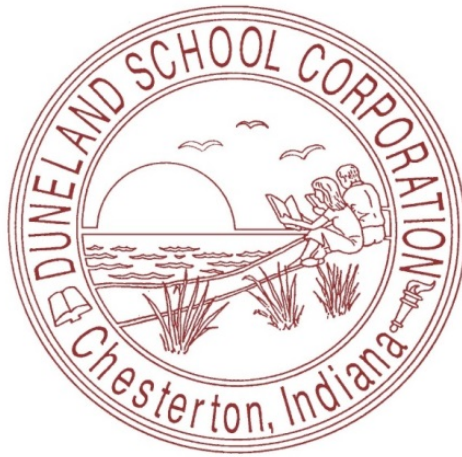


Project Manual
Project Number: 17-063

Duneland School Corporation 2018 Additions at Brummitt Elementary School

2500 Indiana Boundary Road, Chesterton, Indiana 46304



For
Board of School Trustees
Duneland School Corporation
601 West Morgan Avenue
Chesterton, Indiana 46304

Issued for Bid and Permit: January 31, 2018



West Suburban Office: 901 McClintock Drive, Suite 100, Burr Ridge, Illinois 60527
South Suburban Office: 1820 Ridge Road, Suite 209, Homewood, Illinois 60430
Company Main: 630.455.4500 Fax: 630.455.4040
www.TriaArchitecture.com

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SECTION 00030

ADVERTISEMENT FOR BIDS

ADVERTISEMENT FOR BIDS

1.1 BID INFORMATION

- A. Notice is hereby given that sealed bids will be received by the Board of School Trustees of the Duneland School Corporation on February 21, 2018 until 12:00 p.m. CST (local time) for the: 2018 Addition at Brummitt Elementary School. Bids will be opened and publicly read aloud at the Duneland School Corporation Administration Office, 601 West Morgan Avenue, Chesterton, Indiana 46304.
- B. A non-mandatory Pre-Bid Conference will be held on February 15, 2018 at 2:00 p.m. at Brummitt Elementary School, 2500 Indian Boundary Road, Chesterton, Indiana 46304. All Bidders are encouraged to attend and sign in at the meeting. A walk-through of the school will immediately follow the pre-bid meeting.
- C. Anticipated Award of Contract date: March 5, 2018
- D. Anticipated Start of Construction: March 6, 2018
- E. Anticipated Substantial Completion date: August 1, 2018
- F. Lump sum bid proposals will be received for this project at the scheduled time. Bids received after this time shall be returned unopened.
- G. Bid security in the form of a bid bond or certified check in an amount equal to 10 percent of the base bid amount shall be submitted with the bid. Should a bid bond be submitted, the bid bond shall be payable to the Duneland School Corporation.
- H. Bids shall be submitted on or before the specified closing time in an opaque sealed envelope addressed to: Mr. Greg Lindy, Director of Support Services, 601 W. Morgan Avenue, Chesterton, IN 46304, ATTENTION: 2018 ADDITION BID – BRUMMITT ELEMENTARY SCHOOL.
- I. The Board of School Trustees of the Duneland School Corporation reserves the right to reject any or all bids or parts thereof, or to waive any irregularities or informalities, and to make the award in the best interest of the Duneland School Corporation. No bid shall be withdrawn for a period of sixty (60) days after the scheduled bid opening date.
- J. All bidders must comply with all Board of School Trustees local policies as outlined in the bidding documents.
- K. The Architect for the above referenced project is Tria Architecture, Inc., (630) 455-4500.
- L. Bidding documents are on file and may be obtained upon receipt of deposit in the amount of \$100 for 1 set of the bidding documents consisting of 2 sets of plans, 2 Project Manuals, 1 Compact Disc containing PDF files of drawings and project manual, and 1 set of bid forms from: GRI Gill Reprographics, Inc. 17W715 Butterfield Road, Suite B, Oakbrook Terrace, IL 60181, (630) 652-0800, chicagoorders@gillrepro.com.

Board of School Trustees of the Duneland School Corporation

END OF SECTION

SECTION 00100

INSTRUCTIONS TO BIDDERS

PART 1 – GENERAL

1.1 PROPOSAL

- A. The Board of School Trustees of the Duneland School Corporation will receive sealed bids for the 2018 Flooring Renovations at Yost Elementary School and Jackson Elementary School.
- B. To receive full consideration bids must contain the following documents properly completed and signed:
 - 1. Bid Form.
 - 2. Bid Bond.
 - 3. Addendum to Contract for Construction.
 - 4. Certification Regarding Investment Activities in Iran.
 - 5. Contractor's Bid for Public Work - Form 96.
 - 6. Responsible Bidder Form.
 - 7. Fully completed AIA document A305 providing the Contractor's qualifications and references.

