Division 2 and this Section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned ducts and piping to source of supply and/or main lines.
- D. Remove exposed abandoned pipes and ducts, including abandoned pipes and ducts above accessible ceilings. Cut ducts flush with walls and floors, cap duct that remains, and patch surfaces. Cut pipes above ceilings, below floors and behind walls. Cap remaining lines. Repair building construction to match original. Remove all clamps, hangers, supports, etc. associated with pipe and duct removal.
- E. Disconnect and remove mechanical devices and equipment serving equipment that has been removed.
- F. Repair adjacent construction and finishes damaged during demolition and extension work.
- G. Maintain access to existing mechanical installations which remain. Modify installation or provide access panels as appropriate.
- H. Remove unused sections of supply and return air ductwork back to mains. Patch opening with sheet metal and seal airtight. Patch existing insulation to match existing. Where existing ductwork is to be capped and reused, locate the end cap within 6" of the last branch. End caps shall be 3" pressure class and seal class "A".
- I. Extend existing installations using materials and methods compatible with existing installations, or as specified.

3.4 **CUTTING AND PATCHING**

- A. This Contractor is responsible for all penetrations of existing construction required to complete the work of this project. Refer to Section 23 05 29 for additional requirements.
- B. Penetrations in existing construction should be reviewed carefully prior to proceeding with any work.
- C. Penetrations shall be neat and clean with smooth and/or finished edges. Core drill where possible for clean opening.
- D. Repair existing construction as required after penetration is complete to restore to original condition. Use similar materials and match adjacent construction unless otherwise noted or agreed to by the Architect/Engineer prior to start of work.
- E. This Contractor is responsible for all costs incurred in repair, relocations, or replacement of any cables, conduits, or other services if damaged without proper investigation.

3.5 **CLEANING AND REPAIR**

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Clean all systems adjacent to project which are affected by the dust and debris caused by this construction.

- C. MECHANICAL ITEMS REMOVED AND NOT RELOCATED REMAIN THE PROPERTY OF THE OWNER. CONTRACTOR SHALL PLACE ITEMS RETAINED BY THE OWNER IN A LOCATION COORDINATED WITH THE OWNER. THE CONTRACTOR SHALL DISPOSE OF MATERIAL THE OWNER DOES NOT WANT TO REUSE OR RETAIN FOR MAINTENANCE PURPOSES.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Single Phase and Three Phase Electric Motors.

1.2 REFERENCES

- A. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
- B. AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings.
- C. ANSI/ASHRAE 90.1-2010 - Energy Standard for Buildings Except Low-Rise Residential Buildings.
- D. ANSI/IEEE 112 - Test Procedure for Polyphase Induction Motors and Generators.
- E. ANSI/NEMA MG 1 - Motors and Generators.
- F. ANSI/NFPA 70 - National Electrical Code.
- G. Energy Independence and Security Act of 2007.
- H. Energy Policy Act (EPA) of 1992.

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Section 23 05 00. Include nominal efficiency and power factor for all premium efficiency motors. Efficiencies must meet or exceed the nominal energy efficiency levels presented below.
- B. Submit shop drawings for all three phase motors.
- C. Submit motor data with equipment when motor is installed by the manufacturer at the factory.
- D. Submit shaft grounding device for all motors as required.

1.4 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data including assembly drawings, bearing data including replacement sizes, and lubrication instructions.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of commercial and industrial motors and accessories, with a minimum of three years documented manufacturing experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weatherproof coverings. For extended outdoor storage, follow manufacturer's recommendations for equipment and motor.

PART 2 - PRODUCTS

2.1 MOTORS - GENERAL CONSTRUCTION AND REQUIREMENTS

- A. Refer to the drawings for required electrical characteristics.
- B. Design motors for continuous operation in 40°C environment, and for temperature rise in accordance with ANSI/NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
- C. Explosion-Proof Motors: UL listed and labeled for the hazard classification shown on the drawing, with over-temperature protection.
- D. Visible Nameplate: Indicating horsepower, voltage, phase, hertz, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, insulation class.
- E. Electrical Connection: Boxes, threaded for conduit. For fractional horsepower motors where connection is made directly, provide conduit connection in end frame.
- F. Unless otherwise indicated, motors 3/4 HP and smaller shall be single phase, 60 hertz, open drip-proof or totally enclosed fan-cooled type.
- G. Unless otherwise indicated, motors 1 HP and larger shall be three phase, 60 hertz, squirrel cage type, NEMA Design B (low current in-rush, normal starting torque), open drip-proof or totally enclosed fan-cooled type.
- H. Each contractor shall set all motors furnished by him.
- I. All motors shall have a minimum service factor of 1.15.
- J. All motors shall have ball or roller bearings with a minimum L-10 fatigue life of 150,000 hours in direct-coupled applications and 50,000 hours for belted applications. Belted rating shall be based on radial loads and pulley sizes called out in NEMA MG1-14.43.
- K. Bearings shall be sealed type for 10 HP and smaller motors. Bearings shall be regreasable type for larger motors.
- L. Aluminum end housings are not permitted on motors 15 HP or larger.
- M. Provide all belted motors with a means of moving and securing the motor to tighten belts. Motors over 2 HP shall have screw type tension adjustment. Motors over 40 HP shall have dual screw adjusters. Slide bases shall conform to NEMA standards.

2.2 PREMIUM EFFICIENCY MOTORS (INCLUDING MOST 3-PHASE GENERAL PURPOSE MOTORS)

- A. All motors, unless exempted by EPA legislation that becomes federal law on December 19, 2010, shall comply with the efficiencies listed in that standard, which are reprinted below. These match the 2010 NEMA premium efficiency ratings. All ratings listed are nominal full load efficiencies, verified in accordance with IEEE Standard 112, Test Method B. Average expected (not guaranteed minimum) power factors shall also be at least the following:

HP	Full-Load Efficiencies %					
	Open Drip-Proof			Totally Enclosed Fan Cooled		
	1200 rpm	1800 rpm	3600 rpm	1200 rpm	1800 rpm	3600 rpm
1.0	82.5	85.5	77.0	82.5	85.5	77.0
1.5	86.5	86.5	84.0	87.5	86.5	84.0
2.0	87.5	86.5	85.5	88.5	86.5	85.5
3.0	88.5	89.5	85.5	89.5	89.5	86.5
5.0	89.5	89.5	86.5	89.5	89.5	88.5

B. Motor nameplate shall be noted with the above ratings.

2.3 MOTORS ON VARIABLE FREQUENCY DRIVES

A. All motors driven by VFDs shall be premium efficiency type.

B. Motors shall be designed for use with VFDs in variable torque applications with 1.15 service factor. Motors shall not be equipped with auxiliary blowers.

C. Motors driven by VFDs shall have Class F or H insulation and be designated by the motor manufacturer to be suitable for inverter duty service in accordance with NEMA MG 1 Section IV, "Performance Standards Applying to All Machines," Part 31 "Definite-Purpose Inverter-Fed Polyphase Motors.

2.4 MOTOR DRIVEN EQUIPMENT

A. No equipment shall be selected or operate above 90% of its motor nameplate rating. Motor size may not be increased to compensate for equipment with efficiency lower than that specified.

B. If a larger motor than specified is required on equipment, the contractor supplying the equipment is responsible for all additional costs due to larger starters, wiring, etc.

2.5 SHEAVES

A. All sheaves shall conform to NEMA Standard MG1-14.42, which lists minimum diameters and maximum overhangs. Locate motors to minimize overhang.

B. When replacing sheaves, use sheaves of at least the originally supplied sizes.

C. Contractor responsible for motor shall also be responsible for replacement sheaves. Coordinate with testing and balancing of the equipment.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All rotating shafts and/or equipment shall be completely guarded from all contact. Partial guards and/or guards that do not meet all applicable OSHA standards are not acceptable. Contractor is responsible for providing this guarding if it is not provided with the equipment supplied.

B. For flexible coupled drive motors, mount coupling to the shafts in accordance with the coupling manufacturer's recommendations. Align shafts to manufacturer's requirements or within 0.002 inch per inch diameter of coupling hub.

- C. For belt drive motors, mount sheaves on the appropriate shafts per manufacturer's instructions. Use a straight edge to check alignment of the sheaves. Reposition sheaves as necessary so the straight edge contacts both sheave faces squarely. After sheaves are aligned, loosen the adjustable motor base so the belt(s) can be added, and tighten the base so the belt tension is in accordance with the drive manufacturer's recommendations. Frequently check belt tension and adjust if necessary during the first day of operation and again after 80 hours of operation.

End of Section

**TESTING, ADJUSTING, AND BALANCING
SECTION 23 05 93**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Testing, adjusting, and balancing of air systems.
- B. Measurement of final operating condition of HVAC systems.

1.2 REFERENCES

- A. AABC - National Standards for Total System Balance, 2002.
- B. ADC – Test Code for Grilles, Registers, and Diffusers.
- C. AMCA – Publication 203-90; Field Performance Measurement of Fan Systems.
- D. ASHRAE - 2003 HVAC Applications Handbook; Chapter 37, Testing, Adjusting and Balancing.
- E. ASHRAE/ANSI - Standard 111-1988; Practices for Measurement, Testing, Adjusting and Balancing of Building HVAC&R Systems.
- F. NEBB - Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems, Sixth Edition, 1998.
- G. SMACNA - HVAC Systems; Testing, Adjusting and Balancing, Third Edition, 2002.
- H. TABB – International Standards for Environmental Systems Balance.

1.3 SUBMITTALS

- A. Submit copies of report forms, balancing procedures, and the name and qualifications of testing and balancing agency for approval within 30 days after award of Contract.
- B. Submit four (4) certified copies of test reports to the Architect/Engineer for approval in soft cover, 3-hole binder manuals, with cover identification. Include index page and indexing tabs.

1.4 REPORT FORMS

- A. Submit reports on AABC, SMACNA or NEBB forms. Use custom forms approved by the Architect/Engineer when needed to supply specified information.
- B. Include in the final report a schematic drawing showing each system component, including balancing devices, for each system. Each drawing shall be included with the test reports required for that system. The schematic drawings shall identify all testing points and cross-reference these points to the report forms and procedures.
- C. Refer to PART 4 for required reports.

1.5 QUALITY ASSURANCE

- A. Agency shall be a company specializing in the adjusting and balancing of systems specified in this section with minimum three years' experience. Perform work under supervision of AABC Certified Test and Balance Engineer, NEBB Certified Testing, Balancing and Adjusting Supervisor, SMARTA Certified Air and Hydronic Balancer, or TABB Certified Supervisor.
- B. Work shall be performed in accordance with the requirements of the references listed at the start of this section.

1.6 WARRANTY/GUARANTEE

- A. The TAB Contractor shall include an extended warranty of 90 days after owner receipt of a completed balancing report, during which time the Owner may request a recheck of terminals, or resetting of any outlet, coil, or device listed in the test report. This warranty shall provide a minimum of 24 man hours of onsite service time. If it is determined that the new test results are not within the design criteria, the balancer shall rebalance the system according to design criteria.
- B. Warranty/Guarantee must meet one of the following programs: TABB International Quality Assurance Program, AABC National Project Performance Guarantee, NEBB's Conformance Certification.

1.7 SCHEDULING

- A. Coordinate schedule with other trades. Provide a minimum of seven days' notice to all trades and the Architect/Engineer prior to performing each test.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. All procedures must conform to a published standard listed in Paragraph 1.2. All equipment shall be adjusted in accordance with the manufacturer's recommendations. Any system not listed in this specification but installed under the contract documents shall be balanced using a procedure from a published standard listed in Paragraph 1.2.
- B. Recorded data shall represent actual measured or observed conditions.
- C. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing is complete, close probe holes and patch insulation with new materials as specified. Restore vapor barrier and finish as specified.
- D. Permanently mark setting of valves, dampers, and other adjustment devices allowing for settings to be restored. Set and lock memory stops.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, plugging test holes, and restoring thermostats to specified settings.

- F. The Balancing Contractor shall measure terminal air box air flow, and the ATC shall adjust DDC readout to match. Refer to Section 23 09 00 for additional information.
- G. Installations with systems consisting of multiple components shall be balanced with all system components operating.

3.2 EXAMINATION

- A. Before beginning work, verify that systems are complete and operable. Ensure the following:
 - 1. General Equipment Requirements:
 - a. Equipment is safe to operate and in normal condition.
 - b. Equipment with moving parts is properly lubricated.
 - c. Temperature control systems are complete and operable.
 - d. Proper thermal overload protection is in place for electrical equipment.
 - e. Direction of rotation of all fans and pumps is correct.
 - f. Access doors are closed and end caps are in place.
 - 2. Duct System Requirements:
 - a. All filters are clean and in place. If required, install temporary media.
 - b. Duct systems are clean and free of debris.
 - c. Fire/smoke and manual volume dampers are in place, functional and open.
 - d. Air outlets are installed and connected.
 - e. Duct system leakage has been minimized.
- B. Report any defects or deficiencies to Architect/Engineer.
- C. Promptly report items that are abnormal or prevent proper balancing.
- D. If, for design reasons, system cannot be properly balanced, report as soon as observed.
- E. Beginning of work means acceptance of existing conditions.

3.3 PREPARATION

- A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to the Architect/Engineer for spot checks during testing.
- B. Instruments shall be calibrated within six months of testing performed for project, or more recently if recommended by the instrument manufacturer.

3.4 INSTALLATION TOLERANCES

- A. $\pm 10\%$ of scheduled values:
 - 1. Adjust air inlets and outlets to $\pm 10\%$ of scheduled values.
- B. $\pm 5\%$ of scheduled values:
 - 1. Adjust fume exhaust systems to $\pm 5\%$ of scheduled values.
 - 2. Adjust supply and exhaust air-handling systems for space pressurization to $\pm 5\%$ of scheduled values, and to provide proper pressurization.

- C. Adjust supply, return, and exhaust air-handling systems to +10% / -5% of scheduled values.

3.5 **ADJUSTING**

- A. After adjustment, take measurements to verify balance has not been disrupted or that disruption has been rectified.
- B. Once balancing of systems is complete, at least one damper or valve must be 100% open.
- C. After testing, adjusting and balancing are complete, operate each system and randomly check measurements to verify system is operating as reported in the report. Document any discrepancies.
- D. Contractor responsible for each motor shall also be responsible for replacement sheaves. Coordinate with contractor.

3.6 **SUBMISSION OF REPORTS**

- A. Fill in test results on appropriate forms.

PART 4 - SYSTEMS TO BE TESTED, ADJUSTED AND BALANCED

4.1 **GENERAL REQUIREMENTS**

- A. Title Page:
 - 1. Project name.
 - 2. Project location.
 - 3. Project Architect.
 - 4. Project Engineer (KJWW Engineering Consultants).
 - 5. Project General Contractor.
 - 6. TAB Company name, address, phone number.
 - 7. TAB Supervisor's name and certification number.
 - 8. TAB Supervisor's signature and date.
 - 9. Report date.
- B. Report Index
- C. General Information:
 - 1. Test conditions.
 - 2. Nomenclature used throughout report.
 - 3. Notable system characteristics/discrepancies from design.
 - 4. Test standards followed.
 - 5. Any deficiencies noted.
 - 6. Quality assurance statement.
- D. Instrument List:
 - 1. Instrument.
 - 2. Manufacturer, model, and serial number.
 - 3. Range.
 - 4. Calibration date.

4.2 AIR SYSTEMS

- A. Duct Leakage Test:
1. Air system and fan.
 2. Leakage class.
 3. Test pressure.
 4. Construction pressure.
 5. Flow rate (): specified and actual.
 6. Leakage (refer to Section 23 31 00 in the specifications): specified and actual.
 7. Statement that fire dampers, reheat coils and other accessories were included in the test.
 8. Pass or Fail.
 9. Test performed by.
 10. Test witnessed by.
- B. Fan Data:
1. Drawing symbol.
 2. Location.
 3. Manufacturer and model.
 4. Flow rate (cfm): specified and actual.
 5. Total static pressure: specified and actual. (Indicate measurement locations).
 6. Inlet pressure.
 7. Discharge pressure.
 8. Fan RPM.
- C. Electric Motors:
1. Drawing symbol of equipment served.
 2. Manufacturer, Model, Frame.
 3. Nameplate: HP, phase, service factor, RPM, operating amps, efficiency.
 4. Measured: Amps in each phase.
- D. Air Terminal (Inlet or Outlet):
1. Drawing symbol.
 2. Room number/location.
 3. Terminal type and size.
 4. Velocity: specified and actual.
 5. Flow rate (cfm): specified and actual.
 6. Percent of design flow rate.
- E. Fire, Smoke, and Fire/Smoke Dampers:
1. Damper ID #.
 2. System identification.
 3. Type.
 4. Size.
 5. U.L. assembly number.
 6. Location of damper and access door.
 7. Fusible link temperature rating.
 8. Manufacturer and model.
 9. Operation pass/fail/reset.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Ductwork Insulation.
- B. Insulation Jackets.

1.2 REFERENCES

- A. ANSI/ASHRAE 90.1-2010 - Energy Standard for Buildings Except Low-Rise Residential Buildings.
- B. ANSI/ASTM C553 - Mineral Fiber Blanket and Felt Insulation.
- C. ANSI/ASTM C612 - Mineral Fiber Block and Board Thermal Insulation.
- D. ASTM E84 - Surface Burning Characteristics of Building Materials.
- E. ASTM E136 - Standard Test Method for the Behavior of Materials in a Vertical Tube Furnace at 750°C.
- F. ASTM E814 - Fire Tests of Through Penetrations Firestops.
- G. ASTM E2336-04 – Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems.
- H. National Commercial & Industrial Insulation Standards - 1999 Edition - as published by Midwest Insulation Contractors Association and endorsed by National Insulation Contractors Association.
- I. NFPA 96 - Standard for the Installation of Equipment for Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment.
- J. NFPA 255 - Surface Burning Characteristics of Building Materials.
- K. UL - XHEZ - Through Penetration Firestop Systems.
- L. UL 263 - Full Scale External Fire Tests with Hose Stream.
- M. UL 723 - Surface Burning Characteristics of Building Materials.
- N. UL 1479 - Fire Tests of Through Penetrations Firestops.

1.3 QUALITY ASSURANCE

- A. Applicator: Company specializing in ductwork insulation application with five years minimum experience. When requested, installer shall submit manufacturer's certificate indicating qualifications.
- B. Materials: UL listed in Category HNKT; flame spread/smoke developed rating of 25/50 in accordance with ASTM E84, NFPA 255, or UL 723.
- C. Adhesives: UL listed, meeting NFPA 90A/90B requirements.

1.4 SUBMITTALS

- A. Submit shop drawings per Section 23 05 00. Include product description, list of materials and thickness for each service, and location.
- B. Submit manufacturer's installation instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Type A: Flexible Fiberglass - Outside Wrap; ANSI/ASTM C553; commercial grade; 0.28 maximum 'K' value at 75°F; foil scrim kraft facing, 1.0 lb./cu. ft. density.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions, codes, and industry standards.
- B. Install materials after ductwork has been tested.
- C. Clean surfaces for adhesives.
- D. Provide insulation with vapor barrier when air conveyed may be below ambient temperature.
- E. Exterior Duct Wrap - Flexible, Type A:
 - 1. Apply with edges tightly butted.
 - 2. Cut slightly longer than perimeter of duct to insure full thickness at corners. Do not wrap excessively tight.
 - 3. Seal joints with adhesive backed tape.
 - 4. Apply so insulation conforms uniformly and firmly to duct.
 - 5. Provide high-density insulation inserts at trapeze duct hangers and straps to prevent crushing of insulation. Maintain continuous vapor barrier through the hanger.
 - 6. Tape all joints with Royal Tapes #RT 350 (216-439-7229), Venture Tape 1525CW, or Compac Type FSK. No substitutions will be accepted without written permission from the Architect/Engineer.
 - 7. Press tape tightly to the duct covering with a squeegee for a tight continuous seal. Fish mouths and loose tape edges are not acceptable.
 - 8. Staples may be used, but must be covered with tape.
 - 9. Vapor barrier must be continuous.
 - 10. Mechanically fasten on 12" centers at bottom of ducts over 24" wide and on all sides of vertical ducts.

3.2 **SCHEDULE**

- A. Refer to Section 23 31 00 for scheduling of insulation.

End of Section

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PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Complete System of Automatic Controls.
- B. Control Devices, Components, Wiring and Material.
- C. Instructions for Owners.
- D. Remodeling.

1.2 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Automatic Dampers.

1.3 REFERENCES

- A. AMCA 500 - Test Methods for Louvers, Dampers and Shutters.
- B. ANSI/ASHRAE 90.1-2010 - Energy Standard for Buildings Except Low-Rise Residential Buildings.
- C. ANSI/ASHRAE Standard 135-2001: BACnet[®] – A Data Communication Protocol for Building Automation and Control Networks, including all amendments.
- D. ANSI/NEMA 250 - Enclosures for Electrical Equipment (1000 volts Maximum).
- E. ANSI/NFPA 70 - National Electrical Code.
- F. ANSI/NFPA 90A - Installation of Air-Conditioning and Ventilation Systems.
- G. ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality.
- H. ASHRAE 85 - Automatic Control Terminology for Heating, Ventilating, Air Conditioning.

1.4 AGENCY AND CODE APPROVALS

- A. All products shall have the following agency approvals. Provide verification that the approvals exist for all submitted products with the submittal package.
 - 1. UL-916; Energy Management Systems.
 - 2. C-UL listed to Canadian Standards Association C22.2 No. 205-M1983 “Signal Equipment.”
 - 3. EMC Directive 89/336/EEC (European CE Mark).
 - 4. FCC, Part 15, Subpart J, Class A Computing Devices.

1.5 ACRONYMS

- A. Acronyms used in this specification are as follows:
 - 1. B-AAC BACnet Advanced Application Controller
 - 2. B-ASC BACnet Application Specific Controller
 - 3. BTL BACnet Testing Laboratories
 - 4. DDC Direct Digital Controls
 - 5. FMCS Facility Management and Control System
 - 6. GUI Graphic User Interface

7.	IBC	Interoperable BACnet Controller
8.	IDC	Interoperable Digital Controller
9.	LAN	Local Area Network
10.	NAC	Network Area Controller
11.	ODBC	Open DataBase Connectivity
12.	OOT	Object Oriented Technology
13.	OPC	Open Connectivity via Open Standards
14.	PICS	Product Interoperability Compliance Statement
15.	PMI	Power Measurement Interface
16.	POT	Portable Operator's Terminal
17.	TCC	Temperature Control Contractor
18.	TCS	Temperature Control System
19.	WAN	Wide Area Network
20.	WBI	Web Browser Interface

1.6 SUMMARY

- A. Extend Existing System:
 - 1. Extend the existing FMCS for this project.
 - 2. All controllers and accessories shall interface with the existing FMCS control system.
- B. All labor, material, equipment and software not specifically referred to herein or on the plans that are required to meet the intent of this specification shall be provided without additional cost to the Owner.
- C. The Owner shall be the named license holder of all software associated with any and all incremental work on the project.

1.7 SYSTEM DESCRIPTION

- A. The existing TCS is comprised of a network of interoperable, standalone digital controllers communicating via the following protocol to an NAC. Temperature Control System products shall be as specified below.
- B. Provide materials and labor necessary to connect factory supplied control components.
- C. Provide central and remote hardware, software, and interconnecting wire and conduit.

1.8 SUBMITTALS

- A. Equipment Coordination:
 - 1. The Controls Contractor shall obtain approved equipment submittals from other contractors to determine equipment wiring connections, to choose appropriate controllers, and to provide programming.
 - 2. Control valve selections shall be based on flow rates shown in approved shop drawings.
 - 3. Coordinate the control interface of all equipment with the equipment manufacturers prior to submittal submission.

B. Shop Drawings:

1. Submit shop drawings per Section 23 05 00. In addition, submit an electronic copy of the shop drawings in Adobe Acrobat (.pdf) format to the Owner for review.
2. Cross-reference **all** control components and point names in a single table located at the beginning of the submittal with the **identical** nomenclature used in this section.
3. Submittal shall also include a trunk cable schematic diagram depicting operator workstations, control panel locations and a description of the communication type, media and protocol.
4. Diagrams shall include:
 - a. Wiring diagrams and layouts for each control panel showing all termination numbers.
 - b. Schematic diagrams for all control, communication, and power wiring. Provide a schematic drawing of the central system installation. Label all cables and ports with computer manufacturers' model numbers and functions. Show all interface wiring to the control system.
 - c. Identification of all control components connected to emergency power.
 - d. Schematic diagrams for all field sensors and controllers.
 - e. A schematic diagram of each controlled system. The schematics shall have all control points labeled. The schematics shall graphically show the location of all control elements in the system.
 - f. A schematic wiring diagram for each controlled system. Each schematic shall have all elements labeled. Where a control element is the same as that shown on the control system schematic, label it with the same name. Label all terminals.
 - g. A tabular instrumentation list for each controlled system. The table shall show element name, type of device, manufacturer, model number and product data sheet number.
 - h. All installation details and any other details required to demonstrate that the system will function properly.
 - i. All interface requirements with other systems.
5. The network infrastructure shall conform to the published guidelines for wire type, length, number of nodes per channel, termination, and other relevant wiring and infrastructure criteria as published. The number of nodes per channel shall be no more than 80% of the defined segment (logical or physical) limit in order to provide future system enhancement with minimal infrastructure modifications.
6. Sequences: Submit a complete description of the operation of the control system, including sequences of operation. The description shall include and reference a schematic diagram of the controlled system. **The wording of the control sequences in the submittal shall match verbatim that included in the construction documents to ensure there are no sequence deviations from that intended by the Engineer. Clearly highlight any deviations from the specified sequences on the submittals.**

7. Points List Schedule: Submit a complete points list of all points to be connected to the TCS and FMCS. The points list for each system controller shall include both inputs and outputs (I/O), point number, the controlled device associated with the I/O point, the location of the I/O device, and reference drawings. Where a control point is the same as that shown on the control system schematic, label it with the same name. Points list shall specifically identify alarms, trends, event history, archive, totalization, graphic points, and all mapped points from other systems (security systems, lighting control, fire alarm, etc.). Provide points lists, point naming convention, and factory support information for systems provided and integrated into the FMCS.
 8. Damper Schedule: Schedule shall include a separate line for each damper and a column for each of the damper attributes:
 - a. Damper Identification Tag.
 - b. Location.
 - c. Damper Type.
 - d. Damper Size.
 - e. Duct Size.
 - f. Arrangement.
 - g. Blade Type.
 - h. Velocity.
 - i. Pressure Drop.
 - j. Fail Position.
 - k. Actuator Identification Tag.
 - l. Actuator Type.
 - m. Mounting.
 9. Product Data Sheets: Required for each component that includes: unique identification tag that is consistent throughout the submittal, manufacturer's description, technical data, performance curves, installation/maintenance instructions, and other relevant items. When manufacturer's literature applies to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means. Each submitted piece of literature and drawings shall clearly reference the specification and/or drawing that the submittal is to cover. General catalogs shall not be accepted as cutsheets to fulfill submittal requirements.
 10. Provide PICS files indicating the BACnet® functionality and configuration of each device.
 11. Graphic Display: Include a sample graphic of each system and component identified in the points list with a flowchart (site map) indicating how the graphics are to be linked to each other for system navigation.
 12. Clearly identify work by others in the submittal.
 13. Quantities of items submitted may be reviewed but are the responsibility of the Contractor to verify.
- C. Operation and Maintenance Manual:
1. In addition to the requirements of Section 23 05 00, submit an electronic copy of the O&M manuals in PDF format.
 2. Provide three complete sets of manuals.

3. Each O&M manual shall include:
 - a. Table of contents with indexed tabs dividing information as outlined below.
 - b. Definitions: List of all abbreviations and technical terms with definitions.
 - c. Warranty Contacts: Names, addresses, and 24-hour telephone numbers of contractors installing equipment and controls and service representatives of each.
 - d. Licenses, Guarantees, and Warranties: Provide documentation for all equipment and systems.
 - e. System Components: Alphabetical list of all system components, with the name, address, and telephone number of the vendor.
 - f. Operating Procedures: Include procedures for operating the control systems; logging on/off; enabling, assigning, and reporting alarms; generating reports; collection, displaying, and archiving of trended data; overriding computer control; event scheduling; backing up software and data files; and changing setpoints and other variables.
 - g. Programming: Description of the programming language (including syntax), statement descriptions (including algorithms and calculations used), point database creation and modification, program creation and modification, and use of the editor.
 - h. Engineering, Installation, and Maintenance: Explain how to design and install new points, panels, and other hardware; recommended preventive maintenance procedures for all system components, including a schedule of tasks (inspection, cleaning, calibration, etc.), time between tasks, and task descriptions; how to debug hardware problems; and how to repair or replace hardware. A list of recommended spare parts.
 - i. Original Software: Complete original issue CDs for all software provided, including operating systems, programming language, operator workstation software, and graphics software.
 - j. Software: One set of CDs containing an executable copy of all custom software created using the programming language, including the setpoints, tuning parameters, and object database.
 - k. Graphics: A glossary or icon symbol library detailing the function of each graphic icon and graphics creation and modification. One set of CDs containing files of all color graphic screens created for the project.

D. Training Manual:

1. Provide a course outline and training manuals for each training class.

E. Record Documents:

1. Submit record documentation per Section 23 05 00.
2. Provide a complete set of “as-built” drawings and application software on CDs. Provide drawings as AutoCAD™ or Visio™ compatible files. Provide two copies of the “as-

built” drawings with revisions clearly indicated in addition to the documents on compact disk. All as-built drawings shall also be installed on the FMCS server in a dedicated directory. Provide all product data sheets in PDF format.

3. Submit two hard copies and one electronic copy of as-built versions of the shop drawings, including product data and record drawings with revisions clearly indicated. Provide floor plans showing actual locations of control components including panels, thermostats, sensors, and hardware.
4. Provide all completed testing and commissioning reports and checklists, along with all trend logs for each system identified in the points lists.
5. Submit printouts of all graphic screens with current values (temperatures, pressures, etc.) to the A/E verifying completion and proper operation of all points.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Provide factory-shipping cartons for each piece of equipment and control device. Maintain cartons through shipping, storage, and handling as required to prevent equipment damage. Store equipment and materials inside and protected from weather.
- B. Factory-Mounted Components: Where control devices specified in this section are indicated to be factory mounted on equipment, arrange for shipping control devices to unit manufacturer.

1.10 JOB CONDITIONS

- A. Cooperation with Other Trades: Coordinate the Work of this section with that of other sections to ensure that the Work will be carried out in an orderly fashion. It is this Contractor's responsibility to check the Contract Documents for possible conflicts between the Work of this section and that of other crafts in equipment location; pipe, duct and conduit runs; electrical outlets and fixtures; air diffusers; and structural and architectural features.

1.11 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five years' experience.
- B. TCC: Company specializing in the work of this section with minimum five years temperature control experience.
- C. Technician: Minimum five years' experience installing commercial temperature control systems.
- D. TCCs are limited to firms regularly employing a minimum of five full-time temperature control technicians within 100 miles of the job site.

1.12 WARRANTY

- A. Refer to Section 23 05 00 for warranty requirements.
- B. Within the warranty period, any defects in the work provided under this section due to faulty materials, methods of installation or workmanship shall be promptly (within 48 hours after receipt of notice) repaired or replaced by this Contractor at no expense to the Owner.
- C. Warranty requirements include furnishing and installing all FMCS software upgrades issued by the manufacturer during the one-year warranty period.

- D. Update all software and back-ups during warranty period and all user documentation on the Owner's archived software disks.

1.13 **WARRANTY ACCESS**

- A. The Owner shall grant to this Contractor reasonable access to the TCS and FMCS during the warranty period.

PART 2 - PRODUCTS

2.1 **ACCEPTABLE MANUFACTURERS**

Acceptable Manufacturers	BACnet Protocol	LonTalk Protocol
Trane Summit by Trane Corporation (Contact Steve Blau 630-400-4323)		•

2.2 **CONTROL INSTRUMENTATION**

- A. Current Measuring Devices:
 - 1. Current Switches for Constant Speed Motors:
 - a. Digital device rated for amperage load of motor or device with split core design, adjustable high and low trip points, 600 VAC rms isolation, induced power from the monitored load, LED indicator lamps for output status and sensor power. The device shall sense overloading, belt-loss, and power failure with a single signal.
 - 2. Current Switches for Motors Controlled by VFD:
 - a. Digital device rated for amperage load of motor or device with split core design, factory programmed to detect motor undercurrent conditions on variable or constant volume loads, self-calibrating, positive status indication, LED indicator lamps, 600 VAC rms isolation, induced power from the monitored load with N.O. output. The current sensor shall store the motor current operating parameters in non-volatile memory and have a pushbutton reset to clear the memory if the operating parameters change or the sensor is moved to another load. The device shall sense overloading, belt-loss, and power failure with a single signal. The sensor shall be mounted on the load side of variable frequency drives.
- B. Occupancy Sensors:
 - 1. Ceiling mounted, passive infrared, 360° coverage pattern, zero crossing circuitry, adjustable sensitivity and time delay (initial setting: Time delay - 5 minutes), integral isolated relay with normally open and normally closed outputs, LED indicator, five-year warranty, UL listed. ATC shall submit manufacturer supplied sensor layout drawing for shop drawing review. Provide full room coverage as recommended by manufacturer.
- C. Pressure Measuring Devices
 - 1. Pressure Transmitters/Transducer:
 - a. Select device suitable for intended application; water or air, static or differential.

- b. Select for appropriate range, including negative if applicable.
- c. 100% solid state device, temperature compensated, suitable for pressures of 200% rated range with averaging to stabilize output, accuracy of $\pm 1\%$ full scale, and a 4-20 mA output.
- d. Provide a NEMA 4 enclosure unless panel mounted.
- e. Air service shall have a minimum of three field selectable ranges.
- f. When used for room pressure control, the transducer shall be bidirectional with a range of $\pm 0.1''$ W.C.
- g. Provide pressure line outlet cover on both sides of the wall when used for room pressure control.
- h. Furnish with integral LED's to indicate Zero Pressure, Pressure In Range, and Pressure Out Of Range as a diagnostic aid.

D. Miscellaneous Devices:

1. Twist Timers:

- a. Wall-mounted heavy duty, with rotary dial and face graduated in minutes or hours as noted. Unit shall fit behind standard "decorator" wall plate. Color of timer and face plate shall match remainder of project. Verify with Electrical Contractor. Provide wall plate and engraved plastic label indicating service.
- b. Switch shall be rated for 20 amps at 125 volts (10 amps at 277 volts) and fit standard 2-1/2" deep electrical box.
- c. Provide time cycle noted on the drawings or in the specifications; up to 12 hours.
- d. Acceptable Manufacturers: Paragon SWD Series, Tork A500 Series, Intermatic FD Series, or Marktime Series 93.

2.3 **CONDUIT**

- A. Conduit and Fittings: Refer to Electrical Section 26 05 33 for materials and sizing.

2.4 **WIRE AND CABLE**

- A. Wire and Cable Materials: Refer to Electrical Section 26 05 13 for wire and cable materials.

PART 3 - EXECUTION

3.1 **GENERAL INSTALLATION**

- A. Verify that systems are ready to receive work. Beginning of installation means installer accepts existing conditions.
- B. Install system and materials in accordance with manufacturer's instructions.

- C. Drawings of the TCS and FMCS network are diagrammatic only. Any apparatus not shown but required to meet the intent of the project documents shall be furnished and installed without additional cost.
- D. Install all operators, sensors, and control devices where accessible for service, adjustment, calibration, and repair. Do not install devices where blocked by piping or ductwork. Devices with manual reset or limit adjustments shall be installed below 6'-0" if practical to allow inspection without using a ladder.
- E. Verify locations of wall-mounted devices (such as thermostats, temperature and humidity sensors, and other exposed sensors) with drawings and room details before installation. Coordinate mounting heights to be consistent with other wall-mounted devices. Maximum height above finished floor shall not exceed 48".
- F. Mount control panels adjacent to associated equipment on vibration-free walls or freestanding angle iron supports. One cabinet may accommodate more than one system in same equipment room.
- G. After completion of installation, test and adjust control equipment.
- H. Check calibration of instruments. Recalibrate or replace.
- I. Furnish and install conduit, wire, and cable per the National Electric Code, unless noted otherwise in this section.
- J. All hardware, software, equipment, accessories, wiring (power and sensor), piping, relays, sensors, power supplies, transformers, and instrumentation required for a complete and operational FMCS system, but not shown on the electrical drawings, are the responsibility of the TCC.
- K. Labels For Control Devices:
 - 1. Provide labels indicating service of all control devices in panels and other locations.
 - 2. Labels may be made with permanent marking pen in the control panels if clearly legible.
 - 3. Use engraved labels for items outside panel such as outside air thermostats.
 - 4. Labels are not required for room thermostats, damper actuators and other items where their function is obvious.
- L. VFD's:
 - 1. This project includes several variable frequency drives to control the flow of fans and/or pumps based on a control variable.
 - 2. Verify output signal required, 4-20 mA or 0-10V dc, with the EC.
 - 3. If VFD has a bypass feature, auxiliary contacts on the drive may not be used for motor status. A separate relay must be used to indicate motor rotation in either hand or auto positions.
 - 4. If a separate current transmitter or switch is indicated for status, install this device between the VFD and the motor. In this case, the drive status may be connected to the auxiliary contacts in the VFD.

5. Some devices, such as low limits and fire alarm shutdown relays, must be hardwired to the fan motor. Make connections such that fan will shut down whether in hand or auto position if the unit has a bypass feature.

3.2 GRAPHIC DISPLAY

- A. Create a customized graphic for each piece of equipment indicated on the itemized points list.
- B. Components shall be arranged on graphic as installed in the field.
- C. Include each graphic point listed in the itemized points list using real time data.
- D. The FMCS shall include full graphic operator interface to display the following graphics as a minimum:
 1. Home page to include a minimum of six critical points: Outside Air Temperature, Outside Air Relative Humidity, Enthalpy, KWH, KW, etc.
 2. Graphic floor plans accurately depicting rooms, walls, hallways, and showing accurate locations of space sensors and major mechanical equipment.
 3. Detailed graphics for each mechanical system including AHUs, ERUs, EFs, chillers, and boilers, as a minimum.
 4. Access corresponding system drawings, technical literature, and sequences of operations directly from each system graphic.
- E. The FMCS shall include individual graphical buttons to access the following data stored in PDF format:
 1. Project control as-built documentation including all TCS drawings, diagrams and sequences of operation.
 2. TCS Bill of Material for each system, e.g. AHU, RTU, FCU, boiler, etc.
 3. Technical literature specification data sheets for all components listed in the TCS Bill of Material.

3.3 CONDUIT INSTALLATION

- A. Conduit Sizing and Installation: Refer to Electrical Section 26 05 33 for execution and installation.
 1. Thermostats/temperature sensors shall be installed in junction boxes, flush with the wall, and shall be coordinated for orientation with Architect/Engineer.

3.4 WIRE AND CABLE INSTALLATION

- A. Wire and Cable Materials Installation: Refer to Electrical Section 26 05 13 for execution and installation.
- B. Field Quality Control:
 1. Inspect wire and cable for physical damage and proper connection.
 2. Torque test conductor connections and terminations to manufacturer's recommended values.

3. Perform continuity test on all conductors.
4. Protection of cable from foreign materials:
 - a. It is the Contractor's responsibility to provide adequate physical protection to prevent foreign material application or contact with any cable type. Foreign material is defined as any material that would negatively impact the validity of the manufacturer's performance warranty. This includes, but is not limited, to overspray of paint (accidental or otherwise), drywall compound, or any other surface chemical, liquid or compound that could come in contact with the cable, cable jacket or cable termination components.
 - b. Overspray of paint on any cable, cable jacket or cable termination component will not be accepted. It shall be the Contractor's responsibility to replace any component containing overspray, in its entirety, at no additional cost to the project. Cleaning of the cables with harsh chemicals is not allowed. This requirement is regardless of the PASS/FAIL test results of the cable containing overspray. Should the manufacturer and warrantor of the structured cabling system desire to physically inspect the installed condition and certify the validity of the structured cabling system (via a signed and dated statement by an authorized representative of the structured cabling manufacturer), the Owner may, at their sole discretion, agree to accept said warranty in lieu of having the affected cables replaced. In the case of plenum cabling, in addition to the statement from the manufacturer, the Contractor shall also present to the Owner a letter from the local Authority Having Jurisdiction stating that they consider the plenum rating of the cable to be intact and acceptable.