1.2 PREPARATION FOR BIDS

- A. Proposals to be entitled for consideration must be made in accordance with the following instructions.
 - 1. Submit one copy of bid on forms provided by the Architect with all blank spaces for bid prices filled in, in ink, or typewritten.
 - 2. Submit one reproduction of bid forms and associated documents.
 - 3. Submit bid in an opaque, sealed envelope, addressed to: Mr. Greg Lindy, Director of Support Services, 601 West Morgan Avenue, Chesterton, Indiana 46304.
 - a. Mark the envelope ATTENTION: 2018 ADDITION AT BRUMMITT ELEMENTARY SCHOOL - BID.
 - 4. Sealed Bids will be received until 12:00 p.m. CST (local time), on February 21, 2018 for all specified work at Duneland School Corporation Administration Office, 601 West Morgan Avenue, Chesterton Indiana 46304.
 - 5. Bids received after this time shall be returned unopened.
 - 6. Erasures or written memorandum on the Bid Form are prohibited. Include additional explanations, statements, or qualifications in a separate sheet attached to the Bid Form.
 - 7. The Base Bid shall appear only where called for in the Bid Form and shall not appear elsewhere in the proposal. Any Alternate prices (other than those set forth in the Bid Form) shall be listed on the Substitution Sheet.
 - 8. Fill in all blank spaces for the bid items with prices, or if not applicable, the words "No Bid."
- B. The Owner reserves the right to reject any or all bids or parts thereof at its sole discretion.
- C. The Owner reserves the right to waive any or all irregularities or informalities.
- D. The Owner reserves the right to terminate this request for bids at any time in the bidding process.
- E. All costs associated with developing or submitting a bid in response to this request, or to obtain oral or written clarification of its content shall be borne by the respondent. The Owner and Architect, and their agents, assume no responsibility for these costs. This request for bids does not commit the Owner or Architect, or any of their agents, to pay any costs incurred in the preparation or submission of a bid.
- F. Do not detach Bid Proposal Forms from the Project Manual for use in submission of bids; use separate forms furnished by the Architect.
- G. Telegraphic bids will not be accepted, but modifications by telegram of bids already submitted will be considered if received prior to the scheduled closing time for receiving bids.

1.3 DEFINITIONS

- A. All definitions set forth in the General Conditions of the Contract for Construction as printed in AIA Document A201 as modified and included herewith are applicable to these Instructions to Bidders.
- B. Bidding Documents include the Advertisement to Bid, Instructions to Bidders, the Bid Proposal

SECTION 00100

INSTRUCTIONS TO BIDDERS

Form and required attachments, AIA Document A101 Standard Form of Agreement Between Owner and Contractor where the Basis of Payment is a Stipulated Sum, 2007 edition, including General Conditions as modified for this project, AIA Document A305, and the proposed Contract Documents including any addendum issued prior to receipt of bids.

- C. Addenda are written or graphic instruments issued prior to the execution of the Contract which modify or interpret the bidding documents, including Drawings and Specifications, by additions, clarifications, or corrections. Addenda will become part of the Contract Documents when the Construction Contract is executed.
 - 1. Addenda will be issued by Email, FAX transmittal, direct mail or United Parcel delivery. Bidders are to consider all addenda, regardless of method of transmittal, as a binding modification to the contract documents.
 - 2. It is the bidder's responsibility to ascertain from the Architect that they have received all addenda issued to the bidding documents prior to submitting their bids.

1.4 DOCUMENTS

- A. The Bidding Documents are on file and may be examined at Gill Reprographics, Inc. (GRI), 17W715 Butterfield Road, Suite B, Oak Brook Terrace, IL 60181, (630) 652-0800, www.gillrepro.com.
- B. General Contractors may obtain (1) set of the Bidding Documents, consisting of (2) sets of drawings, (2) project manuals, (1) Compact Disc containing PDF files of the drawings and the project manual, and (1) set of bid forms at Gill Reprographics, Inc. (GRI), 17W715 Butterfield Road, Suite B, Oak Brook Terrace, IL 60181, (630) 652-0800, www.gillrepro.com, upon deposit of a check in the amount of \$100.00 made payable to the Duneland School Corporation. Deposit is refundable if a bid is submitted and if drawings are returned in good condition by March 21, 2018, as well as to the winning bidder.
- C. Contractors may obtain additional sets of plans and specifications directly from the Printer. Contractor shall be responsible for the reproduction costs. Amounts paid for additional sets are not refundable.
- D. All documents furnished for bidding purposes (including Compact Disc), obtained by deposit or purchase MUST BE RETURNED to the Printer, transportation prepaid, within ten days after opening of the Bids or deposit checks will not be returned.

1.5 EXAMINATION OF DOCUMENTS AND SITE

- A. Bidders are responsible for examining all documents on file at the office of the Printer or Owner and must make a mandatory site visit to examine the site to become familiar with and make allowance for any conditions which may affect the work. Contractors will not be given extra payments for conditions which can be determined by examining the site and documents.
- B. A non-mandatory Pre-Bid Conference will be held on February 15, 2018, 2:00 p.m. at Brummitt Elementary School, 2500 Indian Boundary Road, Chesterton, Indiana 46304. All Bidders are encouraged to attend and sign in at the conference which will also be attended by the Owner, the Architect, and the Engineer. There will be a walk-through immediately following the pre-bid meeting at the school. The Architect will transmit to prospective bidders of record any Addenda the Architect considers necessary in response to questions arising at the conference.

1.6 POST-BID QUALIFICATION

- A. Any bidder may be required to submit supporting data to substantiate that such bidder is properly qualified to carry out the obligations of the Contract and to complete the Work contemplated therein.

1.7 BID WITHDRAWAL

- A. Any bidder may withdraw their bid prior to the scheduled closing time for receiving bids. All bidders shall hold their Bids open for a period of sixty calendar days from the date of Bid Opening. The Owner and Bidders may agree to extend the period of irrevocability beyond the sixty-day period.

SECTION 00100

INSTRUCTIONS TO BIDDERS

1.8 INTERPRETATION OF BIDDING DOCUMENTS

- A. Submit all questions regarding the Bidding Documents to the Architect. Replies will be issued to all bidders of record in the form of an Addendum. Questions received less than five days before the bid opening date cannot be answered.

1.9 NON-SPECIFIED ITEMS

- A. Approved Equal Items:
 - 1. To obtain approval to use non-specified items, submit written request at least five days prior to the opening date; requests received after this time will NOT be considered.
 - 2. Requests shall clearly describe the items for which approval is asked including all data necessary to demonstrate acceptability.
 - 3. If an item is acceptable, the Architect will approve same in an Addendum issued to all bidders of record.
- B. Substitutions:
 - 1. Substitutions for the items specified may be made by the Contractor only by submitting proposed substitutions on the Substitution Sheet provided.
 - 2. Requests received after bid opening will not be considered except for the following conditions:
 - a. Product discontinued.
 - b. Insufficient quantity. Except the following will not establish cause for substitution:
 - 1) Failure to award subcontract in sufficient time, or failure to place orders for products so as to ensure delivery without delaying work.
 - c. Delays beyond control, such as strikes, lockouts, storms, fires, or acts of God, which may preclude the procurement and delivery of products for purposes of the Project.
- C. No consideration will be given to substitutions after the Contractor submits the Schedule of Values.

1.10 METHOD OF AWARD

- A. If the Owner should award a Contract, the Owner will award it to the lowest responsible bonafide Bidder with full consideration given to Contractor's Completion Schedule.
- B. In determining the lowest responsible bona fide Bidder and in awarding a contract, the Owner may take into consideration skill, facilities, capacity, experience, ability, responsibility, previous work, financial standing of bidder, amount of work being carried on by bidder, quality and efficiency of construction equipment proposed to be furnished, period of time within which proposed equipment is furnished and delivered, and necessity of prompt and efficient completion of work herein described.

1.11 PROPOSAL REQUIREMENTS

- A. Bidder's proposals shall be expressly based on the following items:
 - 1. Instructions to Bidders.
 - 2. Bid Proposal Form.
 - 3. General Conditions.
 - 4. Plans and Specifications.
 - 5. Addenda
- B. Any Contract resulting from the Bidding Documents will incorporate the terms and provisions of said documents. It is intended that these Bidding Documents shall prevail over conflicting terms and conditions of Contractor's proposal. Bidder's printed terms and conditions are NOT considered as exceptions to the Contract.

SECTION 00100

INSTRUCTIONS TO BIDDERS

1.12 BID SECURITY

- A. Accompany bids with a Bid Bond, Certified Check or Bank Draft for an amount of Ten Percent of the Base Bid as a guarantee that, if award is made, the bidder will sign the agreement and furnish the required bonds within five days or forfeit his bid security as liquidated damages, but not as a penalty. Execute Bid Bond on A.I.A. Form A-310, current edition or on form furnished by the Architect.
 - 1. Make Bid Security payable to: Duneland School Corporation.
- B. Where a bid bond is given as the bid security, the bid bond must comply with the rating level required for the performance and payment bond as stated in section 11.4 of the AIA document A201 included in specification section 00700.
- C. The bid security of all except the three lowest bidders will be returned within five days after the award of the Contract.
- D. The bid security of the successful bidder and the two other bidders will be returned promptly after the Owner and the accepted bidder have executed the agreement, and the appropriate bonds and certificates of insurance have been provided by the successful bidder. Bid security of the other Contractor's will be returned promptly after agreement is finalized.

1.13 PERFORMANCE ASSURANCE

- A. Accepted Bidder: Provide a Performance and Labor and Material/Payment bond.
 - 1. Provide a 100 percent Performance Bond on AIA A312.
 - 2. Provide a 100 percent Payment Bond on AIA 312.
 - 3. Deliver bonds within 3 days after execution of the Contract.

1.14 OTHER CERTIFICATIONS AND SUBMITTALS

- A. All bidders must complete and sign the following certifications and submit them with their bid proposals. FAILURE TO DO SO MAY RESULT IN DISQUALIFICATION OF BIDDER.
 - 1. Addendum to Contract for Construction.
 - 2. Certification Regarding Investment Activities in Iran.
 - 3. Contractor's Bid for Public Work - Form 96.
 - 4. Responsible Bidder Form.
 - 5. Fully completed AIA document A305 providing the Contractor's qualifications and references.

1.15 POWER OF ATTORNEY

- A. Attorneys-in-Fact who sign bonds, Agreements or bids must file with each such document a certified and effectively-dated copy of their Power of Attorney.