C. Installation Schedule:

1. Conduit terminations to all devices installed in applications with rotating equipment, expansion/contraction or vibration shall be made with flexible metallic conduit, unless noted otherwise. Final terminations to exterior devices installed in damp or wet locations shall be made with liquidtight flexible metallic conduit. Terminations in hazardous areas, as defined in the National Electrical Code, shall be connected using flexible conduit rated for the environment.

3.5 FMCS INSTALLATION

- A. Coordinate voltage and ampacity of all contacts, relays, and terminal connections of equipment being monitored or controlled. Voltage and ampacity shall be compatible with equipment voltage and be rated for full ampacity of wiring or overcurrent protection of circuit controlled.
- B. Naming Conventions: Coordinate all point naming conventions with Owner standards. In the absence of Owner standards, naming conventions shall use equipment designations shown on plans.

3.6 COMMISSIONING

- A. Upon completion of the installation, this Contractor shall load all system software and start up the system. This Contractor shall perform all necessary calibration, testing and de-bugging and perform all required operational checks to ensure that the system is functioning in full accordance with these specifications.

- B. This Contractor shall perform tests to verify proper performance of components, routines, and points. Repeat tests until proper performance results. This testing shall include a point-by-point log to validate 100% of the input and output points of the FMCS system operation.
- C. This Contractor shall prove that the controls network is functioning correctly and within acceptable bandwidth criteria and shall test the system with an approved protocol analysis tool. Provide a log and statistics summary showing that each channel is within acceptable parameters. Each channel shall be shown to have at least 25% spare capacity for future expansion.
- D. Upon completion of the performance tests described above, repeat these tests, point by point, as described in the validation log above in the presence of Owner's Representative, as required. Properly schedule these tests so testing is complete at a time directed by the Owner's Representative. Do not delay tests so as to prevent delay of occupancy permits or building occupancy.
- E. System Acceptance: Satisfactory completion is when this Contractor has performed successfully all the required testing to show performance compliance with the requirements of the Contract Documents to the satisfaction of the Owner's Representative. System acceptance shall be contingent upon completion and review of all corrected deficiencies.

3.7 **PREPARATION FOR BALANCING**

- A. Verify that all dampers are in the position indicated by the controller (e.g., open, closed or modulating).
- B. Check the calibration and setpoints of all controllers.
- C. Check the locations of all thermostats and humidistats for potential erratic operation from outside influences such as sunlight, drafts, or cold walls.
- D. Check that all sequences operate as specified. Verify that no simultaneous heating and cooling occurs, unless specified. Observe that heating cannot begin at TAB reheat terminals until the unit is at the minimum cfm.
- E. Verify the operation of all interlock systems.

3.8 **TEST AND BALANCE COORDINATION**

- A. The Contractor shall furnish a single set of all tools necessary to interface to the control system for test and balance purposes.
- B. The Contractor shall provide a minimum of four (4) hours training for the Balancing Contractor in the use of these tools.
- C. In addition, the Contractor shall provide a qualified technician to assist in the test and balance process until the first 20 terminal units are balanced.
- D. The tools used during the test and balance process shall be returned at the completion of the testing and balancing.

3.9 **DEMONSTRATION AND ACCEPTANCE**

- A. At completion of installation, provide two days minimum instruction for operators. Demonstrate operation of all controls and systems. Describe the normal operation of all equipment.

3.10 **INSTALLATION OF SENSORS**

- A. Install sensors in accordance with the manufacturer's recommendations.
- B. Mount sensors rigidly and adequately for the environment within which the sensor operates.
- C. All wires attached to sensors shall be air sealed in their raceways or in the wall to stop air transmitted from other areas affecting sensor readings.
- D. Averaging sensors and low limits shall be installed at the top of the assembly with the element on a slight downward incline away from the sensor making a serpentine pattern over the cross-sectional area with elements spaced not over 12" apart and within 6" of the top and bottom of the area.
- E. Install all wall-mounted CO2 sensors between 3 feet and 6 feet above the floor.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Ductwork Reinforcement
- B. Ductwork Sealants
- C. Rectangular Ductwork - Single Wall
- D. Round and Flat Oval Ductwork - Single Wall
- E. Exposed Ductwork (Rectangular, Round, or Oval)
- F. Flexible Duct
- G. Leakage Testing
- H. Ductwork Penetrations
- I. Duct Cleaning
- J. Painting

1.2 DEFINITIONS

- A. Duct Sizes shown on drawings are inside clear dimensions. Maintain clear dimensions inside any lining.
- B. Transitions are generally not shown in single-line ductwork. Where sizes change at a divided flow fitting, the larger size shall continue through the fitting.

1.3 SUBMITTALS

- A. Submit shop drawings per Section 23 05 00.
- B. Submit duct fabrication standards in compliance with SMACNA and these specifications. Clearly indicate metal gauges, reinforcement, and joining methods intended for use for each pressure classification. Furnish details of all common duct fittings and joint connections to be used on this project.
- C. The engineer may require field verification of sheet metal gauges and reinforcing to verify compliance with these specifications. At the request of the engineer, the contractor shall remove a sample of the duct for verification. The contractor shall repair as needed.

PART 2 - PRODUCTS

2.1 DUCTWORK REINFORCEMENT

- A. General Requirements:
 - 1. All reinforcement shall be external to the duct except that tie rods may be used with the following limitations.
 - a. Ducts must be over 18" wide.
 - b. Duct dimensions must be increased 2" in one dimension (h or w) for each row of tie rods installed.
 - c. Tie rods must not exceed 1/2" diameter.

- d. Manufacturer of tie rod system must certify pressure classifications of various arrangements, and this must be in the shop drawings.

2.2 DUCTWORK SEALANTS

- A. One part joint sealers shall be water-based mastic systems that meet the following requirements: maximum 48-hour cure time, service temperature of -20°F to +175°F, resistant to mold, mildew and water, flame spread rating below 25 and smoke-developed rating below 50 when tested in accordance with ASTM E84, suitable for all SMACNA seal classes and pressure classes. Mastic used to seal flexible ductwork shall be marked UL 181B-M. All other mastics shall be marked UL 181A-M.
- B. Two-part joint sealers shall consist of a minimum 3" wide mineral-gypsum compound impregnated fiber tape and a liquid sealant. Sealant system shall meet the following requirements: maximum 48-hour cure time, service temperature of 0°F to 200°F, resistant to mold, mildew, and water, flame spread rating below 25 and smoke developed rating below 50 when tested in accordance with ASTM E84, suitable for all SMACNA seal classes and pressure classes.

2.3 RECTANGULAR DUCT - SINGLE WALL

- A. General Requirements:
 - 1. All ductwork gauges and reinforcements shall be as listed in SMACNA Duct Construction Standards Chapter 2. Where necessary to fit in confined spaces, furnish heaviest duct gauge and least space consuming reinforcement.
 - 2. Offsets and transitions shall not exceed the angles in Figure 4-7.
- B. Exceptions and modifications to the 2005 HVAC Duct Construction Standards are:
 - 1. All ducts shall be cross-broken or beaded.
 - 2. Turning vanes shall be used in all 90° mitered elbows, unless clearly noted otherwise on the drawings. Vanes shall be as follows:
 - a. Type 1:
 - 1) **Description:** Single wall type with 22-gauge (0.029") or heavier vanes, 3-1/4" blade spacing, and 4" to 4-1/2" radius. Vanes hemmed if recommended by runner manufacturer. Runners shall have extra-long locking tabs. C-value independently tested at below 0.26. EZ Rail II by Sheet Metal Connectors or equal.
 - 2) **Usage:** Limited to 3,000 fpm and vane lengths 36" and under.
 - b. Type 2:
 - 1) **Description:** Double wall type with 3-1/4" blade spacing, 4-1/2" radius, 24-gauge minimum, and SMACNA Type 1 runners. C-value below 0.27.
 - 2) **Usage:** No limits other than imposed by the manufacturer. Provide intermediate support for vanes over 48" long.

- c. Type 3 (acoustical - where acoustical lagging is located or as noted on drawings):
 - 1) **Description:** Same as Type 2, except filled with fiberglass and with slotted or perforated inner curve. Minimum insertion loss of 9 dB at 250 Hz and 6 dB at 1 KHz.
 - 2) **Usage:** No limits other than imposed by the manufacturer. Provide intermediate support for vanes over 48" long.
 - d. Turning vanes shall operate quietly. Repair or replace vanes that rattle or flutter.
 - e. Runners must be installed at a 45° angle. Elbows with different size inlet and outlet must be radius type.
 - f. Omitting every other vane is prohibited.
3. Where smooth radius rectangular elbows are shown, they shall be constructed per SMACNA Figure 4-2. Type RE1 shall be constructed with a centerline duct radius R/W of 1.0. Where shown on drawings, Type RE3 elbows with 3 vanes shall be used with centerline duct radius R/W of 0.6 (SMACNA r/W=0.1). RE1 or RE3 elbows may be used where mitered elbows are shown if space permits. **Mitered elbows (with or without turning vanes) may not be substituted for radius elbows.** Do not make branch takeoffs within 4 duct diameters on the side of the duct downstream from the inside radius of radius elbows.
 4. Rectangular branch and tee connections in ducts over 1" pressure class shall be 45° entry type per Figs. 4-5 and 4-6. Rectangular straight taps are not acceptable above 1" pressure class.
 5. Bellmouth fittings shown on return duct inlets shall expand at a 60-degree total angle horizontally and vertically (space permitting) and have length of at least 25% of the smallest duct dimension.
 6. Round taps off rectangular unlined ducts shall be flanged conical or bellmouth type (equal to Buckley Bellmouth or Sheet Metal Connectors E-Z Tap), or 45° rectangular with transition to round (equal to Sheet Metal Connectors Inc. High Efficiency Takeoff). Straight taps are acceptable if pressure class is 1" or less, round duct is 12" diameter or less, and the tap is not located between fans and TAB devices.
 7. All lined duct shall utilize dovetail joints where round or conical taps occur. The dovetail joints shall extend past the liner before being folded over.
 8. Cushion heads are acceptable only downstream of TAB devices in ducts up to ± 2" pressure class, and must be less than 6" in length.
 9. Slide-on flanged transverse joint systems are acceptable provided they are a manufactured product that has been tested for conformance with Chapter 2 of the SMACNA HVAC Duct Construction Standards for sheet and joint deflection at the specified pressure class.
 - a. Apply sealant to all inside corners. Holes at corners are not acceptable.
 - b. Acceptable Manufacturers: Ductmate Industries - 25/35/45, Nexus, Mez, or WDCI. Other manufacturers must submit test data and fabrication standards and receive Engineer's approval before any fabrication begins.

2.4 **ROUND AND FLAT OVAL DUCTWORK - SINGLE WALL**

- A. Conform to applicable portions of Rectangular Duct Section. Round or flat oval ductwork may be substituted for rectangular ductwork where approved by the Engineer. The spiral seam ductwork shall meet the standards set forth in this specification. The ductwork shall meet or exceed the specified cross-sectional area and insulation requirements. The substitution shall be coordinated with all other trades prior to installation.
- B. Snap lock seams are not permitted.
- C. Flat oval duct in negative pressure applications shall have flat sides reinforced as required for rectangular ducts of the same gauge with dimensions equal to the flat span of the oval duct.
- D. 90° elbows shall be smooth radius or have a minimum of five sections with mitered joints and R/D of at least 1.5.
- E. Duct and fittings shall meet the required minimum gauges listed in chapter 3 of the SMACNA requirements for the specified pressure class. Ribbed and lightweight duct are not permitted.
- F. Ductwork shall be suitable for velocities up to 5,000 fpm.
- G. Divided flow fittings may be made as separate fittings or factory installed taps with sound, airtight, continuous welds at intersection of fitting body and tap.
- H. Spot weld and bond all fitting seams in the pressure shell. Coat galvanizing damaged by welding with corrosion resistant paint to match galvanized duct color.
- I. Ducts with minor axis less than 22" shall be spiral seam type. Larger ducts may be rolled, longitudinal welded seam type. SMACNA seams RL-2 and RL-3 are not permitted.
- J. Reinforce flat oval ducts with external angles. Internal tie rods are permitted only as indicated for rectangular ductwork.
- K. Transverse Joint Connections:
 - 1. Crimped joints are not permitted.
 - 2. Ducts and fittings 36" in diameter and smaller shall have slip joint connections. Size fitting ends to slip inside mating duct sections with minimum 2-inch insertion length and a stop bead. Use inside slip couplings for duct-to-duct joints, and outside slip couplings for fitting-to-fitting joints.
 - 3. Ducts and fittings larger than 36" shall have flanged connections.
 - 4. Secure all joints with at least 3 sheet metal screws before sealing.
 - 5. Slide-on flanges as manufactured by Ductmate Industries, Accuflange, or Sheet Metal Connectors are acceptable. Self-sealing duct systems are also acceptable (Lindab, Ward "Keating Coupling").

2.5 EXPOSED DUCTWORK (RECTANGULAR, ROUND, AND FLAT OVAL)

- A. The following applies to all ductwork exposed in finished areas in addition to requirements noted above:
1. Provide extra shipping protection. Use Cardboard or other protective means to prevent dents and deformed ends.
 2. Provide cardboard or other means of protection during field fabrication. Protect from scratches. Provide stiffeners to retain shape during fabrication.
 3. Remove all identification stickers and thoroughly clean exterior of all ducts.
 4. Locate fitting seams on least visible side of duct.
 5. Provide exterior finish suitable for field painting without further oil removal.
 6. Provide ramp-type internal joint couplings. Provide bead of sealant around the inside of the duct about 1/2" from the end of the duct. Slide-on flanges as manufactured by Ductmate Industries, Accuflange or Sheet Metal Connectors are acceptable. Self-sealing duct system is also acceptable (Lindab, Ward "Keating Koupling").
 7. The system shall be free of visible dents and scratches when viewed from normal occupancy.
 8. All insulation shall be internal, except at reheat coils.
- B. In addition to the paragraphs above, this section applies to all ductwork specified or shown as "Architecturally Exposed":
1. All spiral ductwork fittings shall be carbon arc welded.
 2. Grind all welds to remove irregularities.
 3. Conical taps shall be one piece. Taps for grilles and takeoffs shall be factory installed with a continuous weld and ground smooth.
 4. Welds shall be ground smooth and painted.
 5. All architecturally exposed ducts shall be round or flat oval except where not possible (grilles, reheat coils, etc.).
- C. Alternate manufacturers, including shop fabricated duct, must be reviewed before installation. The following information is required:
1. Metal gauge of duct and fittings.
 2. Fitting type and construction.
 3. Type and size of reinforcement.

2.6 FLEXIBLE DUCT

- A. Flexible duct shall be listed and labeled as UL 181 Class 1 Air Duct Material, and shall comply with NFPA 90A and 90B, and meet GSA, FHA and other U.S. Government agency standards. Flexible duct shall bear the ADC Seal of Certification.
- B. Flame Spread/Smoke Developed: Not over 25/50.

- C. Flexible duct shall have corrosion-resistant wire helix, bonded to an inner liner that prevents air from contacting the insulation, covered with 1-1/2", 3/4 pound density fiberglass insulation blanket, sheathed in a vapor barrier of metalized polyester film laminated to glass mesh.
- D. Inner liner shall be airtight and suitable for 6" WC static pressure through 16" diameter. Outer jacket shall act as a vapor barrier only with permeance not over 0.1 perm per ASTM E96, Procedure A. "U" value shall not exceed 0.23 Btuh/ft²/°F. Temperature range of at least 0-180°F. Maximum velocity of 4,000 fpm.
- E. Usage:
 - 1. Take-offs from supply ducts to inlets of terminal air boxes. Do not exceed 36" in length.
 - 2. Connections to air inlets and outlets. Do not exceed 6'-0" in length.
- F. Stretch all flexible duct to prevent sags and reduce air friction. Shorten and reinstall all sagging or loose flexible duct. Avoid sharp elbows. Elbows shall maintain 1.5 diameter centerline turning radius.
- G. Install per the SMACNA Flexible Duct Manual. Secure inner layer with draw band. Wrap with pressure sensitive tape for protection prior to installing draw band. Pressure sensitive tape alone is not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide openings in ducts for thermometers and controllers.
- B. Locate ducts with space around equipment for normal operation and maintenance.
- C. Do not install ducts or other equipment above electrical switchboards or panelboards. This includes a dedicated space extending 25 feet from the floor to the structural ceiling with width and depth equal to the electrical equipment. Unless intended to serve these rooms, do not install any ductwork or equipment in electrical rooms, transformer rooms, electrical closets, telephone rooms or elevator machine rooms
- D. During construction provide temporary closures of metal or taped polyethylene on open ducts to prevent dust from entering ductwork.
- E. Repair all duct insulation and liner tears.
- F. Install manual volume dampers in branch supply ducts so all outlets can be adjusted. Do not install dampers at air terminal device or in outlets, unless specifically shown.
- G. Install flexible duct in accordance with the ADC Flexible Duct Performance and Installation Standards.
- H. Install all exterior ductwork per SMACNA Fig. 6-3. Where drawings do not indicate otherwise, ductwork seams and joints shall be sealed watertight and pitched to shed water.
- I. Support all duct systems in accordance with the SMACNA HVAC Duct Construction Standards: Metal and Flexible.

- J. Adhesives, sealants, tapes, vapor retarders, films, and other supplementary materials added to ducts, plenums, housing panels, silencers, etc. shall have flame spread/smoke developed ratings of under 25/50 per ASTM E84, NFPA 255, or UL 723.

3.2 DUCTWORK APPLICATION SCHEDULE

USAGE	MATERIAL	PRESSURE CLASS	SEAL CLASS†	INSULATION (Refer to Section 23 07 13 for insulation types)
General Exhaust Duct	Galvanized Sheet Metal	-1"	A	None
Dust Exhaust Duct	18 GA Galvanized Sheet Metal	-8"	---	1-1/2" thick Type A
Transfer Ducts	Galvanized Sheet Metal	-1/2"	---	1" thick Type C
Ductwork Accessories (Fabric Flex Connectors, Equipment Flanges, etc.)	---	---	---	1-1/2" thick Type A
† Seal Class is per SMACNA HVAC Air Duct Leakage Test Manual				

3.3 DUCTWORK SEALING

A. General Requirements:

1. Openings, such as rotating shafts, shall be sealed with bushings or similar.
2. Pressure sensitive tape shall not be used as the primary sealant unless it has been certified to comply with UL-181A or UL-181B by an independent testing laboratory and the tape is used in accordance with that certification.
3. All connections shall be sealed including, but not limited to, taps, other branch connections, access doors, access panels, and duct connections to equipment. Sealing that would void product listings is not required. Spiral lock seams need not be sealed.
4. Mastic-based duct sealants shall be applied to joints and seams in minimum 3 inch wide by 20 mil thick bands using brush, putty knife, trowel, or spray, unless manufacturer's data sheet specifies other application methods or requirements.

B. For Seal Class A ducts, all transverse joints, longitudinal seams, and duct wall penetrations shall be sealed. Joints are inclusive of, but not limited to, girth joints, branch and sub-branch intersections, duct collar tap-ins, fitting subsections, louver and air terminal connections to ducts, access door and access panel frames and jambs, duct, plenum, and casing abutments to building structures.

1. Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column pressure classification shall not require additional closure systems.

C. Double-wall ductwork: Install insulation end fittings at all transitions from double to single-wall construction.

3.4 TESTING

- A. Duct - 2" WG or Less (positive or negative):
1. Systems shall not leak more than shown in Table 4-1 of SMACNA HVAC Air Duct Leakage Test Manual for Seal Class A.
 2. Leak testing of these systems is not normally required for interior ductwork. However, leak tests will be required if, in the opinion of the Architect/Engineer, the leakage appears excessive. All exterior ductwork shall be tested. If duct has outside wrap, testing shall be done before it is applied.
 3. Leak test shall be at the Contractor's expense and shall require capping and sealing all openings.
 4. Seal ducts to bring the air leakage into compliance.
 5. Contractor shall notify the Architect/Engineer five business days prior to pressurizing ductwork for testing.
- B. Duct - 3" WG and Above (positive or negative):
1. Duct system shall be completely pressure tested. If duct has outside wrap, testing shall be done before it is applied.
 2. Leak test shall be at the Contractor's expense and shall require capping and sealing all openings.
 3. Seal ducts to bring the air leakage into compliance.
 4. Contractor shall notify the Architect/Engineer five business days prior to pressurizing ductwork for testing.
- C. Test procedure shall be as listed in the latest edition of the SMACNA HVAC Duct Leakage Manual, with the following additional requirements:
1. Test pressure shall be the specified duct pressure class. Testing at reduced pressures and converting the results mathematically is not acceptable. This is required to test the structural integrity of the duct system.
 2. If any leak causes discernible noise at a distance of 3 feet, that leak shall be eliminated, regardless of whether that section of duct passed the leakage test.
 3. All joints shall be felt by hand, and all discernible leaks shall be sealed.
 4. Totaling leakage from several tested sections and comparing them to the allowable leakage for the entire system is not acceptable. Each section must pass the test individually.
 5. Contractor shall notify the Architect/Engineer five business days prior to pressurizing ductwork for testing. Failure to notify the architect/engineer of pressure testing may require the contractor to repeat the duct pressure test after proper notification.
 6. Upon completion of the pressure test, the contractor shall submit an air duct leakage test summary report as outlined in the SMACNA HVAC Duct Leakage Test Manual.

7. All access doors, taps to terminal air boxes, and other accessories and penetrations must be installed prior to testing. Including terminal air boxes in the test is not required.
8. The required leakage class for Seal Class A, both round and rectangular ducts, shall be 4.
9. Positive pressure leakage testing is acceptable for negative pressure ductwork.

3.5 **DUCTWORK PENETRATIONS**

- A. All duct penetrations of firewalls shall have fire or fire/smoke dampers where required by code.
- B. Dampers shall be compatible with fire rating of wall assembly. Verify actual rating of any wall being penetrated with Architect.
- C. Seal all duct penetrations of walls that are not fire rated by caulking or packing with fiberglass. Install galvanized steel (unless otherwise indicated) trim strip to cover vacant space and raw construction edges of all rectangular openings in finished rooms.

End of Section



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ELECTRONIC FILE TRANSMITTAL - CONTRACTOR	
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LOCATION: Crystal Lake, Illinois	FILE NAME:
ENGINEER: Paul VanDuyne Jr.	TRANSFER METHOD:
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PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Manual Volume Dampers.
- B. Fabric Connectors.

1.2 REFERENCES

- A. ASTM E-477-99 - Standard Test Method for Measuring Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers.
- B. ASTM E2336-04 – Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems.
- C. NFPA 90A - Installation of Air-Conditioning and Ventilating Systems.
- D. SMACNA - HVAC Duct Construction Standards – Third Edition - 2005.
- E. UL 33 - Heat Responsive Links for Fire-Protection Service.
- F. UL 555 - Fire Dampers and Ceiling Dampers.
- G. UL 555C – Ceiling Dampers.
- H. UL 555S - Leakage Rated Dampers for Use in Smoke Control Systems.

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Section 23 05 00.
- B. Submit manufacturer's installation instructions.

PART 2 - PRODUCTS

2.1 MANUAL VOLUME DAMPERS

- A. Fabricate in accordance with SMACNA Duct Construction Standards, and as indicated.
- B. Fabricate single blade dampers for duct sizes to 9-1/2 x 30 inches.
- C. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes 12" x 72". Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- D. Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide molded synthetic or oil-impregnated nylon or sintered bronze bearings.
- E. Provide locking quadrant regulators on single and multi-blade dampers.
- F. On insulated ducts, mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

- G. If blades are in open position and extend into the main duct, mount damper so blades are parallel to airflow.

2.2 FABRIC CONNECTORS

- A. Fabric connectors shall be installed between all fans or fan units and metal ducts or casings to prevent transfer of fan or motor vibration.
- B. The fabric connectors shall be completely flexible material which shall be in folds and not drawn tight.
- C. Fabric connectors shall be of glass fabric double coated with neoprene, with UL approval. Weight = 30 oz. per square yard minimum. Fabric shall not be affected by mildew and shall be absolutely waterproof, airtight and resistant to acids, alkalies, grease and gasoline, and shall be noncombustible.
- D. Fabric connections shall not exceed 6" in length on ductwork that has a positive pressure. On ductwork that has a negative pressure, the length shall not exceed 2" in length.
- E. All corners shall be folded, sealed with mastic and stapled on 1" centers.
- F. Fabric connectors shall not be painted.
- G. Unless otherwise shown on the drawings, the fabric connection at the inlet to centrifugal fans shall be at least one duct diameter from the fan to prevent inlet turbulence.
- H. Acceptable Materials: Durodyne MFN-4-100, Vent Fabrics, Inc. "Ventglas", or Proflex PFC3NGA.
- I. Fabric connectors exposed to sunlight and weather shall be as described above, except the coating shall be hypalon in lieu of neoprene.
- J. Acceptable Materials: Durodyne "Duralon MFD-4-100", Vent Fabrics, Inc. "Ventlon", or Proflex PFC3HGA.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General Installation Requirements:
 - 1. Install accessories in accordance with manufacturer's instructions.
 - 2. Where duct access doors are located above inaccessible ceilings, provide ceiling access doors. Coordinate location with the Architect/Engineer.
 - 3. Coordinate and install access doors provided by others.
 - 4. Provide access doors for all equipment requiring maintenance or adjustment above an inaccessible ceiling. Minimum size shall be 24" x 24".
 - 5. Provide duct test holes where indicated and as required for testing and balancing purposes.

B. Manual Volume Damper:

1. Provide manual volume dampers at points on low pressure supply, return, and exhaust systems where branches are taken from larger ducts where indicated on drawings and as required for air balancing. Use splitter dampers only where indicated.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Fume Exhaust Fans.

1.2 REFERENCES

- A. AMCA 99 - Standards Handbook.
- B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
- C. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
- D. AMCA 301 - Method of Calculating Fan Sound Ratings from Laboratory Test Data.
- E. ANSI/AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
- F. ANSI/AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings.
- G. SMACNA - HVAC Duct Construction Standards, 1995 Edition.

1.3 QUALITY ASSURANCE

- A. Performance Ratings: Bear the AMCA Certified Rating Seal - Air Performance.
- B. Fabrication: Conform to AMCA 99.

1.4 SUBMITTALS

- A. Submit shop drawings per Section 23 05 00. Include all centrifugal fans and accessories. Provide fan curves with specified operating point clearly plotted. Submit sound power levels for both fan inlet and outlet at rated capacity. Submit motor ratings and electrical characteristics, plus motor and electrical accessories.
- B. Submit operation and maintenance data. Include instructions for lubrication, motor and drive replacement, and spare parts list.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect motors, shafts, and bearings from weather and construction dust.

1.6 EXTRA STOCK

- A. Provide one extra belt set for each fan unit.

PART 2 - PRODUCTS

2.1 FUME EXHAUST FAN (300-20,000 CFM & 0-8" STATIC PRESSURE)

- A. Single inlet, single width.
- B. Arrangement 10 with motor below shaft.

- C. Heavy gauge steel all welded construction (14 gauge min. sides), adaptable to any of 8 discharge positions in the field.
- D. Suitable for exhaust streams from -40° to +200°F and ambient temperatures from -40° to +120°F.
- E. Non-overloading horsepower characteristic. Stable performance from closed-off to wide-open at all speeds.
- F. Lifting eyes.
- G. 14 gauge minimum inlet collar, flanged outlet connection.
- H. Belts and sheaves sized for a minimum 1.3 of motor horsepower.
- I. Motor per the drawings and Section 23 05 13.
- J. AMCA Type B spark resistant construction including aluminum wheel and non-ferrous shaft closure plate.
- K. Regreaseable bearings rated for 100,000 hour B-10 life at specified operating point.
- L. Heavy-duty gas-tight shaft seals.
- M. Backward inclined airfoil wheels suitable for handling fumes and gases at minimum noise levels, or backward inclined flat blades suitable for handling particulates. Refer to drawings for type required.
- N. Furnish factory mounted and wired disconnect switch, non-fusible type with thermal overload protection in a NEMA 3R enclosure.
- O. Adjustable pitch sheaves with the specified operating point in the center of adjustment range, anti-static type belts.
- P. Positive screw-type belt tensioning mechanism.
- Q. Factory tested before shipment.
- R. Belt guards with tachometer knockouts on indoor fans. Removable weather covers on outdoor fans.
- S. 1" drain connections in housing bottoms.
- T. Lever operated access door near top of scroll for wheel inspection.
- U. Acceptable Products: Aerovent 'BI' or 'BIA', Twin City 'BC', or Cook 'CA'.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General Installation Requirements:
 - 1. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

2. Install flexible connections between fan and ductwork. Install metal bands of connectors parallel with minimum 1" flex between ductwork and fan while running.
3. Provide safety screen where inlet or outlet is exposed. Screens shall meet OSHA regulations for size of openings.

B. Fume Exhaust Fan:

1. Each fume exhaust fan shall have a 3/8" diameter hole drilled in one of its base rails for electrical grounding. Scrape away paint near the hole for good grounding.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Roof Exhaust Fans.
- B. Rooftop Fan Curbs.

1.2 REFERENCES

- A. AMCA 99 - Standards Handbook.
- B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
- C. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
- D. AMCA 301 - Method of Publishing Sound Ratings for Air Moving Devices.
- E. SMACNA - HVAC Duct Construction Standards, 1995 Edition.

1.3 QUALITY ASSURANCE

- A. Performance Ratings: Conform to AMCA 210 and bear AMCA Certified Rating Seal.
- B. Sound Ratings: AMCA 301, tested to AMCA 300.
- C. Fabrication: Conform to AMCA 99.

1.4 SUBMITTALS

- A. Submit shop drawings per Section 23 05 00. Include product data on wall and roof exhausters, and ceiling and cabinet fans.
- B. Provide multi-rpm fan curves with specified operating point clearly plotted.
- C. Submit manufacturer's installation instructions.

1.5 EXTRA STOCK

- A. Provide one (1) extra belt set for each fan unit.

PART 2 - PRODUCTS

2.1 ROOFTOP EXHAUST FAN - VERTICAL DISCHARGE - BELT DRIVEN

- A. Fan Wheel: Centrifugal type, aluminum hub and wheel with backwards inclined blades, statically and dynamically balanced.
- B. Housing: Removable, spun aluminum dome or rectangular top, with square, one piece, aluminum base and curb cap with Venturi inlet cone.
- C. Fan Shaft: Turned, ground and polished steel; keyed to wheel hub.

- D. V-belt drive with adjustable pitch drive sheave and adjustable motor mountings for belt tensioning.
- E. Motor mounted outside of air stream and ventilated with outside air. Motor not less than 1/3 HP.
- F. Aluminum or brass bird screen. Plastic mesh will not be allowed.
- G. Furnish factory mounted and wired disconnect switch: Non-fusible type with thermal overload protection mounted inside fan housing, factory wired through an aluminum conduit.
- H. Permanently lubricated, permanently sealed, self-aligning ball bearings.
- I. Furnish normally closed, electric motorized damper. Furnish step down transformer if required. Install and wire damper to open when fan runs.
- J. Mill aluminum finish.
- K. Acceptable Manufacturers: ACME, Cook, Greenheck, Penn, Twin City.

2.2 ROOFTOP FAN CURBS

- A. Furnish and install prefabricated roof curbs for all rooftop fans.
- B. Size curb to match the curb cap of fan.
- C. Top of all curbs shall be at least 12" above the top of the roof. Increase curb height to allow for roof insulation.
- D. Unitized construction, continuous arc welded corner seams. Insulated with 1-1/2" thick, 3 lb. density rigid fiberglass board. Damper support angle. Pressure treated wood nailer.
- E. If called for in the drawings, curbs shall be of the sound attenuation type. Sound attenuation curbs shall reduce the fan sone rating by at least 40% and not decrease fan cfm more than 8% (which is accounted for in the scheduled fan cfm). Baffles shall be removable for access to the dampers.
- F. 14-gauge aluminum construction.
- G. Curb without cant.
- H. Acceptable Manufacturers: Same manufacturer as the fan, Pate, RPS or Thy.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure roof exhausters with cadmium plated lag screws to roof curb.
- C. If manufacturer has no recommendations, secure roof exhaust fans to curbs with 1/4" lag bolts on 8" maximum centers.

- D. MC shall install and wire factory provided damper to open when the fan runs if the manufacturer does not provide an option to pre-wire the damper.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Centrifugal Fans.
- B. Ductwork Accessories.
- C. Inlet Fittings.
- D. Dust Elimination and Collection Devices.

1.2 SUBMITTALS

- A. Submit per Section 23 05 00. Include dimensions, sizes, weights and point loadings, material thickness, and locations and sizes of field connections, rated capacities, accessories, electrical requirements and wiring diagrams.
- B. Provide fan curves with specified operating point clearly plotted.
- C. Submit sound power levels for both fan inlet and outlet at rated capacity.
- D. Submit assembly and installation instructions.
- E. Submit operation data. Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.3 QUALITY ASSURANCE

- A. Fans:
 - 1. Performance Ratings: Bear the AMCA Certified Rating Seal for Air Performance.
 - 2. Fabrication: Conform to AMCA 99.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2 - PRODUCTS

2.1 AMBIENT AIR CLEANER (AAC-1)

- A. Indoor dust collector consisting of frame, casing, filters, fan and accessories.
- B. Frame and Casing: Steel frame with enamel finish, 16 galvanized steel panels, ceiling hung.
- C. Prefilter: 24 x 24 x 4 inch pleated fiber filter.
- D. Bag Filter: 95% bag filter with no less than 7 pockets.
- E. Final Filter: 20 x 20 x 11.5 inch 99.97% @ .3 Micron HEPA filter.

- F. Fan: Welded construction centrifugal fan with material handling wheel, direct drive.
 - 1. Minimum Capacity: 1500 cfm.
 - 2. Motor: 3/4 hp, 115 volt, single phase, 60 Hz.
- G. Maximum Sound Level: 68dB without discharge silencer.
- H. Accessories: Discharge silencer, eye-bolts and chain, pressure gauge.
- I. Acceptable Manufacturers: Blue Ox Air Cleaners, Bailey Ceramic Supply, or Airflow Systems, Inc.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General Installation Requirements:
 - 1. Install equipment per manufacturer's instructions.
 - 2. Install with sufficient space around equipment for normal operation and maintenance.
- B. Fan Requirements:
 - 1. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.
 - 2. Install fans with resilient mountings and flexible electrical leads.

End Of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Grilles and Registers.

1.2 REFERENCES

- A. AMCA 500L-07 - Test Method for Louvers, Dampers and Shutters.
- B. ANSI/ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Inlets and Outlets.
- C. ANSI/ASHRAE 90.1-2010 - Energy Standard for Buildings Except Low-Rise Residential Buildings.
- D. SMACNA - Duct Construction Standards.

1.3 QUALITY ASSURANCE

- A. Test and rate performance of air inlets and outlets per ASHRAE 70.
- B. Test and rate performance of louvers per AMCA 500L-99.
- C. All air handling and distribution equipment mounted outdoors shall be designed to prevent rain intrusion into the airstream when tested at design airflow and with no airflow, using the rain test apparatus described in Section 58 of UL 1995.

1.4 REGULATORY REQUIREMENTS

- A. Conform to ANSI/NFPA 90A.
- B. Conform to ASHRAE 90.1-2010.

1.5 SUBMITTALS

- A. Submit product data under provisions of Section 23 05 00.
- B. Submit schedule of inlets and outlets indicating type, size, location, application, and noise level.
- C. Review requirements of inlets and outlets as to size, finish, and type of mounting prior to submitting product data and schedules of inlets and outlets.
- D. Submit manufacturer's installation instructions.

PART 2 - PRODUCTS

2.1 GRILLES AND REGISTERS

- A. Reference to a grille means an air supply, exhaust or transfer device without a damper.

- B. Reference to a register means an air supply, exhaust or transfer device with a damper.
- C. The type of unit, margin, material, finish, etc., shall be as shown on the drawing schedule and suitable for the intended use.
- D. All margins shall be compatible with ceiling types specified (including 'Thin-Line' T-bar lay-in grid system). Any discrepancies in contract documents shall be brought to the attention of the Architect/Engineer, in writing, prior to Bid Date. Submission of Bid indicates ceiling and air inlet and outlet types have been coordinated.
- E. The capacity and size of the unit shall be as shown on the drawings.
- F. All units shall handle the indicated cfm as shown on the drawings while not exceeding an NC level of 25, referenced to 10^{-12} watts with a 10 dB room effect. Noise in classrooms may not exceed 35 dBA or 55 dBC per ANSI Standard S12.60-2002 and ASHRAE 70.
- G. Refer to the drawings for construction material, color and finish, margin style, deflection, and sizes of grilles and registers.
- H. Provide with 3/4" blade spacing. Blades shall have steel friction pivots to allow for blade adjustment, plastic pivots are not acceptable.
- I. Corners of steel grilles and registers shall be welded and ground smooth before painting. Aluminum grilles and registers shall have staked corners.
- J. Where specified to serve registers, provide opposed blade volume dampers operable from the face of the register.
- K. Screw holes for surface fasteners shall be countersunk for a neat appearance. Provide concealed fasteners for installation in lay-in ceilings and as specified on the drawings.
- L. Acceptable Manufacturers: Tuttle & Bailey, Titus, Price, Nailor, Carnes, or Krueger.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General Installation Requirements:
 - 1. Install items in accordance with manufacturers' instructions.
 - 2. Check location of inlets and outlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.
 - 3. Install diffusers to ductwork with air tight connections.
 - 4. Flexible ducts shall NOT be joined to flat-oval connections. Provide sheet metal oval-to-round transitions where required.
- B. Volume Damper:
 - 1. Provide manual volume dampers on duct take-off to diffusers when there are multiple connections to a common duct. Locate volume dampers as far as possible from the air inlet or outlet.

End of Section

BASIC ELECTRICAL REQUIREMENTS
SECTION 26 05 00

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Requirements applicable to all Division 26 Sections. Also refer to Division 1 - General Requirements.
- B. All materials and installation methods shall conform to the applicable standards, guidelines and codes referenced in each specification section.

1.2 SCOPE OF WORK

- A. This Specification and the associated drawings govern furnishing, installing, testing and placing into satisfactory operation the Electrical Systems.
- B. The Contractor shall furnish and install all new materials as indicated on the drawings, and/or in these specifications, and all items required to make his portion of the Electrical Work a finished and working system.
- C. Description of Systems shall be as follows:
 - 1. Extension of existing electrical power system to and including light fixtures, equipment, motors, devices, etc.
 - 2. Extension of existing grounding system.
 - 3. Wiring of equipment furnished by others.

1.3 WORK SEQUENCE

- A. All work that will produce excessive noise or interference with normal building operations, as determined by the Owner, shall be scheduled with the Owner. It may be necessary to schedule such work during unoccupied hours. The Owner reserves the right to determine when restricted construction hours are required.

1.4 DIVISION OF WORK BETWEEN MECHANICAL, ELECTRICAL, AND CONTROL CONTRACTORS

- A. Division of work is the responsibility of the Prime Contractor. Any scope of work described at any location on the contract document shall be sufficient for including said requirement in the project. The Prime Contractor shall be solely responsible for determining the appropriate subcontractor for the described scope. In no case shall the project be assessed an additional cost for scope that is described on the contract documents on bid day. The following division of responsibility is a guideline based on typical industry practice.
- B. Definitions:
 - 1. "Mechanical Contractors" refers to the Contractors listed in Division 21/22/23 of this Specification.