1.16 EMPLOYMENT AND LABOR PROVISIONS

- A. The Contractor must comply with all Board of School Trustees local policies as outlined in the bidding documents. See Document 00820 – Duneland School Corporation Responsible Bidder Form.
- B. Vendors/Contractors must conform to all federal, state, local and OSHA Regulations now in effect.
- C. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin.

END OF SECTION

SECTION 00300

BID FORM

THE PROJECT AND THE PARTIES

1.1 NAME OF BIDDER: _____

1.2 TO: **MR. GREG LINDY, DIRECTOR OF SUPPORT SERVICES**
DUNELAND SCHOOL CORPORATION
601 WEST MORGAN AVENUE
CHESTERTON, INDIANA 46304

- A. We as contractor having familiarized ourselves with local conditions affecting the work and with the proposed Contract Documents on file at the office of the Owner, hereby propose to perform everything required to be performed and to provide all of the labor, materials, necessary equipment and all utilities and transportation and services necessary to perform and complete in a workmanlike manner all work required to complete the proposed work indicated in the bidding documents for the construction of the 2018 Addition at Brummitt Elementary School, all in accordance with the Drawings and Specifications prepared by the office of Tria Architecture, Inc. including Addenda No. _____, _____ and _____ issued thereto for the sum of:

1. Base Bid for all Work:

(\$ _____ , _____ , _____ . _____)

2. The base bid consists of all Work specified and required by the proposed Contract Documents.

- B. Unit Prices: Should additional work of the following categories be required, adjustments will be made to the Contract Sum at the following Unit Prices, which shall include all expenses, including overhead and profit; should less work be required, the Unit Prices will be 15% less the price quoted for additional work. Refer to Section 01270 for additional information.

- | | | |
|--|----------|-----------------|
| 1. Item: Structural Fill – CA-6 | \$ _____ | Per Cubic Yard |
| 2. Item: Graded Granular Fill – CA-6 | \$ _____ | Per Cubic Yard |
| 3. Item: Open Granular Fill – CA-7 | \$ _____ | Per Cubic Yard |
| 4. Item: Concrete Fill - Lean Concrete | \$ _____ | Per Cubic Yard |
| 5. Item: Remove Unsuitable Material | \$ _____ | Per Cubic Yard |
| 6. Item: Masonry Infill | \$ _____ | Per Square Foot |

- C. Accompanying this proposal is a Bid Security payable to the Board of Education, Duneland School Corporation, which is agreed will be forfeited to the aforementioned as liquidated damages if the undersigned fails to execute the standard form of Owner/Contractor Agreement (AIA Document A101, 2007 Edition, as modified), which is included herein, and furnish evidence of their ability to become bonded and to provide insurance coverage as specified, within five days after notification of the Intent to Award Contract to the undersigned.
- D. In signing and submitting this Bid, the undersigned certifies that all materials and construction to be provided are as indicated in the proposed Contract Documents.
- E. Time of Completion: If awarded the Contract, the bidder agrees to complete all Construction Work and achieve Substantial Completion by August 1, 2018, 5:00 p.m. NOTE: Substantial Completion for this project refers to all work being a minimum of 99% complete. Final Completion for this project refers to all scheduled work, punch-list and closeout items being 100% complete.

SECTION 00300

BID FORM

- F. The space below of the desired Substantial Completion Date has been left blank for insertion of Contractor's own desired Substantial Completion Date, if he feels that the desired date as stated in the specifications cannot be met. Insertion of a date by the bidder does not change the specified Substantial Completion Date unless the Owner chooses to accept the bidder's date when awarding the contract.

1. Specified Substantial Completion Date: August 1, 2018, 5:00 p.m.

2. Contractor's Desired Substantial Completion Date: _____.

- G. Base Bid Breakdown: For the purpose of logical comparison of orders of magnitude in the bids, the Owner requires a global breakdown of the components of the base bid. Contractors are required to provide this breakdown. Failure to do so will subject the bid to rejection. The sum of the following items must equal the Lump Sum Base Bid.

BREAKDOWN:

Division 01:	General Requirements – Allowances:	\$ _____
Division 01:	General Requirements – O&P:	\$ _____
Division 01:	General Requirements – Remaining Items:	\$ _____
Division 02:	Sitework:	\$ _____
	Subcontractor (Legal Name, Address):	_____
Division 03:	Concrete:	\$ _____
	Subcontractor (Legal Name, Address):	_____
Division 04:	Masonry:	\$ _____
	Subcontractor (Legal Name, Address):	_____
Division 05:	Metals:	\$ _____
	Subcontractor (Legal Name, Address):	_____
Division 06:	Wood and Plastic:	\$ _____
	Subcontractor (Legal Name, Address):	_____
Division 07:	Thermal and Moisture Protection:	\$ _____
	Subcontractor (Legal Name, Address):	_____
Division 08:	Doors and Windows:	\$ _____
	Subcontractor (Legal Name, Address):	_____

BID FORM

BID FORM
00300 - 3

SECTION 00300

BID FORM

FIRM NAME: _____

OFFICIAL ADDRESS: _____

Telephone Number: _____ Fax Number: _____

Email Address: _____

By: _____ Date: _____
(Signature)

(Printed/Typed Name and Title)

Where the Bidder is a corporation, add Attest

Secretary (signature) Date (SEAL)

CERTIFIED OR CASHIERS CHECK, BID BOND, OR BANK DRAFT ENCLOSED IN THE
FOLLOWING AMOUNT: \$_____.