2. **Motor Power Wiring:** The single phase or 3 phase wiring extending from the power source (transformer, panelboard, feeder circuits, etc.) through disconnect switches and motor controllers to, and including the connections to the terminals of the motor.
3. **Motor Control Wiring:** The wiring associated with the remote operation of the magnetic coils of magnetic motor starters or relays, or the wiring that permits direct cycling of motors by means of devices in series with the motor power wiring. In the latter case, the devices are usually single phase, have "Manual-Off-Auto" provisions, and are usually connected into the motor power wiring through a manual motor starter.
4. Control devices such as start-stop push buttons, thermostats, pressure switches, flow switches, relays, etc., generally represent the types of equipment associated with motor control wiring.
5. Motor control wiring is single phase and usually 120 volts. In some instances, the voltage will be the same as the motor power wiring. When the motor power wiring exceeds 120 volts, a control transformer is usually used to give a control voltage of 120 volts.
6. **Temperature Control Wiring:** The wiring associated with the operation of a motorized damper, solenoid valve or motorized valve, etc., either modulating or two-position, as opposed to wiring that directly powers or controls a motor used to drive equipment such as fans, pumps, etc. This wiring will be from a 120 volt source and may continue as 120 volt, or be reduced in voltage (24 volt), in which case a control transformer shall be furnished as part of the temperature control wiring.
7. **Control Motor:** An electric device used to operate dampers, valves, etc. It may be two-position or modulating. Conventional characteristics of such a motor are 24 volts, 60 cycles, 1 phase, although other voltages may be encountered.

C. **General:**

1. The purpose of these Specifications is to outline the Electrical and Mechanical Contractors' responsibilities related to electrical work required for items such as temperature controls, mechanical equipment, fans, chillers, compressors, etc. The exact wiring requirements for much of the equipment cannot be determined until the systems have been selected and submittals approved. Therefore, the electrical drawings show only known wiring related to such items. All wiring not shown on the electrical drawings, but required for mechanical systems, is the responsibility of the Mechanical Contractor.
2. Where the drawings require the Electrical Contractor to wire between equipment furnished by the Mechanical Contractor, such wiring shall terminate at terminals provided in the equipment. The Mechanical Contractor shall furnish complete wiring diagrams and supervision to the Electrical Contractor and designate the terminal numbers for correct wiring.
3. The Electrical Contractor shall establish electrical utility elevations prior to fabrication and installation. The Electrical Contractor shall coordinate utility elevations with other trades. When a conflict arises, priority shall be as follows:
 - a. Sheet metal.
 - b. Other piping.
 - c. Conduits and wireway.

- D. Mechanical Contractor's Responsibility:
1. Assumes responsibility for internal wiring of all equipment furnished by the Mechanical Contractor.
 2. Assumes all responsibility for miscellaneous items furnished by the Mechanical Contractor that require wiring but are not shown on the electrical drawings or specified in the Electrical Specification. If items such as relays, flow switches, or interlocks are required to make the mechanical system function correctly or are required by the manufacturer, they are the responsibility of the Mechanical Contractor.
 3. Assumes all responsibility for Temperature Control wiring, if the Temperature Control Contractor is a Subcontractor to the Mechanical Contractor.
 4. This Contractor is responsible for coordination of utilities with all other Contractors. If any field coordination conflicts are found, the Contractor shall coordinate with other Contractors to determine a viable layout.
- E. Temperature Control Contractor's or Subcontractor's Responsibility:
1. Wiring of all devices needed to make the Temperature Control System functional.
 2. Verifying any control wiring on the electrical drawings as being by the Electrical Contractor. All wiring is required for the Control System, but not shown on the electrical drawings, is the responsibility of the Temperature Control Contractor or Subcontractor.
 3. Coordinating equipment locations (such as PE's, EP's, relays, transformers, etc.) with the Electrical Contractor, where wiring of the equipment is by the Electrical Contractor.
- F. Electrical Contractor's Responsibility:
1. Furnishes and installs all combination starters, manual starters and disconnect devices shown on the Electrical Drawings or indicated to be by the Electrical Contractor in the Mechanical Drawings or Specifications.
 2. Installs and wires all remote control devices furnished by the Mechanical Contractor or Temperature Control Contractor when such so noted on the Electrical Drawings.
 3. Furnishes and installs motor control and temperature control wiring, when noted on the drawings.
 4. Furnishes, installs, and connects all relays, etc., for automatic shutdown of certain mechanical equipment (supply fans, exhaust fans, etc.) upon actuation of the Fire Alarm System.
 5. This Contractor is responsible for coordination of utilities with all other Contractors. If any field coordination conflicts are found, the Contractor shall coordinate with other Contractors to determine a viable layout.

1.5 QUALITY ASSURANCE

- A. Contractor's Responsibility Prior to Submitting Pricing/Bid Data:
1. The Contractor is responsible for constructing complete and operating systems. The Contractor acknowledges and understands that the Contract Documents are a two-dimensional representation of a three-dimensional object, subject to human interpretation.

This representation may include imperfect data, interpreted codes, utility guides, three-dimensional conflicts, and required field coordination items. Such deficiencies can be corrected when identified prior to ordering material and starting installation. The Contractor agrees to carefully study and compare the individual Contract Documents and report at once in writing to the Architect/Engineer any deficiencies the Contractor may discover. The Contractor further agrees to require each subcontractor to likewise study the documents and report at once any deficiencies discovered.

2. The Contractor shall resolve all reported deficiencies with the Architect/Engineer prior to awarding any subcontracts, ordering material, or starting any work with the Contractor's own employees. Any work performed prior to receipt of instructions from the Architect/Engineer will be done at the Contractor's risk.

B. Qualifications:

1. Only products of reputable manufacturers as determined by the Architect/Engineer are acceptable.
2. All Contractors and subcontractors shall employ only workmen who are skilled in their trades. At all times, the number of apprentices at the job site shall be less than or equal to the number of journeymen at the job site.

C. Compliance with Codes, Laws, Ordinances:

1. Conform to all requirements of the 2011 National Electrical Codes.
2. If there is a discrepancy between the codes and regulations and these specifications, the Architect/Engineer shall determine the method or equipment used.
3. If the Contractor notes, at the time of bidding, any parts of the drawings or specifications that do not comply with the codes or regulations, he shall inform the Architect/Engineer in writing, requesting a clarification. If there is insufficient time for this procedure, he shall submit with his proposal a separate price to make the system comply with the codes and regulations.
4. All changes to the system made after the letting of the contract to comply with codes or the requirements of the Inspector, shall be made by the Contractor without cost to the Owner.
5. If there is a discrepancy between manufacturer's recommendations and these specifications, the manufacturer's recommendations shall govern.

D. Examination of Drawings:

1. The drawings for the electrical work are completely diagrammatic, intended to convey the scope of the work and to indicate the general arrangements and locations of equipment, outlets, etc., and the approximate sizes of equipment.
2. Contractor shall determine the exact locations of equipment and rough-ins, and the exact routing of raceways so as to best fit the layout of the job.
3. Scaling of the drawings will not be sufficient or accurate for determining these locations.
4. Where job conditions require reasonable changes in arrangements and locations, such changes shall be made by the Contractor at no additional cost to the Owner.

5. Because of the scale of the drawings, certain basic items, such as junction boxes, pull boxes, conduit fittings, etc., may not be shown, but where required by other sections of the specifications or required for proper installation of the work, such items shall be furnished and installed.
6. If an item is either shown on the drawings or called for in the specifications, it shall be included in this contract.
7. The Contractor shall determine quantities and quality of material and equipment required from the documents. Where discrepancies arise between drawings, schedules and/or specifications, the greater and better quality number shall govern.
8. Where used in electrical documents the word “furnish” shall mean supply for use, the word “install” shall mean connect up complete and ready for operation, and the word “provide” shall mean to supply for use and connect up complete and ready for operation.
9. Any item listed as furnished shall also be installed unless otherwise noted.
10. Any item listed as installed shall also be furnished unless otherwise noted.

E. Electronic Media/Files:

1. Construction drawings for this project have been prepared utilizing AutoCAD MEP.
2. Contractors and Subcontractors may request electronic media files of the contract drawings and/or copies of the specifications. Specifications will be provided in PDF format.
3. Upon request for electronic media, the Contractor shall complete and return a signed “Electronic File Transmittal” form provided by KJWW.
4. If the information requested includes floor plans prepared by others, the Contractor will be responsible for obtaining approval from the appropriate Design Professional for use of that part of the document.
5. The electronic contract documents can be used for preparation of shop drawings and as-built drawings only. The information may not be used in whole or in part for any other project.
6. The drawings prepared by KJWW for bidding purposes may not be used directly for ductwork layout drawings or coordination drawings.
7. The use of these CAD documents by the Contractor does not relieve them from their responsibility for coordination of work with other trades and verification of space available for the installation.
8. The information is provided to expedite the project and assist the Contractor with no guarantee by KJWW as to the accuracy or correctness of the information provided. KJWW accepts no responsibility or liability for the Contractor’s use of these documents.

F. Field Measurements:

1. Verify all pertinent dimensions at the job site before ordering any conduit, conductors, wireways, bus duct, fittings, etc.

1.6 SUBMITTALS

- A. Submittals shall be required for the following items, and for additional items where required elsewhere in the specifications or on the drawings.

1. Submittals list:

Referenced Specification Section	Submittal Item
26 24 19	Motor Control
26 29 23	Variable Frequency Drives

- B. In addition to the provisions of Division 1, the following provisions are required:

1. Submittals shall include all fabrication, erection, layout, and setting drawings; manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment or systems and the location thereof conform to the requirements of the contract documents.
2. The Contractor shall submit electronic copy of each shop drawing for review by the Architect/Engineer BEFORE releasing any equipment for manufacture or shipment.
3. Review and markup air conditioning and ventilating contractor's layout drawings with electrical equipment and conduit routings for coordination.
4. The Contractor shall thoroughly review and approve all shop drawings before submitting them to the Architect/Engineer. **CONTRACTOR'S APPROVAL STAMP IS REQUIRED ON ALL SUBMITTALS. APPROVAL WILL INDICATE THE CONTRACTOR'S REVIEW of all material and a COMPLETE UNDERSTANDING OF EXACTLY WHAT IS TO BE FURNISHED.** Contractor shall clearly mark all deviations from the contract documents on all submittals. **IF THE CONTRACTOR DOES NOT MARK DEVIATIONS, THEN THE ITEM SHALL BE REQUIRED TO MEET ALL DRAWING AND SPECIFICATION REQUIREMENTS.**
5. Each data sheet shall clearly show at the top of the sheet what General Electrical Equipment Schedule symbol (and applicable variations and subscripts) that data sheet corresponds to.
6. Each data sheet shall show the size, rating, style, finish, material, catalog number, manufacturer name and product photos for each item to ensure compliance with these specifications.
7. Assemble all submittals in sets, such as panelboards, fire alarm, lighting, or motor control. All sets shall be identical and contain an index of the items enclosed with a general topic description on the cover.
8. Where more than one model is shown on a manufacturer's sheet, clearly indicate exactly which item and which data is relevant to the work.
9. Where the manufacturer lists multiple part numbers or options on a single data sheet, the part number and options to be used shall be clearly set apart from other part numbers shown on that sheet.

10. Failure to comply with the above shall be reason to resubmit all shop drawings.
 11. The Architect/Engineer's responsibility shall be to review one set of shop drawing submittals for each product. If the first submittal is incomplete or does not comply with the drawings and/or specifications, the Contractor shall be responsible to bear the cost to the Owner, for the Architect/Engineer to recheck and handle the additional shop drawing submittals.
- C. Provide Schedule of Values:
1. Application forms: Use AIA Document Continuation Sheets G703 (or similar) as the form for application.
 2. Provide line items on the Schedule of Values including:
 - a. General Conditions (mobilization, bonds, insurance, etc.)
 - b. Power
 3. Change orders shall have schedule of values broken out as listed above submitted with each change order.
 4. Coordinate with the Project Architect/Engineer the items included in the Schedule of Values. The intent is to not create schedules in addition to those the Electrical Contractor normally submits to the General Contractor for payment.

1.7 PRODUCT DELIVERY, STORAGE, HANDLING AND MAINTENANCE

- A. Exercise care in transporting and handling to avoid damage to materials. Store materials on the site to prevent damage.
- B. Keep all materials clean, dry and free from damaging environments.
- C. Coordinate the installation of heavy and large equipment with the General Contractor and/or Owner. If the Electrical Contractor does not have prior documented experience in rigging and lifting similar equipment, he/she shall contract with a qualified lifting and rigging service that has similar documented experience. Follow all equipment lifting and support guidelines for handling and moving.
- D. Contractor is responsible for moving equipment into the building and/or site. Contractor shall review site prior to bid for path locations and any required building modifications to allow movement of equipment. Contractor shall coordinate his/her work with other trades.

1.8 WARRANTY

- A. Provide one-year warranty for all fixtures, equipment, materials, and workmanship.
- B. The warranty period for all work in this specification Division shall commence on the date of Substantial Completion or successful system performance whichever occurs later. The warranty may also commence if a whole or partial system or any separate piece of equipment or component is put into use for the benefit of any party other than the installing contractor with prior written authorization of the Owner. In this instance, the warranty period shall commence on the date when such whole system, partial system or separate piece of equipment or component is placed in operation and accepted in writing by the Owner.
- C. Warranty requirements extend to correction, without cost to the Owner, of all work found to be defective or nonconforming to the contract documents. The Contractor shall bear the cost of

correcting all damage due to defects or nonconformance with contract documents excluding repairs required as a result of improper maintenance or operation, or of normal wear as determined by the Architect/Engineer.

1.9 INSURANCE

- A. This Contractor shall maintain insurance coverage as set forth in Division 1 of these specifications.

1.10 MATERIAL SUBSTITUTION

- A. Where several manufacturers' names are given, the manufacturer for which a catalog number is given is the basis of design and establishes the quality required.
- B. Equivalent equipment manufactured by the other named manufacturers may be used. Contractor shall ensure that all items submitted by these other manufacturers meet all requirements of the drawings and specifications, and fit in the allocated space. The Architect/Engineer shall make the final determination of whether a product is equivalent.
- C. Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured in writing from the Architect/Engineer via addendum. The Contractor assumes all costs incurred as a result of using the offered material, article or equipment, on his part or on the part of other Contractors whose work is affected.
- D. Voluntary add or deduct prices for alternate materials may be listed on the bid form. These items will not be used in determining the low bidder. This Contractor assumes all costs incurred as a result of using the offered material or equipment on his part or on the part of other Contractors whose work is affected.
- E. All material substitutions requested after the final addendum must be listed as voluntary changes on the bid form.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All items of material having a similar function (e.g., safety switches, panelboards, switchboards, contactors, motor starters, dry type transformers) shall be of the same manufacturer unless specifically stated otherwise on drawings or elsewhere in specifications.

PART 3 - EXECUTION

3.1 JOBSITE SAFETY

- A. Neither the professional activities of the Architect/Engineer, nor the presence of the Architect/Engineer or his or her employees and subconsultants at a construction site, shall relieve the Contractor and any other entity of their obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending or coordinating all portions of the work of construction in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. The Architect/Engineer and his or her personnel have no authority to exercise any control over any construction contractor or other entity or their employees in connection with their

work or any health or safety precautions. The Contractor is solely responsible for jobsite safety. The Architect/Engineer and the Architect/Engineer's consultants shall be indemnified and shall be made additional insureds under the Contractor's general liability insurance policy.

3.2 ENGINEER OBSERVATION OF WORK

- A. The Architect/Engineer will review the installation and provide a written report noting deficiencies requiring correction. The contractor's schedule shall account for these reviews and show them as line items in the approved schedule.

3.3 PROJECT CLOSEOUT

- A. The following paragraphs supplement the requirements of Division 1.
- B. Final Jobsite Observation:
 - 1. In order to prevent the Final Jobsite Observation from occurring too early, the Contractor shall review the completion status of the project and certify that the job is ready for the final jobsite observation.
 - 2. Attached to the end of this section is a typical list of items that represent the degree of job completeness expected prior to requesting a review. The Contractor shall sign the attached certification and return it to the Architect/Engineer so that the final observation can be scheduled.
 - 3. It is understood that if the Architect/Engineer finds the job not ready for the final observation and additional trips and observations are required to bring the project to completion, the cost of the additional time and expenses incurred by the Architect/Engineer will be deducted from the Contractor's final payment.
 - 4. Contractor shall notify Architect/Engineer 48 hours prior to installation of ceilings or lay-in ceiling tiles.
- C. The following must be submitted before Architect/Engineer recommends final payment:
 - 1. Operation and maintenance manuals with copies of approved shop drawings.
 - 2. Record documents including reproducible drawings and specifications.
 - 3. A report documenting the instructions given to the Owner's representatives complete with the number of hours spent in the instruction. The report shall bear the signature of an authorized agent of this Contractor and shall be signed by the Owner's representatives.
 - 4. Provide spare parts, maintenance, and extra materials in quantities specified in individual specification sections. Deliver to project site and place in location as directed and submit receipt to Architect/Engineer.
 - 5. Start-up reports on all equipment requiring a factory installation or start-up.

3.4 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. Submit three (3) properly indexed and bound copies, in "D" ring style notebooks, of the Operations and Maintenance Instructions to the Architect/Engineer. Make all corrections or additions required.

- B. Operation and Maintenance Instructions shall include:
1. Prepare binder covers (front and spine) with printed title "Operation and Maintenance Instructions", title of project, and subject matter of binder when multiple binders are required.
 2. Title page with project title, Architect, Engineer, Contractor, and Subcontractor with addresses, telephone numbers, and contacts.
 3. Table of Contents describing all index tabs.
 4. Listing of all Subcontractors and major equipment suppliers with addresses, telephone numbers, and contacts.
 5. Index tabs dividing information by specification section, major equipment, or systems. All tab titles shall be clearly printed under reinforced plastic tabs. Label all equipment to match the identification in the construction documents.
 6. Copies of warranties.
 7. Copies of all final approved shop drawings and submittals.
 8. Copies of all factory inspection and/or equipment start-up reports.
 9. Operation and maintenance data shall consist of written instructions for the care, maintenance, and operation of the equipment and systems. Instruction books, cards, manuals furnished with the equipment shall be included.

3.5 INSTRUCTING THE OWNER'S REPRESENTATIVE

- A. Adequately instruct the Owner's designated representatives in the maintenance, care, and operation of the complete systems installed under this contract.
- B. Provide verbal and written instructions to the Owner's representatives by **FACTORY PERSONNEL** in the care, maintenance, and operation of the equipment and systems.
- C. The Owner has the option to make a video recording of all instructions. Coordinate schedule of instructions to facilitate this recording.
- D. The instructions shall include:
1. Maintenance of equipment.
 2. Start-up procedures for all major equipment.
 3. Description of emergency system operation.
- E. Notify the Architect/Engineer of the time and place for the verbal instructions to the Owner's representative so his representative can be present if desired.
- F. Minimum hours of instruction time for each item and/or system shall be as indicated in each individual specification section.
- G. Operating Instructions:
1. Contractor is responsible for all instructions to the Owner's representatives for the electrical and specialized systems.

2. If the Contractor does not have staff that can adequately provide the required instructions, he shall include in his bid an adequate amount to reimburse the Owner for the Architect/Engineer to perform these services.

3.6 RECORD DOCUMENTS

- A. The following paragraphs supplement the requirements of Division 1.
- B. Maintain at the job site a separate and complete set of electrical drawings and specifications with all changes made to the systems clearly and permanently marked in complete detail.
- C. Mark drawings and specifications to indicate approved substitutions; Change Orders, and actual equipment and materials used. All Change Orders, RFI responses, Clarifications and other supplemental instructions shall be marked on the documents. Record documents that merely reference the existence of the above items are not acceptable. Should this Contractor fail to complete Record Documents as required by this contract, this Contractor shall reimburse Architect/Engineer for all costs to develop record documents that comply with this requirement. Reimbursement shall be made at the Architect/Engineer's hourly rates in effect at the time of work.
- D. Record changes daily and keep the marked drawings available for the Architect/Engineer's examination at any normal work time.
- E. Upon completing the job, and before final payment is made, give the marked-up drawings to the Architect/Engineer.

3.7 PAINTING

- A. Paint all equipment that is marred or damaged prior to the Owner's acceptance. Paint and color shall match original equipment paint and shall be obtained from the equipment supplier if available. All equipment shall have a finished coat of paint applied unless specifically allowed to be provided with a prime coat only.
- B. Equipment cabinets, casings, covers, metal jackets, etc., located in equipment rooms or concealed spaces, shall be furnished in standard finish, free from scratches, abrasions, chippings, etc.
- C. Equipment in occupied spaces, or if standard to the unit, shall have a baked primer with baked enamel finish coat free from scratches, abrasions, chipping, etc. If color option is specified or is standard to the unit, verify with the Architect his color preference before ordering.

3.8 ADJUST AND CLEAN

- A. Thoroughly clean all equipment and systems prior to the Owner's final acceptance of the project.
- B. Clean all foreign paint, grease, oil, dirt, labels, stickers, etc. from all equipment.
- C. Remove all rubbish, debris, etc., accumulated during construction from the premises.

3.9 SPECIAL REQUIREMENTS

- A. Coordinate the installation of all equipment, controls, devices, etc., with other trades to maintain clear access area for servicing.
- B. Install all equipment to maximize access to parts needing service or maintenance. Review the final location, placement, and orientation of equipment with the Owner's representative prior to setting equipment.

- C. Installation of equipment or devices without regard to coordination of access requirements and confirmation with the Owner's representative will result in removal and reinstallation of the equipment at the Contractor's expense.

3.10 INDOOR AIR QUALITY (IAQ) MAINTENANCE FOR OCCUPIED FACILITIES UNDER CONSTRUCTION

- A. Within the limits of Construction:
 - 1. The Electrical Contractor shall coordinate all work with the contractor responsible for IAQ.
 - 2. The means, methods and materials used by the Electrical Contractor shall be coordinated with the contractor responsible for IAQ and shall comply with the IAQ requirements set forth in Division 1 and Division 21/22/23 of these specifications.
- B. Outside the limits of Construction:
 - 1. IAQ shall be the responsibility of the electrical contractor for work that is required outside the limits of construction.
 - 2. The Electrical Contractor is responsible for the IAQ set forth in Division 1 and Division 21/22/23 of these specifications.
 - 3. The Electrical Contractor shall review and coordinate all IAQ plans and procedures with the owner's IAQ representative.

3.11 SYSTEM COMMISSIONING

- A. The electrical systems shall be complete and operating. System start-up, testing, balancing, and satisfactory system performance is the responsibility of the Contractor. This includes all calibration and adjustment of electrical controls, balancing of loads, troubleshooting and verification of software, and final adjustments that may be needed.
- B. All operating conditions and control sequences shall be tested during the start-up period. Testing all interlocks, safety shut-downs, controls, and alarms.
 - 1. The Contractor, subcontractors, and equipment suppliers shall have skilled technicians to ensure that all systems perform properly. If the Architect/Engineer is requested to visit the job site for trouble shooting, assisting in start-up, obtaining satisfactory equipment operation, resolving installation and/or workmanship problems, equipment substitution issues or unsatisfactory system performance, including call backs during the warranty period, through no fault of the design; the Contractor shall reimburse the Owner on a time and materials basis for services rendered at the Architect/Engineer's standard hourly rates in effect when the services are requested. The Contractor shall pay the Owner for services required that are product, installation or workmanship related. Payment is due within 30 days after services are rendered.

3.12 FIELD QUALITY CONTROL

- A. General:
 - 1. Conduct all tests required during and after construction.
 - 2. Supply necessary instruments, meters, etc., for the tests. Supply competent technicians with training in the proper testing techniques.

3. All cables and wires shall be tested for shorts and grounds following installation and connection to devices. Replace shorted or grounded wires and cables.
 4. Any wiring device, electrical apparatus or lighting fixture, if grounded or shorted on any integral "live" part, shall have all defective parts or materials replaced.
- B. Other Equipment:
1. Give other equipment furnished and installed by the Contractor all standard tests normally made to assure that the equipment is electrically sound, all connections properly made, phase rotation correct, fuses and thermal elements suitable for protection against overloads, voltage complies with equipment nameplate rating, and full load amperes are within equipment rating.
- C. If any test results are not satisfactory, make adjustments, replacements and changes as needed and repeat the tests and make additional tests as the Architect/Engineer or authority having jurisdiction deem necessary.

END OF SECTION

READINESS CERTIFICATION PRIOR TO FINAL JOBSITE OBSERVATION

In order to prevent the final job observation from occurring too early, we require that the Contractor review the completion status of the project and, by copy of this document, certify that the job is indeed ready for the final job observation. The following is a typical list of items that represent the degree of job completeness expected prior to your requesting a final job observation.

- 1. Electrical panels have typed circuit identification.
- 2. Bound copies of approved shop drawings have been submitted as per Section 26 05 00.
- 3. Report of instruction of Owner's representative has been submitted as per Section 26 05 00.
- 4. Start-up reports from factory representative have been submitted as per Section 26 05 00.

Accepted by:

Prime Contractor _____

By _____ Date _____

Upon Contractor certification that the project is complete and ready for a final job observation, we require the Contractor to sign this agreement and return it to the Architect/Engineer so that the final observation can be scheduled.

It is understood that if the Architect/Engineer finds the job not ready for the final observation and that additional trips and observations are required to bring the project to completion, the costs incurred by the Architect/Engineers for additional time and expenses will be deducted from the Contractor's contract retainage prior to final payment at the completion of the job.

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**ELECTRICAL DEMOLITION FOR REMODELING
SECTION 26 05 05**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electrical demolition

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work shall be as specified in individual Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. THE DRAWINGS ARE INTENDED TO INDICATE THE SCOPE OF WORK REQUIRED AND DO NOT INDICATE EVERY BOX, CONDUIT, OR WIRE THAT MUST BE REMOVED. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID AND VERIFY EXISTING CONDITIONS.
- B. Where mechanical equipment is indicated as being removed on electrical, mechanical, or technology drawings, the Contractor shall be responsible for disconnecting the equipment and removing all starters, VFD, controllers, electrical equipment, raceways, wiring, etc. associated with the device.
- C. Verify that abandoned wiring and equipment serve only abandoned equipment or facilities. Extend conduit and wire to facilities and equipment that will remain in operation following demolition. Extension of conduit and wire to equipment shall be compatible with the surrounding area. Extended conduit and conductors to match existing size and material.
- D. Coordinate scope of work with all other Contractors and the Owner at the project site. Schedule removal of equipment and electrical service to avoid conflicts.
- E. Bid submittal shall mean the Contractor has visited the project site and has verified existing conditions and scope of work.

3.2 PREPARATION

- A. The Contractor shall obtain approval from the Owner before turning off power to circuits, feeders, panels, etc. Coordinate all outages with Owner.
- B. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations. Assume all equipment and systems must remain operational unless specifically noted otherwise on drawings.

3.3 **DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK**

- A. Demolish and extend existing electrical work under provisions of Division 1 of Specifications and this Section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring and raceway to source of supply. Existing conduit in good condition may be reused in place by including an equipment ground conductor in reused conduit. Relocating conduit shall not be allowed.
- D. Remove exposed abandoned raceway, including abandoned raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces. Remove all associated clamps, hangers, supports, etc. associated with raceway removal.
- E. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- F. Repair adjacent construction and finishes damaged during demolition and extension work. Patch openings to match existing surrounding finishes.
- G. Maintain access to existing electrical installations that remain active. Modify installation or provide junction boxes and access panel as appropriate.
- H. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified. Extended conduit and conductors to match existing size and material.
- I. This Contractor is responsible for all costs incurred in repair, relocations, or replacement of any cables, conduits, or other services if damaged without proper investigation.

3.4 **CLEANING AND REPAIR**

- A. Clean and repair existing materials and equipment that remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

3.5 **INSTALLATION**

- A. Install relocated materials and equipment under the provisions of Division 1 of Specifications.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Building wire

1.2 REFERENCES

- A. NEMA WC 70 - Power Cables Rated 2,000V or Less for the Distribution of Electrical Energy
- B. UL 44 – Thermoset-Insulated Wires and Cables
- C. UL 83 – Thermoplastic-Insulated Wires and Cables
- D. UL 1581 – Standard for Electrical Wires, Cables, and Flexible Cords

PART 2 - PRODUCTS

2.1 BUILDING WIRE

- A. Feeders and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600 volt insulation, THHN/THWN.
- B. Feeders and Branch Circuits Larger than 6 AWG in Underground Conduit: Copper, stranded conductor, 600 volt insulation, THWN.
- C. Feeders and Branch Circuits 6 AWG and Smaller: Copper conductor, 600 volt insulation, THHN/THWN. 6 and 8 AWG, stranded conductor; smaller than 8 AWG, solid or stranded conductor, unless otherwise noted on the drawings.
- D. Control Circuits: Copper, stranded conductor 600 volt insulation, THHN/THWN.

PART 3 - EXECUTION

3.1 WIRE AND CABLE INSTALLATION SCHEDULE

- A. Above Accessible Ceilings: Building wire in raceways.
- B. All Other Locations: Building wire in raceway.

3.2 GENERAL WIRING METHODS

- A. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.
- B. Use no wire smaller than 18 AWG for low voltage control wiring (<100 volts).
- C. Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 75 feet, and for 20 ampere.

- D. The ampacity of multiple conductors in one conduit shall be derated per National Electrical Code, Article 310. In no case shall more than 4 conductors be installed in one conduit to such loads as motors larger than 1/4 HP, panelboards, motor control centers, etc.
- E. Where installing parallel feeders, place an equal number of conductors for each phase of a circuit in same raceway or cable.
- F. Splice only in junction or outlet boxes.
- G. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- H. Make conductor lengths for parallel circuits equal.
- I. All conductors shall be continuous in conduit from last outlet to their termination.
- J. Terminate all spare conductors on terminal blocks, and label the spare conductors.

3.3 **WIRING INSTALLATION IN RACEWAYS**

- A. Pull all conductors into a raceway at the same time. Use UL listed wire pulling lubricant for pulling 4 AWG and larger wires.
- B. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.
- C. Pulling shall be continuous without unnecessary stops and starts with wire or cable only partially thru raceway.
- D. Where reels of cable or wire are used, they shall be set up on jacks close to the point where the wire or cable enters the conduit or duct so that the cable or wire may be unreeled and run into the conduit or duct with a minimum of change in the direction of the bend.
- E. Cables or wires shall not be laid out on the ground before pulling.
- F. Cables or wires shall not be dragged over earth or paving.
- G. Care shall be taken so as not to subject the cable or wire to high mechanical stresses that would cause damage to the wire and cable.
- H. Conductors shall not be pulled through conduits until plastering or masonry work is completed and conduits are free from moisture. Care shall be taken so that long pulls of wire or pulls around several bends are not made where the wire may be permanently stretched and the insulation damaged.
- I. Only nylon rope shall be permitted to pull cables into conduit and ducts.
- J. At least six (6) inch loops or ends shall be left at each outlet for installation connection of luminaires or other devices.
- K. All wires in outlet boxes not connected to fixtures or other devices shall be rolled up, spliced if continuity of circuit is required, and insulated.
- L. Completely and thoroughly swab raceway system before installing conductors.

3.4 WIRING CONNECTIONS AND TERMINATIONS

- A. Splice and tap only in accessible junction boxes.
- B. Use solderless, tin-plated copper, compression terminals (lugs) applied with circumferential crimp for copper conductor terminations, 8 AWG and larger.
- C. Use solderless, tin-plated, compression terminals (lugs) applied with indenter crimp for copper conductor terminations, 10 AWG and smaller.
- D. Use solderless pressure connectors with insulating covers for copper wire splices and taps, 8 AWG and smaller. For 10 AWG and smaller, use insulated spring wire connectors with plastic caps.
- E. Use copper, compression connectors applied with circumferential crimp for copper wire splices and taps, 6 AWG and larger. Tape uninsulated conductors and connectors with electrical tape to 150 percent of the insulation value of conductor.
- F. Thoroughly clean wires before installing lugs and connectors.
- G. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- H. Phase Sequence: All apparatus shall be connected to operate in the phase sequence A-B-C representing the time sequence in which the phase conductors so identified reach positive maximum voltage.
- I. As a general rule, applicable to switches, circuit breakers, starters, panelboards, switchgear and the like, the connections to phase conductors are intended thus:
 - 1. Facing the front and operating side of the equipment, the phase identification shall be:
 - a. Left to Right - A-B-C
 - b. Top to Bottom - A-B-C
- J. Connection revisions as required to achieve correct rotation of motors shall be made at the load terminals of the starters or disconnect switches.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 1.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Torque test conductor connections and terminations to manufacturer's recommended values.
- D. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Rigid metallic conduit and fittings
- B. Electrical metallic tubing and fittings
- C. Flexible metallic conduit and fittings
- D. Liquidtight flexible metallic conduit and fittings
- E. Wall and ceiling outlet boxes
- F. Pull and junction boxes

1.2 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI C80.1 - Rigid Steel Conduit, Zinc-Coated
 - 2. ANSI C80.3 - Electrical Metallic Tubing, Zinc-Coated and Fittings
 - 3. ANSI C80.4 - Fittings for Rigid Metal Conduit and Electrical Metallic Tubing
 - 4. ANSI/NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers and Box Supports
- B. Federal Specifications (FS):
 - 1. A-A-50553A – Fittings for Conduit, Metal, Rigid, (Thick-Wall and Thin-Wall (EMT) Type
 - 2. A-A-55810 – Specification for Flexible Metal Conduit
- C. NECA “Standards of Installation”
- D. National Electrical Manufacturers Association (NEMA):
 - 1. ANSI/NEMA FB 1 – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing and Cable
- E. National Fire Protection Association (NFPA):
 - 1. ANSI/NFPA 70 – National Electrical Code
- F. Underwriters Laboratories (UL): Applicable Listings
 - 1. UL 1 – Flexible Metal Conduit
 - 2. UL 6 – Rigid Metal Conduit
 - 3. UL 360 – Liquid Tight Flexible Steel Conduit
 - 4. UL514-B – Conduit Tubing and Cable Fittings
 - 5. UL746A – Standard for Polymeric Materials – Short Term Property Evaluations
 - 6. UL797 – Electrical Metal Tubing
 - 7. UL1242 – Intermediate Metal Conduit
- G. Definitions:
 - 1. Fittings: Conduit connection or coupling.

2. Body: Enlarged fittings with opening allowing access to the conductors for pulling purposes only.
3. Mechanical Spaces: Enclosed areas, usually kept separated from the general public, where the primary use is to house service equipment and to route services. These spaces generally have exposed structures, bare concrete and non-architecturally emphasized finishes.
4. Finished Spaces: Enclosed areas where the primary use is to house personnel and the general public. These spaces generally have architecturally emphasized finishes, ceilings and/or floors.
5. Concealed: Not visible by the general public. Often indicates a location either above the ceiling, in the walls, in or beneath the floor slab, in column coverings, or in the ceiling construction.
6. Above Grade: Not directly in contact with the earth. For example, an interior wall located at an elevation below the finished grade shall be considered above grade but a wall retaining earth shall be considered below grade.
7. Slab: Horizontal pour of concrete used for the purpose of a floor or sub-floor.

PART 2 - PRODUCTS

2.1 RIGID METALLIC CONDUIT (RMC) AND FITTINGS

- A. Acceptable Manufacturers:
 1. Acceptable Manufacturers: Allied, LTV, Steelduct, Wheatland Tube Co, O-Z Gedney, or approved equal.
 2. Acceptable Manufacturers of RMC Conduit Fittings: Appleton Electric, O-Z/Gedney Co., Electroline, Raco, Bridgeport, Midwest, Regal, Thomas & Betts, Crouse-Hinds, Killark, or approved equal.
- B. Minimum Size Galvanized Steel: 3/4 inch (19mm), unless otherwise noted.
- C. Fittings and Conduit Bodies:
 1. End Bell Fittings: Malleable iron, hot dip galvanized, threaded flare type with provisions for mounting to form.
 2. Expansion Joints: Malleable iron and hot dip galvanized providing a minimum of 4 inches of movement. Fitting shall be watertight with an insulating bushing and a bonding jumper.
 3. Expansion Joint for Concrete Encased Conduit: Neoprene sleeve with bronze end coupling, stainless steel bands and tinned copper braid bonding jumper. Fittings shall be watertight and concrete-tight.
 4. Conduit End Bushings: Malleable iron type with molded-on high impact phenolic thermosetting insulation. Where required elsewhere in the contract documents, bushing shall be complete with ground conductor saddle and clamp. **High impact phenolic threaded type bushings are not acceptable.**

5. All other fittings and conduit bodies shall be of malleable iron construction and hot dip galvanized.
- D. PVC Externally Coated Conduit: NEMA RN 1; rigid steel conduit with external 20 mil PVC coating and internal galvanized surface. All fittings and conduit bodies shall be complete with coating. Acceptable Manufacturers: Robroy, Permacote, or approved equal.

2.2 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS

- A. Minimum Size Electrical Metallic Tubing: 3/4 inch, unless otherwise noted.
- B. Acceptable Manufacturers of EMT Conduit: Allied, LTV, Steelduct, Wheatland Tube Co, or approved equal.
- C. Fittings and Conduit Bodies:
 1. 2" Diameter or Smaller: Compression type of steel designed for their specific application.
 2. Larger than 2": Compression type of steel designed for their specific application.
 3. Acceptable Manufacturers of EMT Conduit Fittings: Appleton Electric, O-Z/Gedney Co., Electroline, Raco, Bridgeport, Midwest, Regal, Thomas & Betts, or approved equal.

2.3 FLEXIBLE METALLIC CONDUIT (FMC) AND FITTINGS

- A. Minimum Size Galvanized Steel: 3/4 inch, unless otherwise noted. Lighting branch circuit wiring to an individual luminaire may be a manufactured, UL listed 3/8" flexible metal conduit with #12 AWG THHN conductors and an insulated ground wire.
- B. Acceptable Manufacturers: American Flex, Alflex, Electri-Flex Co, or approved equal.
- C. Construction: Flexible steel, approved for conduit ground, zinc coated, threadless type formed from a continuous length of spirally wound, interlocked zinc coated strip steel. Provide a separate equipment grounding conductor when used for equipment where flexibility is required.
- D. Fittings and Conduit Bodies:
 1. Threadless hinged clamp type, galvanized zinc coated cadmium plated malleable cast iron or screw-in type, die-cast zinc.
 2. Fittings and conduit bodies shall include plastic or cast metal inserts supplied by the manufacturer to protect conductors from sharp edges.
 3. Acceptable Manufacturers: O-Z/Gedney Co., Thomas & Betts, Appleton Electric, Electroline, Bridgeport, Midwest, Regal, or approved equal.

2.4 LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT (LFMC) AND FITTINGS

- A. Acceptable Manufacturers: Anaconda Type UA, Electri-Flex Type LA, Alflex, Carlon (Lamson & Sessions), or approved equal.
- B. Construction: Flexible steel, approved for conduit ground, zinc coated, threadless type formed from a continuous length of spirally wound, interlocked zinc coated strip steel and an extruded PVC cover.

- C. Fittings and Conduit Bodies:
 - 1. Watertight, compression type, galvanized zinc coated cadmium plated malleable cast iron, UL listed.
 - 2. Fittings and conduit bodies shall include plastic or cast metal inserts supplied by the manufacturer to protect conductors from sharp edges.
 - 3. Acceptable Manufacturers: Appleton Electric, O-Z/Gedney Co., Electroline, Bridgeport, Thomas & Betts, Midwest, Regal, Carlon (Lamson & Sessions), or approved equal.

2.5 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1; galvanized steel, minimum of 14 gauge, with 1/2 inch male fixture studs where required.