END OF BID FORM

SECTION 00410

BID BOND

1.1 BID BOND INFORMATION

- A. KNOW ALL MEN BY THESE PRESENTS, THAT WE _____ as Principal, hereinafter called the Principal, and _____ a corporation duly organized under the laws of the State of Illinois as Surety, are held and firmly bound unto _____ as Oblige, hereinafter called Oblige, in the sum of _____ Dollars (\$ _____), for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.
- B. WHEREAS, the Principal has submitted a bid for: 2018 Addition at Brummitt Elementary School.
- C. NOW, THEREFORE, if the Oblige shall accept the bid of the Principal and the Principal shall enter into a Contract with the Oblige in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Oblige the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Oblige may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.
- D. The bid bond must comply with the rating level required for the performance and payment bond as stated in section 11.4 of AIA document A201.

Signed and sealed this _____ day of _____.

(Principal) (SEAL)

(Witness) (Title)

(Surety) (SEAL)

(Witness) (Title)

SECTION 00440

SUBSTITUTION SHEET

1.1 SUBSTITUTION INFORMATION

- A. All bids shall be based upon the provisions of the proposed Contract Documents.
- B. Bidders desiring to make substitutions for "proprietary brands" specified shall list such proposed substitutions below, together with the amount to be added or deducted from the amounts of their base bids.
- C. The Owner reserves the right to reject all such substitutions, and such substitutions will not be used to determine the low bid.
- D. Complete descriptions and technical data shall accompany all proposed substitutions.
- E. NOTE: Manufacturer's names and material approved by the Architect during the bidding time, but not shown in Addenda, must be listed below if said material is to be considered.

F.	BRAND/MAKE SPECIFIED	PROPOSED	ADD	DEDUCT
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____
10.	_____	_____	_____	_____
11.	_____	_____	_____	_____

NAME OF BIDDER: _____

DATE: _____.

END OF SECTION

SECTION 00495

ADDENDUM TO CONTRACT FOR CONSTRUCTION

This following Addendum to THE Contract for Construction is made by _____ ("contractor") and the Duneland School Corporation ("School Corporation") this ____ day of _____, _____..

The contractor is party to a Contract for Construction with the School Corporation ("Agreement").

The contractor states that it is in compliance with the requirements of Indiana Code 22-5-1.7-11 in that it uses the E-Verify program, as such is defined by Ind. Code 22-5-1.7-3, as such may be amended from time to time, or that it is no longer required to verify the work eligibility status of all newly hired employees if the E-Verify program no longer exists.

Attached to this Addendum is an Affidavit signed on behalf of the contractor and executed in accordance with Ind. Code 22-5-1.7-11(b).

This Addendum is intended to supplement the Agreement between the School Corporation and the contractor, whether oral or in writing.

CONTRACTOR

By: _____

Its: _____

SECTION 00495

ADDENDUM TO CONTRACT FOR CONSTRUCTION

STATE OF INDIANA)
)
COUNTY OF _____)

AFFIDAVIT

The undersigned, being duly sworn upon his oath, does state as follows:

1. He/she is _____ (specify position) of _____
 ("contractor") and has personal knowledge of the facts set forth in this Affidavit.
2. The contractor provides services to the Duneland School Corporation.
3. The contractor does not knowingly employ any unauthorized aliens, as such term is defined by
 Indiana Code 22-5-1.7-9.
4. This Affidavit is made for the purpose of complying with the requirements of Indiana Code 22-5-
 1.7 et seq.

Dated this ____ day of _____, _____.

Further Affiant sayeth not.

I affirm, under the penalties for perjury, that the foregoing representations are true to the best of
my knowledge and belief.

SECTION 00496

CERTIFICATION REGARDING INVESTMENT ACTIVITIES IN IRAN

The CONTRACTOR certifies to the Duneland School Corporation ("OWNER"), as a condition of its contract with the School Corporation that CONTRACTOR is not engaged in investment activities in Iran. Pursuant to Ind. Code §5-22-16.5-8, a firm is considered to be engaging in investment activities with Iran if: (1) it has provided goods or services of Twenty Million Dollars (\$20,000,000.00) or more in value in the energy section of Iran, including oil or liquefied natural gas; or (2) has extended Twenty Million Dollars (\$20,000,000.00) or more in credit to another party, for 45 days or more, if that other party will use the credit to provide goods or services in the energy section in Iran and is, at the time credit is extended, identified on the list developed by the State of Indiana of parties it has determined to be engaged in investment activities in Iran. Be advised that the CONTRACTOR is not listed on the list published and/or endorsed by the State of Indiana pursuant to Ind. Code §5-22-16.5-9 as a company engaged in investment activities with Iran.

Dated this _____ day of _____, 201__.

CONTRACTOR:

By: _____

Its: _____

SECTION 00497

CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96



CONTRACTOR'S BID FOR PUBLIC WORK - FORM 96

State Form 52414 (R2/2-13) / Form 9B (Revised 2013)

Prescribed by State Board of Accounts

PART I

(To be completed for all bids. Please type or print)

Date (month, day, year): _____

1. Governmental Unit (Owner): _____

2. County: _____

3. Bidder (Firm): _____

Address: _____

City/State/ZIP code: _____

4. Telephone Number: _____

5. Agent of Bidder (if applicable): _____

Pursuant to notices given, the undersigned offers to furnish labor and/or material necessary to complete the public works project of _____

(Governmental Unit) in accordance with plans and specifications prepared by _____

_____ and dated _____ for the sum of

_____ \$ _____

The undersigned further agrees to furnish a bond or certified check with this bid for an amount specified in the notice of the letting. If alternative bids apply, the undersigned submits a proposal for each in accordance with the notice. Any addendums attached will be specifically referenced at the applicable page.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract if accepted by the governmental unit. If the bid is to be awarded on a unit basis, the itemization of the units shall be shown on a separate attachment.

The contractor and his subcontractors, if any, shall not discriminate against or intimidate any employee, or applicant for employment, to be employed in the performance of this contract, with respect to any matter directly or indirectly related to employment because of race, religion, color, sex, national origin or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

SECTION 00497

CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96

CERTIFICATION OF USE OF UNITED STATES STEEL PRODUCTS
(If applicable)

I, the undersigned bidder or agent as a contractor on a public works project, understand my statutory obligation to use steel products made in the United States (I.C. 5-16-6-2). I hereby certify that I and all subcontractors employed by me for this project will use U.S. steel products on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

ACCEPTANCE

The above bid is accepted this _____ day of _____, _____, subject to the following conditions: _____

Contracting Authority Members:

_____	_____
_____	_____
_____	_____

PART II

(For projects of \$150,000 or more - IC 36-1-12-4)

Governmental Unit: _____

Bidder (Firm): _____

Date (month, day, year): _____

These statements to be submitted under oath by each bidder with and as a part of his bid. Attach additional pages for each section as needed.

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed for the period of one (1) year prior to the date of the current bid?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

SECTION 00497

CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96

2. What public works projects are now in process of construction by your organization?

Contract Amount	Class of Work	Expected Completion Date	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you? _____ If so, where and why?

4. List references from private firms for which you have performed work.

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed work. (Examples could include a narrative of when you could begin work, complete the project, number of workers, etc. and any other information which you believe would enable the governmental unit to consider your bid.)

2. Please list the names and addresses of all subcontractors (i.e. persons or firms outside your own firm who have performed part of the work) that you have used on public works projects during the past five (5) years along with a brief description of the work done by each subcontractor.

SECTION 00497

CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96

3. If you intend to sublet any portion of the work, state the name and address of each subcontractor, equipment to be used by the subcontractor, and whether you will require a bond. However, if you are unable to currently provide a listing, please understand a listing must be provided prior to contract approval. Until the completion of the proposed project, you are under a continuing obligation to immediately notify the governmental unit in the event that you subsequently determine that you will use a subcontractor on the proposed project.

4. What equipment do you have available to use for the proposed project? Any equipment to be used by subcontractors may also be required to be listed by the governmental unit.

5. Have you entered into contracts or received offers for all materials which substantiate the prices used in preparing your proposal? If not, please explain the rationale used which would corroborate the prices listed.

SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of bidder's financial statement is mandatory. Any bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the contract must be specific enough in detail so that said governing body can make a proper determination of the bidder's capability for completing the project if awarded.

SECTION IV CONTRACTOR'S NON- COLLUSION AFFIDAVIT

The undersigned bidder or agent, being duly sworn on oath, says that he has not, nor has any other member, representative, or agent of the firm, company, corporation or partnership represented by him, entered into any combination, collusion or agreement with any person relative to the price to be bid by anyone at such letting nor to prevent any person from bidding nor to include anyone to refrain from bidding, and that this bid is made without reference to any other bid and without any agreement, understanding or combination with any other person in reference to such bidding.

He further says that no person or persons, firms, or corporation has, have or will receive directly or indirectly, any rebate, fee, gift, commission or thing of value on account of such sale.

SECTION 00497

CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96

SECTION V OATH AND AFFIRMATION

I HEREBY AFFIRM UNDER THE PENALTIES FOR PERJURY THAT THE FACTS AND INFORMATION CONTAINED IN THE FOREGOING BID FOR PUBLIC WORKS ARE TRUE AND CORRECT.

Dated at _____ this _____ day of _____, _____

(Name of Organization)

By _____

(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)
COUNTY OF _____) ss

Before me, a Notary Public, personally appeared the above-named _____ and swore that the statements contained in the foregoing document are true and correct.

Subscribed and sworn to before me this _____ day of _____, _____.