2.6 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: ANSI/NEMA OS 1; galvanized steel.
- B. Sheet metal boxes larger than 12 inches in any dimension that contain terminations or components: Continuous hinged enclosure with 1/4 turn latch and white back panel for mounting terminal blocks and electrical components.
- C. Cast Metal Boxes for Outdoor and Wet Location Installations: NEMA 250; Type 4 and Type 6, flat-flanged, surface-mounted junction box, UL listed as raintight. Galvanized cast iron box and cover with ground flange, neoprene gasket, and stainless steel cover screws.

PART 3 - EXECUTION

3.1 CONDUIT SIZING

- A. Size conduit as shown on the drawings and specifications. Where not indicated in the contract documents, conduit size shall be according to N.E.C. (Latest Edition). Conduit and conductor sizing shall be coordinated to limit conductor fill to less than 40%, maintain conductor ampere capacity as required by the National Electrical Code (to include enlarged conductors due to temperature and quantity derating values) and to prevent excessive voltage drop and pulling tension due to long conduit/conductor lengths.
- B. Minimum Conduit Size (Unless Noted Otherwise):
 - 1. Above Grade: 3/4 inch.
 - 2. Controls Conduit: 3/4 inch.
- C. Conduit sizes shall change only at the entrance or exit to a junction box, unless specifically noted on the drawings.

3.2 CONDUIT ARRANGEMENT

- A. In general, conduit shall be installed concealed in walls, in finished spaces and where possible or practical, or as noted otherwise. In unfinished spaces, mechanical and utility areas, conduit may run either concealed or exposed as conditions dictate and as practical unless noted otherwise on drawings. Installation shall maintain headroom in exposed vicinities of pedestrian or vehicular traffic.

- B. Conduit runs shall be routed as shown on large scale drawings. Conduit routing on drawings scaled 1/4"=1'-0" or less shall be considered diagrammatic, unless noted otherwise. The correct routing, when shown diagrammatically shall be chosen by the Contractor based on information in the contract documents, in accordance with manufacturer's written instructions, applicable codes, the NECA's "Standard of Installation", in accordance with recognized industry standards, and coordinated with other contractors.
- C. Contractor shall adapt his work to the job conditions and make such changes as required and permitted by the Architect/Engineer, such as moving to clear beams and joists, adjusting at columns, avoiding interference with windows, etc., to permit the proper installation of other mechanical and/or electrical equipment.
- D. Contractor shall cooperate with all Contractors on the project. He shall obtain details of other Contractor's work in order to ensure fit and avoid conflict. Any expense due to the failure of This Contractor to do so shall be paid for in full by him. The other trades involved as directed by the Architect/Engineer shall perform the repair of work damaged as a result of neglect or error by This Contractor. The resultant costs shall be borne by This Contractor.

3.3 CONDUIT SUPPORT

- A. Conduit runs installed above a suspended ceiling shall be properly supported. In no case shall conduit rest on the suspended ceiling construction, nor utilize ceiling support system for conduit support.
- B. Conduit shall not be supported from ductwork, water, sprinkler piping, or other non-structural members, unless approved by the Architect/Engineer. All supports shall be from structural slabs, walls, structural members, and bar joists, and coordinated with all other applicable contractors, unless noted otherwise.
- C. Conduit shall be held in place by the correct size of galvanized one-hole conduit clamps, two-hole conduit straps, patented support devices, clamp back conduit hangers, or by other means if called for on the drawings.
- D. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- E. Spring-steel conduit clips specifically designed for supporting single conduits or tubing may be used in lieu of malleable-iron hangers for 1-1/2" and smaller raceways serving lighting and receptacle branch circuits above accessible ceilings and for securing raceways to slotted channel and angle supports.
- F. Group conduits in parallel runs where practical and use conduit racks or trapeze hangers constructed of steel channel, suspended with threaded solid rods or wall mounted from metal channels with conduit straps or clamps. Provide space in each rack or trapeze for 25% additional conduits.
- G. Do not exceed 25 lbs. per hanger and a minimum spacing of 2'-0" on center when attaching to metal roof decking (excludes concrete on metal deck). This 25 lbs. load and 2'-0" spacing include adjacent electrical and mechanical items hanging from deck. If the hanger restrictions cannot be achieved, supplemental framing off steel framing will need to be added.
- 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. Supports for metallic conduit shall be no greater than 10 feet. A smaller interval may be used if necessitated by building construction, but in no event shall support spans exceed the National

Electrical Code requirements. Conduit shall be securely fastened within 3 feet of each outlet box, junction box, device box, cabinet, or fitting.

- J. Supports of flexible conduit shall be within 12 inches of each outlet box, junction box, device box, cabinet, or fitting and at intervals not to exceed 4.5 feet.
- K. Where conduit is to be installed in poured concrete floors or walls, provide concrete-tight conduit inserts securely fastened to forms to prevent conduit misplacement.
- L. Finish:
 - 1. Prime coat exposed steel hangers and supports. Hangers and supports in crawl spaces, pipe shafts, and above suspended ceiling spaces are not considered exposed.
 - 2. Trim all ends of exposed field fabricated steel hangers, slotted channel and threaded rod to within 1" of support or fastener to eliminate potential injury to personnel unless shown otherwise on the drawings. Smooth ends and install elastomeric insulation with two coats of latex paint if exposed steel is within 6'-6" of finish floor and presents potential injury to personnel.

3.4 CONDUIT INSTALLATION

- A. Conduit Connections:
 - 1. Shorter than standard conduit lengths shall be cut square using industry standards. The ends of all conduits cut shall be reamed or otherwise finished to remove all rough edges.
 - 2. Metallic conduit connections in slab on grade installation shall be sealed and one coat of rust inhibitor primer applied after the connection is made.
 - 3. Where conduits with tapered threads cannot be coupled with standard couplings, then approved split or Erickson couplings shall be used. Running threads will not be permitted.
 - 4. Install expansion/deflection joints where conduit crosses structure expansion/seismic joints.
- B. Conduit terminations for all low voltage wiring shall have nylon bushings installed on each end of every conduit run.
- C. Conduit Bends:
 - 1. Use a hydraulic one-shot conduit bender or factory elbows for bends in conduit 2" in size or larger. All steel conduit bending shall be done cold; no heating of steel conduit shall be permitted.
 - 2. A run of conduit shall not contain more than the equivalent of four (4) quarter bends (360°), including those bends located immediately at the outlet or body.
 - 3. Use conduit bodies to make sharp changes in direction (i.e. around beams).
- D. Conduit Placement:
 - 1. Conduit shall be mechanically continuous from source of current to all outlets. Conduit shall be electrically continuous from source of current to all outlets, unless a properly

sized grounding conductor is routed within the conduit. All metallic conduits shall be bonded per the National Electrical Code.

2. Route exposed conduit and conduit above suspended ceilings (accessible or not) parallel/perpendicular to the building structural lines, and as close to building structure as possible. Wherever possible, route horizontal conduit runs above water and steam piping.
3. Route conduit through roof openings provided for piping and ductwork where possible. If not provided or routing through provided openings is not possible, route through roof jack with pitch pocket. Coordinate roof penetrations with other trades.
4. Conduits, raceway, and boxes shall not be installed in concealed locations in metal deck roofing or less than 1.5" below bottom of roof decking.
5. Avoid moisture traps where possible. Where unavoidable, provide a junction box with drain fitting at conduit low point.
6. All conduits through walls shall be grouted or sealed into openings. Where conduit penetrates firewalls and floors, seal with a UL listed sealant. Seal penetrations with intumescent caulk, putty, or sheet installed per manufacturer's recommendations. All materials used to seal penetrations of firewalls and floors shall be tested and certified as a system per ASTM E814 Standard for fire tests or through-penetration fire stops as manufactured by 3M or approved equal.
7. **CONTRACTOR SHALL BE RESPONSIBLE FOR ALL OPENINGS REQUIRED IN MASONRY OR EXTERIOR WALLS UNDER THIS DIVISION. A QUALIFIED MASON AT THE EXPENSE OF THIS CONTRACTOR SHALL REPAIR ALL OPENINGS TO MATCH EXISTING CONDITIONS.**
8. Seal interior of conduit at exterior entries, air handling units, coolers/freezers, etc., and where the temperature differential can potentially be greater than 20°F, to prevent moisture penetration. Seal shall be placed where conduit enters warm space. Conduit seal fitting shall be a drain/seal, with sealing compound, equal to O-Z/Gedney type EYD.
9. Contractor shall provide suitable mechanical protection around all conduits stubbed out from floors, walls or ceilings during construction to prevent bending or damaging of stubs due to carelessness with construction equipment.
10. Contractor shall provide a polypropylene pull cord with 2000 lbs. tensile strength in each empty conduit (indoor and outdoor), except in sleeves and nipples.

3.5 **CONDUIT TERMINATIONS**

- A. Where conduit bonding is indicated or required in the contract documents, the bushings shall be a grounding type sized for the conduit and ground bonding conductor as manufactured by O-Z/Gedney, Appleton, Thomas & Betts, Burndy, Regal, or approved equal.
- B. Conduits with termination fittings shall be threaded for one (1) lock nut on the outside and one (1) lock nut and bushing on the inside of each box.
- C. Where conduits terminate in boxes with knockouts, they shall be secured to the boxes with lock nuts and provided with approved screw type tinned iron bushings or fittings with plastic inserts.
- D. Where conduits terminate in boxes, fittings, or bodies with threaded openings, they shall be tightly screwed against the shoulder portion of the threaded openings.

- E. Conduit terminations to all motors shall be made with flexible metallic conduit (FMC), unless noted otherwise. Final connections to roof exhaust fans, or other exterior motors and motors in damp or wet locations shall be made with liquidtight flexible metallic conduit (LFMC). Motors in hazardous areas, as defined in the National Electrical Code, shall be connected using flexible conduit rated for the environment. Flexible conduit shall not exceed 6' in length. Route equipment ground conductors from circuit ground to motor ground terminal through flexible conduit.
- F. All conduit ends shall be sealed with plastic immediately after installation to prevent the entrance of any foreign matter during construction. The seals shall be removed and the conduits blown clear of any and all foreign matter prior to any wires or pull cords being installed.

3.6 CONDUIT INSTALLATION SCHEDULE

- A. In the event the location of conduit installation represents conflicting installation requirements as specified in the following schedule, a clarification shall be obtained from the Architect/Engineer. If This Contractor is unable to obtain a clarification as outlined above, concealed rigid galvanized steel conduit installed per these specifications and the National Electrical Code shall be required.
- B. The following schedule shall be adhered to unless they constitute a violation of applicable codes or are noted otherwise on the drawings. The installation of RMC conduit will be permitted in place of any and all conduit specified in this schedule.
 - 1. Exposed:
 - a. Branch Circuits (lighting, receptacles, controls, etc.): EMT.
 - 2. Finished Spaces/Concealed: EMT.
 - 3. Wet or Damp Locations: RMC conduit, boxes and fittings, installed and equipped so as to prevent water from entering the conduit system.
 - 4. Interior Locations:
 - a. Exposed: EMT.
 - b. Concealed: EMT.

3.7 BOX INSTALLATION SCHEDULE

- A. Galvanized steel boxes may be used in:
 - 1. Concealed interior locations above ceilings and in hollow stud partition walls.
 - 2. Exposed interior locations in mechanical rooms and in rooms without ceilings; higher than 8' above the highest platform level.
- B. Cast boxes shall be used in:
 - 1. Exterior locations.
 - 2. Exposed interior locations within 8' of the highest platform level.
 - 3. Wet locations.

3.8 COORDINATION OF BOX LOCATIONS

- A. Provide electrical boxes as shown on the drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance.
- B. Electrical box locations shown on the Contract Drawings are approximate, unless dimensioned.

- C. Locate and install boxes to allow access. Avoid interferences with ductwork, piping, structure, equipment, etc. Where installation is inaccessible, provide access doors. Coordinate locations and sizes of required access doors with the Architect and General Contractor.
- D. Locate and install to maintain headroom and to present a neat appearance.

3.9 **OUTLET BOX INSTALLATION**

- A. The Contractor shall anchor switch and outlet box to wall construction so that it is flush with the finished masonry, paneling, drywall, plaster, etc. The Contractor shall check the boxes as the finish wall surface is being installed to assure that the box is flush. (Provide plaster rings as necessary.)
- B. Mount at heights shown or noted on the drawings or as generally accepted if not specifically noted.
- C. Provide knockout closures for unused openings.
- D. Support boxes independently of conduit.
- E. Use multiple-gang boxes where more than one device are mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.
- F. Install boxes in walls without damaging wall insulation.
- G. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioned to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.
- H. Provide cast outlet boxes in exterior locations and wet locations, and where exposed rigid or intermediate conduit is used.

3.10 **PULL AND JUNCTION BOX INSTALLATION**

- A. Locate pull boxes and junction boxes above accessible ceilings or in unfinished areas.
- B. Support pull and junction boxes independent of conduit.

3.11 **EXPOSED BOX INSTALLATION**

- A. Boxes shall be secured to the building structure with proper size screws, bolts, hanger rods, or structural steel elements.
- B. On brick, block and concrete walls or ceilings, exposed boxes shall be supported with no less than two (2) Ackerman-Johnson, Paine, Phillips, or approved equal screw anchors or expansion shields and round head machine screws. Cast boxes shall not be drilled.
- C. On steel structures, exposed boxes shall be supported to the steel member by drilling and tapping the member and fastening the boxes by means of round head machine screws.
- D. Boxes may be supported on steel members by APPROVED beam clamps if conduit is supported by beam clamps.
- E. Boxes shall be fastened to wood structures by means of a minimum of two (2) wood screws adequately large and long to properly support. (Quantity depends on size of box.)

- F. Wood, plastic, or fiber plugs shall not be used for fastenings.
- G. Explosive devices shall not be used unless specifically allowed.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Nameplates and tape labels
- B. Wire and cable markers
- C. Conductor color coding

1.2 REFERENCES

- A. ANSI C2 – National Electrical Safety Code
- B. NFPA 70 – National Electrical Code
- C. ANSI A13.1 – Standard for Pipe Identification
- D. ANSI Z535.4 – Standard for Product Safety Signs and Labels

PART 2 - PRODUCTS

2.1 ELECTRICAL IDENTIFICATION PRODUCTS

- A. Colored Adhesive Marking Tape for banding Raceways, Wires, and Cables: Self-adhesive vinyl tape not less than 3 mils thick by 1 inch to 2 inches in width.
- B. Pretensioned Flexible Wraparound Colored Plastic Sleeves for Cable Identification: flexible acrylic bands sized to suit the cable diameter and arranged to stay in place by pre-tensioned gripping action when coiled around the cable.
- C. Wire/Cable Designation Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound, cable/conductor markers with preprinted numbers and letter.
- D. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18-inch minimum width, 50-lb minimum tensile strength, and suitable for a temperature range from minus 50°F to 350°F. Provide ties in specified colors when used for color coding.
- E. Underground Plastic Markers: Bright colored continuously printed plastic ribbon tape of not less than 6 inches wide by 4 mil thick, printed legend indicating type of underground line, manufactured for direct burial service. Tape shall contain a continuous metallic wire to allow location with a metal detector.
- F. Aluminum, Wraparound Marker Bands: 1" in width, .014 inch thick aluminum bands with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.
- G. Brass or aluminum Tags: 2" by 2" by .05-inch metal tags with stamped legend, punched for fastener.
- H. Indoor/Outdoor Number and Letters: Outdoor grade vinyl label, minimum of 3/4" high x 9/16" wide, with acrylic adhesive designed for permanent application in severe indoor and outdoor environments.

2.2 NAMEPLATES AND SIGNS

- A. Engraved, Plastic-Laminated Labels, Signs and Instruction Plates: Engraving stock melamine plastic laminate, 1/16-inch minimum thick for signs up to 20 square inches, or 8 inches in length; 1/8 inch thick for larger sizes. Labels shall be punched for mechanical fasteners. Engraving legend shall be as follows:
 - 1. Black letters on white face for normal power.
 - 2. White letters on red face for emergency power.
 - 3. White letters on green face for grounding.
 - 4. Black letter on yellow face for Caution or UPS.
- B. Baked-Enamel Signs for interior Use: Preprinted aluminum signs, punched, or drilled for fasteners, with colors, legend, and size required for application. Mounting ¼" grommets in corners.
- C. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with .0396 inch galvanized-steel backing; and with colors, legend, and size required for application. Mounting ¼" grommets in corners.
- D. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.
- E. Fasteners for Plastic-Laminated Signs; Self-tapping stainless steel screws or number 10/32 stainless steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lettering and Graphics: Coordinate names, abbreviations, colors, and other designations used in electrical identification work with corresponding designations specified or indicated. Install numbers, lettering, and colors as required by code.
- B. Install identification devices in accordance with manufacturer's written instruction and requirements of NEC.
- C. Sequence of Work: Where identification is to be applied to surfaces that require finish, install identification after completion of finish work. All mounting surfaces shall be cleaned and degreased prior to identification installation.
- D. Identify Junction, Pull and Connection Boxes: Labeling shall be 3/8-inch Kroy tape or permanent magic marker (color coded), neatly hand printed. In rooms that are painted out, provide labeling on inside of cover.
- E. Circuit Identification: Tag or label conductors as follows:
 - 1. Multiple Power or Lighting Circuits in Same Enclosure: Where multiple branch circuits are terminated or spliced in a box or enclosure, label each conductor with source and circuit number.
 - 2. Multiple Control Wiring and Communication/Signal Circuits in Same Enclosure: For control and communications/signal wiring, use wire/cable marking tape at terminations in

wiring boxes, troughs, and control cabinets. Use consistent letter/number conductor designations throughout on wire/cable marking tape.

3. Match identification markings with designations used in panelboards shop drawings, Contract Documents, and similar previously established identification schemes for the facility's electrical installations.
- F. Apply warning, caution and instruction signs as follows:
1. Install warning, caution or instruction signs where required by NEC, where indicated, or where reasonably required to assure safe operation and maintenance of electrical systems and of the items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions or explanations are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
 2. Emergency Operating Signs: Install, where required by NEC, where indicated, or where reasonably required to assure safe operation and maintenance of electrical systems and of the items to which they connect, engraved laminate signs with white legend on red background with minimum 3/8-inch high lettering for emergency instructions on power transfer, load shedding, or other emergency operations.
- G. Apply circuit/control/item designation labels of engraved plastic laminate for pushbuttons, pilot lights, alarm/signal components, and similar items, except where labeling is specified elsewhere.
- H. Install labels parallel to equipment lines at locations as required and at locations for best convenience of viewing without interference with operation and maintenance of equipment.

3.2 RECEPTACLE COVER PLATES

- A. Provide identification on all receptacle cover plates indicated. Identification shall indicate source and circuit number serving the device (i.e. "C1A #24").
- B. Identification material to be a clear, 3/8-inch Kroy tape or Brother self-laminating vinyl label with black letters in normal size "Swiss 721 Bold" font. Letter and number size to 3/16-inch high. Embossed Dymo-Tape labels are not acceptable. Permanently affix identification label to cover plates, centered above the receptacle openings.

3.3 BOX LABELING

- A. All junction, pull, and connection boxes shall be identified as follows:
 1. For power and lighting circuits, indicate system voltage and identity of contained circuits ("120V, 1LA1-3,5,7").

3.4 CONDUCTOR COLOR CODING

- A. Color coding shall be applied at all panels, switches, junction boxes, pull boxes, vaults, manholes etc., where the wires and cables are visible and terminations are made. The same color coding shall be used throughout the entire electrical system, therefore maintaining proper phasing throughout the entire project.
- B. Where more than one nominal voltage system exists in a building or facility, the identification of color coding used in the panelboard or equipment shall be permanently posted on the interior of the door or cover.