Notary Public

My Commission Expires: _____

County of Residence: _____

SECTION 00497

CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96

Part of State Form 52414 (R2/2-13) / Form 96
(Revised 2013)

BID OF

(Contractor)

(Address)

FOR
PUBLIC WORKS
PROJECTS
OF

Filed

Action taken

SECTION 00700

GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

- 1.1 AIA Document A201, General Conditions of the Contract for Construction, 2007 Edition, attached, is the General Conditions between the Owner and Contractor.**
- 1.2 A Letter of Intent to Award a Construction Contract will be issued to the approved contractor upon approval of the Owner. This Letter of Intent shall serve as the Notice to proceed and the Contract for Construction, with all the terms and conditions referenced in the contract documents, until the contract, referenced above, has been fully executed. The awarded contractor shall begin all construction services as specified upon receipt of this Letter of Intent.**

END OF SECTION

DRAFT AIA[®] Document A201[™] – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

«Duneland School Corporation - General»

« _ »

THE OWNER:

(Name, legal status and address)

«Duneland School Corporation»« _ »

«601 West Morgan Ave.
Chesterton, Indiana 46304»

THE ARCHITECT:

(Name, legal status and address)

«Tria Architecture, Inc.»« _ »

«901 McClintock Drive, Suite 100
Burr Ridge, Illinois 60527»

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1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 11.4.1, 13.2, 13.4.2, 15.4.4.2

Written Interpretations

4.2.11, 4.2.12

Written Notice

2.3, 2.4, 3.3.1, 3.9, 3.12.9, 3.12.10, 5.2.1, 8.2.2, 9.7, 9.10, 10.2.2, 10.3, 11.1.3, 12.2.2, 12.2.4, **13.3**, 14, 15.4.1

Written Orders

1.1.1, 2.3, 3.9, 7, 8.2.2, 12.1, 12.2, 13.5.2, 14.3.1, 15.1.2

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, consist of the Invitation to Bid, Instruction to Bidders, Bid Form, Agreement between Owner and Contractor (hereinafter the Agreement),~~ Conditions of the Contract (General, Supplementary and other Conditions), Drawings, ~~Specifications, Addenda Schedules, 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 of the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) 2) a Change Order, 3) a Construction Change Directive, 4) an Architect's Supplemental Instruction, or 5) a written order for a minor change in the Work issued by the Architect.~~ Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.work issued by the Architect.

§ 1.1.2 THE OWNER

The term "Owner" shall refer to the Duneland School Corporation, which shall also be referred to as the "School Corporation."

1.1.3 THE CONTRACT

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

§ 1.1.3 THE WORK

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

§ 1.1.4 THE PROJECTTHE WORK

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

§ 1.1.5 THE DRAWINGSTHE PROJECT

~~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.~~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.

§ 1.1.6 THE SPECIFICATIONSTHE DRAWINGS

~~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.~~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. Figured dimensions shall be followed in preference to measurements by scale. All shall be checked against field measurements of existing conditions to be taken by the Contractor.

§ 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. 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.

§ 1.1.8 INITIAL DECISION MAKER

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.

§ 1.1.9 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.

1.1.10. MISCELLANEOUS DEFINITIONS

1.1.10.1 The term "Fabricated" as used throughout the Contract Documents is hereby defined to mean items specifically assembled or made of selected materials or components to meet individual design requirements.

1.1.10.2 The term "Furnish" as used throughout the Contract Documents is hereby defined to mean materials or items to be furnished.

1.1.10.3 The term "Install" as used throughout the Contract Documents is hereby defined to mean materials or items furnished by other trades shall be installed only. Such materials or items shall be received at the site, unloaded, stored, protected, and installed in place, including connections, auxiliary items, and other work required for a complete and functioning installation, unless any such work is specifically excluded.

1.1.10.4 The term "Provide" as used throughout the Contract Documents is hereby defined to mean "furnish and install."

1.1.10.5 The phrase "Shop Fabricated" or "Shop Made" as used throughout the Contract Documents is hereby defined as items made by a contractor or subcontractor in their own Shop.

1.1.10.6 The words "Contractor shall" are implied and shall be so understood wherever a direction or instruction is stated in the imperative sense.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. all.

§ 1.2.1.1 Where conflicts exist within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes and ordinances, the more stringent, or higher quality or greater quantity requirements shall apply. Large-scale drawings take precedence over small-scale drawings, figured dimensions over scaled dimensions and noted materials over graphic representations.

§ 1.2.1.2 The specifications are of the abbreviated type and may include incomplete sentences. Omissions of phrases such as "The Contractor shall" or "conforming to the requirements of" is intentional; omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the drawings. Words in singular shall include a plural whenever applicable, or the context so indicates.

§ 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.

§ 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.

§ 1.2.3.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities: 1) The Agreement, 2) Addenda, with those of later date having precedence over those of earlier date, 3) The General Conditions of the Contract for Construction, 4) Drawings and Specifications.

§ 1.2.3.2 In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Architect's interpretation. Large scale drawings shall take precedence over small scale drawings; figured dimensions on the drawings over scaled dimensions and noted material over graphic representations.

§ 1.3 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. The descriptive headings of this Agreement are inserted for convenience only and shall not control or affect the meaning or construction of any provisions following them.

§ 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, 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 is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. 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.