- C. All wires and cables, 6 AWG or larger, used in motor circuits, main feeders, sub-main feeders and branch circuits, shall be coded by the application of plastic tape. The tape shall be 3-M, Plymouth or Permacel, in colors specified below. The tape shall be applied at each conductor termination with two 1-inch tape bands at 6-inch centers. Contractor option to use colored cabling in lieu of the tape at each end for conductor 6 AWG to 500 KCM.
- D. Wire and cables smaller than 6 AWG shall be color coded by the manufacturer.
- E. Colored cable ties shall be applied in groups of three ties of specified color to each conductor at each terminal or splice point starting 3 inches from the termination and spaced at 3- inches centers. Tighten to a snug fit, and cut off excess length.
- F. Where more than one nominal voltage system exists in a building or facility, each ungrounded conductor of a multi-wire branch circuit, where accessible, shall be identified by phase and system.
- G. Conductors shall be color coded as follows:
 - 1. 208Y/120 Volt, 4-Wire:
 - a. A-Phase – Black
 - b. B-Phase – Red
 - c. C-Phase – Blue
 - d. Neutral – White
 - e. Ground Bond – Green

3.5 CONTROL EQUIPMENT IDENTIFICATION

- A. Provide identification on the front of all control equipment, such as disconnect switches, starters, VFDs, contactors, motor control centers, etc. Nameplate text shall be a minimum of 1/4” high.
- B. Labeling shall include:
 - 1. Equipment type and contract documents designation of equipment being served.
 - 2. Location of equipment being served if it is not located within sight.
 - 3. Voltage and phase of circuit(s).
 - 4. Panel and circuit number(s) serving the equipment.

EXHAUST FAN EF-1 ("LOCATED ON ROOF") 480V, 3-PHASE FED FROM "1HA1-1"
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End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Magnetic motor starters
- B. Combination magnetic motor starters

1.2 REFERENCES

- A. NEMA ICS 6 - Enclosures for Industrial Controls and Systems
- B. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service
- C. FS W-P-115 - Power Distribution Panel
- D. FS W-F-870 - Fuseholders (For Plug and Enclosed Cartridge Fuses)
- E. FS W-S-865 - Switch, Box, (Enclosed), Surface-Mounted
- F. NEMA AB 1 - Molded Case Circuit Breakers
- G. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies
- H. NEMA KS 1 - Enclosed Switches
- I. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or less
- J. ANSI/UL Standard 508. Standard for Industrial Control Equipment
- K. IEEE Standard 519-1981 - Guide for Harmonic Control and Reactive Compensation of Static Power Converters
- L. FCC Rules and Regulations, Part 15, Subpart J- Radio Frequency Interference

1.3 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 26 05 00.
- B. Provide product data on motor starters and combination motor starters, relays, pilot devices, and switching and over-current protective devices.
- C. Submit manufacturer's instructions under provisions of Section 26 05 00.

1.4 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section 26 05 00.
- B. Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 26 05 00.
- B. Store and protect products under provisions of Section 26 05 00.
- C. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from fumes, dirt, water, construction debris, traffic, and physical damage.

1.6 SPARE PARTS

- A. Keys: Furnish four (4) each to the Owner.
- B. Fuses: Furnish three (3) spare fuses of each type and rating installed to the Owner.
- C. Fuse Pullers: Furnish one (1) fuse puller to the Owner.

PART 2 - PRODUCTS

2.1 MAGNETIC MOTOR STARTERS

- A. Magnetic Motor Starters: NEMA ICS 2; AC general-purpose Class A magnetic controller for induction motors rated in horsepower.
- B. Full Voltage Starting: Non-reversing type, unless otherwise indicated.
- C. Coil Operating Voltage: 120 volts, 60 Hertz, obtained from integral control power transformer of sufficient capacity to operate connected pilot, indicating, and control devices, plus 100% spare capacity.
- D. Size: NEMA ICS 2; size as shown on the drawings.
- E. Overload Relay:
 - 1. Adjustable Overload Relay: Dip switch selectable for motor running overload protection with NEMA ICS 2, Class 20 tripping characteristic, and selected to protect motor against voltage and current unbalance and single phasing. Provide relay with Class II ground-fault protection, with start and run delays to prevent nuisance trip on starting.
- F. Enclosure: NEMA ICS 6; Type 1.
- G. Combination Motor Starters: Combine motor starters with disconnect switch in common enclosure. Provide with disconnecting means as indicated on drawings.
- H. Auxiliary Contacts: NEMA ICS 2; two normally open, field convertible contacts in addition to seal-in contact.
- I. Pushbuttons: NEMA ICS 2; START/STOP in front cover.
- J. Indicating Lights: NEMA ICS 2; RUN: red in front cover.
- K. Selector Switches: NEMA ICS 2; HAND/OFF/AUTO, in front cover.
- L. Relays: NEMA ICS 2.

- M. Control Power Transformers: 120 volt fused secondary, fused primary, minimum VA as scheduled:
- Size 1 - 100 VA
 - Size 2 - 100 VA
 - Size 3 - 150 VA
 - Size 4 - 300 VA
 - Size 5 - 300 VA
 - Size 6 - 300 VA
- N. Provide phase loss protection relay with contacts to de-energize the starter for each starter serving motors 5 HP or greater.

2.2 CONTROLLER OVER-CURRENT PROTECTION AND DISCONNECTING MEANS

- A. Fusible Switch Assemblies: NEMA KS 1, quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle. Provide interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: Provide with Class 'R' rejection clips. Select and size fuses to provide Type 2 protection according to IEC 947-4-1, as certified by a nationally recognized testing laboratory.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install motor control equipment in accordance with manufacturer's instructions on concrete bases.
- B. Install fuses in fusible switches.
- C. Select and install heater elements in motor starters to match installed motor characteristics.
- D. Motor Data: Provide neatly typed label inside each motor starter enclosure door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating.
- E. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.

End of Section

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Receptacles
- B. Device plates and box covers

1.2 REFERENCES

- A. DSCC W-C-896F – General Specification for Electrical Power Connector
- B. FS W-C-596 - Electrical Power Connector, Plug, Receptacle, and Cable Outlet
- C. FS W-S-896 - Switch, Toggle
- D. NEMA WD 1 – General Color Requirements for Wiring Devices
- E. NEMA WD 6 – Wiring Devices – Dimensional Requirements
- F. UL 498 – Standard for Attachment Plugs and Receptacles

1.3 QUALITY ASSURANCE

- A. Provide similar devices from a single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency to Authorities Having Jurisdiction and marked for intended use.
- C. Comply with NFPA 70.

1.4 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. Refer to General Electrical Equipment Schedule for configuration and ratings.
- B. Back wired devices shall be complete with eight holes that are screw activated with metal clamps for connection to #12 or #10 copper conductors.
- C. Side wired devices shall have four binding screws that are undercut for positive wire retention.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install specific-use receptacles at heights shown on the contract drawings. Install devices level, plumb, and square with building lines. Coordinate installation of adjacent devices of separate systems with common mounting heights, including lighting, power, systems, technology, and temperature control device rough-ins.
- B. Install receptacles vertically with ground slot up or where indicated on the drawings, horizontally with ground slot to the left.
- C. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets.
- D. Install devices and wall plates flush and level.
- E. Contractor to verify that wall dimmer ratings are achieved where a ganged installation is used.
- F. Install nameplate identification to receptacle cover plates indicated. Identification shall identify panel name and circuit number. Refer to Specification Section 26 05 53 - Electrical Identification.
- G. Test receptacles for proper polarity, ground continuity and compliance with requirements.

End of Section

**VARIABLE FREQUENCY DRIVES
SECTION 26 29 23**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Variable frequency drives

1.2 RELATED SECTIONS AND WORK

- A. Refer to the Variable Frequency Drive Schedule for rating and configuration.

1.3 REFERENCES

- A. ANSI/UL Standard 508
- B. ANSI/NEMA ICS 6 - Enclosures for Industrial Controls and Systems
- C. IEEE Standard 519-1992 - Guide for Harmonic Control and Reactive Compensation of Static Power Converters
- D. FCC Rules and Regulations, Part 15, Subpart J - Radio Frequency Interference

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 26 05 00.
- B. Shop Drawings: Include front and side views of enclosures with overall dimensions and weights shown; conduit entrance locations and requirements; and nameplate legends.
- C. Product Data: Provide catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.
- 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 Product.
- E. Provide harmonic distortion analysis of total service to prove variable frequency drives proposed do not exceed the latest version of IEEE 519 voltage and current distortion limits as shown in Table 10.2 and 10.3 at the point of common coupling (PCC). The PCC shall be defined as the consumer-utility interface or primary side of the main distribution transformer.

1.5 EXTRA MATERIAL

- A. Furnish under provisions of Section 26 05 00.
- B. Provide two of each air filter.
- C. Provide three of each fuse size and type.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 26 05 00.
- B. Accept controllers 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 in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage.

1.7 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section 26 05 00.
- B. Maintenance Data: Include spare parts data listing, source and current prices of replacement parts and supplies, and recommended maintenance procedures and intervals.
- C. Operation Data: Include instructions for starting and operating controllers, and describe operating limits that may result in hazardous or unsafe conditions.
- D. Shop Drawings: For each VFD.
 - 1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Each installed unit's type and details.
 - b. Nameplate legends.
 - c. Short-circuit current rating of integrated unit.
 - d. UL listing for series rating of overcurrent protective devices in combination controllers.
 - e. Features, characteristics, ratings, and factory settings of each motor-control center unit.
 - 2. Wiring Diagrams: Power, signal, and control wiring for VFDs. Provide schematic wiring diagram for each type of VFD.

PART 2 - PRODUCTS

- A. ACCEPTABLE MANUFACTURERS: refer to Variable Frequency Drive Schedule.

2.2 DESCRIPTION

- A. Converts 60 Hertz input power at voltage specified to a variable AC frequency and voltage for controlling the speed of AC squirrel cage motors. The controller shall be suitable for use with standard NEMA B squirrel cage 1.15 service factor induction motors without requiring any modifications to the motor or the drive.

- B. Controller shall have sufficient capacity to provide speed control of the motors shown or noted throughout the specified environmental operating conditions.
- C. Controller shall have the functional components listed below:
 - 1. Door interlocked input circuit breaker/fused switch.
 - 2. Input rectifier section to supply fixed DC bus voltage.
 - 3. Smoothing reactor for DC bus.
 - 4. DC bus capacitors.
 - 5. Control transformer.
 - 6. Separate terminal blocks for power and control wiring.
 - 7. Terminal block for operator controls.
 - 8. Sine weighted PWM generating inverter section.

2.3 RATINGS

- A. Rated Input Voltage: Refer to Variable Frequency Drive Schedule.
- B. Motor Nameplate (Drive Output) Voltage: Refer to Variable Frequency Drive Schedule.
- C. Displacement Power Factor: Between 1.0 and 0.95, lagging, over entire range of operating speed and load.
- D. Operating Ambient: 0°C to 40°C.
- E. Minimum Relative Humidity Range: 5% to 90% (non-condensing).
- F. Minimum Elevation without Derating: 3300 feet.
- G. Minimum Efficiency at Full Load: 96 percent.
- H. Overload Capability: 1.1 times the base load current for 60 seconds; 2.0 times the base load current for 3 seconds.
- I. Starting Torque: 100 percent of rated torque or as indicated.
- J. Speed Regulation: Plus or minus 1 percent with no motor derating.

2.4 DESIGN

- A. Pulse Width Modulated (PWM) Variable Frequency Drives:
 - 1. Converter shall be of a diode bridge design with a sine-weighted PWM inverter section.
 - 2. Main semi-conductors in the inverter section of controller shall be IGBT transistors capable of a carrier switching frequency of up to 8 kHz. If derating of the inverter is necessary to run at 8kHz, then the unit's derated currents must equal or exceed the motor full load currents listed in NEC Table 430-150.
 - 3. All controllers supplied with semi-conductors capable of switching at less than 8,000 Hertz shall be supplied with a motor acoustic noise reduction filter.
 - 4. Pulse width modulated (PWM) drives shall be supplied with drive input line reactors with a minimum impedance of 3%. Reactors shall be installed to filter entire drive input circuit.

5. Pulse width modulated (PWM) drives shall be supplied with drive input harmonic filter to reduce the total harmonic distortion to less than the IEEE519-1992 limits at the utility service entrance.
 6. Drives that are located beyond the manufacturer's recommended maximum distance from the motor shall be provided with dV/dt (long lead) filters.
- B. All drives shall have built-in diagnostic capability with status and fault indicators mounted on enclosure door. Complete operating instructions for diagnostics shall be mounted inside of the enclosure door.
 - C. Drive shall restart after power loss and under-voltage fault. The minimum number of restart attempts required shall be three, field adjustable.
 - D. The drive shall allow unlimited switching of the output without damage to the drive or motor.

2.5 PRODUCT FEATURES

- A. Display: Provide integral digital display to indicate all protection faults and drive status (including overcurrent, overvoltage, undervoltage, ground fault, overtemperature, phase loss, input power ON, output voltage, output frequency, and output current.
- B. Protection:
 1. Input transient protection by means of surge suppressors.
 2. Snubber networks to protect against malfunctions due to system transients,
 3. Under- and overvoltage trips; inverter overtemperature, overload, and overcurrent trips.
 4. Motor thermal overload relay(s) adjustable and capable of NEMA 250 and sized per motor nameplate data.
 5. Notch filter to prevent operation of the controller-motor-load combination at a natural frequency of the combination.
 6. Instantaneous line-to-line and line-to-ground overcurrent trips on input and output.
 7. Loss-of-phase protection.
 8. Reverse-phase protection.
 9. Short-circuit protection (fuses or circuit breaker).
 10. Motor overtemperature fault.
- C. Acceleration Rate Adjustment: 0.5 - 30 seconds.
- D. Deceleration Rate Adjustment: 1 - 30 seconds.
- E. Minimum Adjustment Range for the Lower Output Frequency shall be: 0 to 40 Hertz.
- F. Minimum Adjustment Range for the Upper Output Frequency Range shall be: 40 to 90 Hertz.
- G. Minimum Volts/Hertz Range: 3.7 to 8.6 volts/Hertz.

- H. Provide MANUAL-OFF-AUTOMATIC selector switch and manual analog speed control mounted on the front of the enclosure.
- I. Safety Interlocks: Provide terminals for remote contact to inhibit starting under both manual and automatic mode.
- J. Control Interlocks: Provide terminals for remote contact to allow starting in automatic mode.
- K. Provide adjustable skip frequencies on the drive output (minimum of three ranges).
- L. Automatic Reset/Restart: Attempts three restarts after controller fault or on return of power after an interruption, and before shutting down for manual reset or fault correction. Bidirectional autospeed search shall be capable of starting into rotating loads spinning in either direction and returning motor to set speed in proper direction, without damage to controller, motor, or load.
- M. Power-Interruption Protection: After a power interruption, it prevents the motor from re-energizing until the motor has stopped.
- N. Torque Boost: Automatically varies starting and continuous torque to at least 1.5 times the minimum torque to ensure high-starting torque and increased torque at slow speeds.
- O. Motor Temperature Compensation at Slow Speeds: Adjustable current fall-back based on output frequency for temperature protection of self-cooled, fan-ventilated motors at slow speeds.
- P. Status Lights: Door-mounted LED indicators shall indicate the following conditions:
 - 1. Power on.
 - 2. Run.
 - 3. Overvoltage.
 - 4. Line fault.
 - 5. Overcurrent.
 - 6. External fault.
- Q. Panel-Mounted Operator Station: Start-stop and auto-manual selector switches with manual speed control potentiometer and elapsed time meter.
- R. Indicating Devices: Meters or digital readout devices and selector switch, mounted flush in controller door and connected to indicate the following controller parameters:
 - 1. Output frequency (Hz).
 - 2. Motor speed (rpm).
 - 3. Motor status (running, stop, fault).
 - 4. Motor current (amperes).
 - 5. Motor torque (percent).
 - 6. Fault or alarming status (code).
 - 7. PID feedback signal (percent).
 - 8. DC-link voltage (VDC).
 - 9. Set-point frequency (Hz).
 - 10. Motor output voltage (V).
- S. Control Signal Interface:
 - 1. Electric Input Signal Interface: A minimum of 2 analog inputs (0 to 10 V or 0/4-20 mA) and 6 programmable digital inputs.

2. Remote Signal Inputs: Capability to accept any of the following speed-setting input signals from the BMS or other control systems:
 - a. 0 to 10-V dc.
 - b. 0-20 or 4-20 mA.
 - c. Potentiometer using up/down digital inputs.
 - d. Fixed frequencies using digital inputs.
 - e. RS485.
 - f. Keypad display for local hand operation.

3. Output Signal Interface:
 - a. A minimum of 1 analog output signal (0/4-20 mA), which can be programmed to any of the following:
 - 1) Output frequency (Hz).
 - 2) Output current (load).
 - 3) DC-link voltage (VDC).
 - 4) Motor torque (percent).
 - 5) Motor speed (rpm).
 - 6) Set-point frequency (Hz).

4. Remote Indication Interface: A minimum of 2 dry circuit relay outputs (120-V ac, 1A) for remote indication of the following:
 - a. Motor running.
 - b. Set-point speed reached.
 - c. Fault and warning indication (overtemperature or overcurrent).
 - d. PID high- or low-speed limits reached.

- T. Communications: Provide a communications card to interface VFD with Facility Management Control System (FMCS). Coordinate interface requirements with the FMCS provided under Section 23 09 00. Interface shall allow all parameter settings of VFD to be programmed via FMCS control and displayed on FMCS operator workstation. Provide capability for VFD to retain these settings within the nonvolatile memory.

- U. Control:
 1. With the "Manual-Off-Auto" switch in the "Manual" position and, if applicable, the "Drive-Bypass" in the "Drive" position, the drive shall be controlled by the manual speed potentiometer on the drive door.
 2. With the "Manual-Off-Auto" switch in the "Auto" position and, if applicable, the "Drive-Bypass" in the "Drive" position, the drive shall be controlled by the input signal from an external source.
 3. If applicable, with the "Drive-Bypass" in the "Bypass" position, regardless the position of the "Manual-Off-Auto" switch, the motor shall be connected across the lines and shall be run at full speed.
 4. With the "Manual-Off-Auto" switch in the "Off" position, if applicable, the drive run circuit shall be open and the VFD shall not operate.
 5. If applicable, signal from the fire alarm control panel shall shut down VFD and bypass.

6. All disconnect switches between VFD and motor(s) shall include an auxiliary contact interlock wired to the VFD fault trip input to shut down the drive upon opening of the disconnect main contacts.

2.6 ACCESSORIES

- A. Devices shall be factory installed in controller enclosure, unless otherwise indicated.
- B. All VFD supplied for fans shall have dynamic or DC injection braking capability to provide a means of rapid deceleration of the AC motor. Adjust controls to the fastest deceleration rate.
- C. Push-Button Stations, Pilot Lights, and Selector Switches: NEMA ICS 2, heavy-duty type.
- D. Stop and Lockout Push-Button Station: Momentary-break, push-button station with a factory-applied hasp arranged so padlock can be used to lock push button in depressed position with control circuit open.
- E. Control Relays: Auxiliary and adjustable time-delay relays.
- F. Standard Displays:
 1. Output frequency (Hz).
 2. Set-point frequency (Hz).
 3. Motor current (amperes).
 4. DC-link voltage (VDC).
 5. Motor torque (percent).
 6. Motor speed (rpm).
 7. Motor output voltage (V).
- G. Historical Logging Information and Displays:
 1. Real-time clock with current time and date.
 2. Running log of total power versus time.
 3. Total run time.
 4. Fault log, maintaining last four faults with time and date stamp for each.
- H. Fabrication:
 1. Enclosure: NEMA 250, Type 1.
 2. Finish: Manufacturer's standard enamel.

PART 3 - EXECUTION

3.1 FACTORY TESTING

- A. The VFD manufacturer shall provide certification that heat test has been completed.
- B. The Electrical Contractor shall have a factory service engineer present for the start-up, field calibration, and check-out of each VFD installed. Factory service engineer shall be required to return to the site for recalibration or set-up should unit not function as specified during system commissioning. All costs shall be a part of This Contract. Provide tag with date and signature of factory service Engineer on inside cover of each drive.

3.2 INSTALLATION

- A. Install variable frequency drive equipment in accordance with the manufacturer's instructions.
- B. Provide engraved phenolic nameplates under the provisions of Section 26 05 53.
- C. Connections: All conduit connections to the VFD shall be by flexible conduit.
- D. Input, output, and control wiring shall each be run in separate conduits.
- E. All interlocking required by the drive manufacturer shall be the responsibility of the Electrical Contractor.

END OF SECTION