~~§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such~~

information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 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, 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. Documents.~~

§ 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.

§ 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, 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. This right shall be in addition to and not in restriction or derogation of the Owner's rights under Article 14 hereof

§ 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 ~~ten day~~ seven day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner ~~may, may immediately~~ 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 including, but not limited to, attorney's fees,~~ compensation for the Architect's additional services and expenses made necessary by such default, neglect or failure. Such ~~action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If Change Order shall be deemed signed by the Contractor for the purposes stated in Section 7.2.1 even if the Contractor fails to physically sign such Change Order. If the~~ payments then or thereafter due the Contractor are not sufficient to cover such ~~amounts, the Contractor shall pay the difference to the Owner; amount, at the Owner's option, the excess shall be deducted from any payment thereafter due or shall be paid by the Contractor immediately upon demand of the Owner.~~

§ 2.5 ADDITIONAL RIGHTS

The rights stated in Article 2 shall be in addition and not in limitation of any other rights of the Owner granted in the Contract Documents or at law or in equity.

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.

§ 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~~ has inspected the local conditions under which the Work is to be ~~performed and correlated personal observations with requirements of the Contract Documents~~ performed, has reviewed the Contract Documents, and correlated personal observations and inspections, and the bid, with all of the requirements of the Contract Documents.

§ 3.2.1.1 It shall be the duty of the Contractor to verify all dimensions given on the Drawings, and to report any error or inconsistency to the Architect before commencing work.

§ 3.2.1.2 If the Contractor finds any details, construction procedures or materials shown on the Drawings or called for in the Specifications which he believes are not satisfactory for the use shown, he shall so notify the Architect at least 5 days before bids are due. Signing of the contract and starting work by the Contractor shall indicate his agreement with all details, construction procedures, and materials so shown and/or specified and shall indicate his willingness to construct the project in strict accordance with these Documents and to guarantee the complete project in full compliance with the warranty provisions of the Contract Documents. By executing this contract, the Contractor further acknowledges that he has satisfied himself as to the nature and location of the Work, the general and local conditions, including those bearing upon transportation, disposal, 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 subsurface 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 affect the Work or the cost thereof under the Contract. 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 the Contract.

§ 3.2.1.3 If work is required in a manner to make it impossible to produce work of the quality required by the Contract, or should discrepancies appear among the Contract Documents, the Contractor shall request in writing an interpretation from the Architect before proceeding with the Work. If the Contractor fails to make such a request, the Architect shall determine the quality of the work required, consistent with the Contract Documents, or 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.

§ 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~~ The Contractor shall promptly report to the Owner and the Architect any 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 Contractor shall not be liable to the Owner or Architect for damage resulting from errors, inconsistencies, or omissions in the Contract Documents unless the Contractor recognized or should have recognized such error, inconsistency, or omission, and failed to report it to the Architect, in which case the Contractor shall not be entitled to an increase in the Contract Sum or Contract Time and the Contractor shall bear all attributable costs for correction. The Contractor agrees to release and hold harmless the Owner for errors, inconsistencies or omissions in the Contract Document.

~~§ 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.~~

~~§ 3.2.2.1 The exactness of grades, elevations, dimensions, existing conditions, 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.~~

~~§ 3.2.2.2 The Contractor shall, therefore, satisfy himself as to the accuracy of all grades, elevations, existing conditions, dimensions and locations. In all cases of interconnection of the Contractor's work with existing or other work, the Contractor shall 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, existing conditions, locations or dimensions shall be promptly rectified by him without extra cost to the Owner.~~

~~§ 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 obligations in Sections 3.2.2 and 3.2.3, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies, or omissions in the Contract Documents, Documents or for differences 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, unless the Contractor recognized or should have recognized the error, inconsistency, omission, or difference and failed to report it.~~

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. ~~If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner required means, methods, techniques, sequences or procedures. The Contractor shall review any construction or installation procedure (including those recommended by any product manufacturer). The Contractor shall provide written notice to the Architect:~~

- ~~(a) If a specified product deviates from good construction practices.~~
- ~~(b) If following the Specifications will affect any warranties.~~
- ~~(c) Any objections which the Contractor may have to the Specifications.~~

~~The responsibilities imposed on the Contractor by this Section shall be in addition to, and not be limited by, any and all other provisions of these Contract Documents.~~

§ 3.3.2 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 the approved superintendent described in Section 3.9.3. The Contractor shall be liable for all property damage including repairs or replacements of the Work and economic losses which proximately result from the breach of this duty. The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, ~~Subcontractors~~ Subcontractors, and their agents and employees, and any other persons or entities performing portions of the Work for, or on behalf of, the ~~Contractor or any of its Subcontractors~~ Contractor, any of its Subcontractors, or claiming by, through or under the Contractor, and for any damages, losses, costs, and expenses resulting from such acts or omissions.

§ 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 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 of or performed by persons other than the Contractor.

§ 3.3.5 The Contractor shall coordinate all portions of the work with separate Owner-employed contractors, if any.

§ 3.3.6 The Contractor shall assign a competent, technically-trained office project manager to this project who shall perform all office functions including checking, approving and coordinating shop drawings and approving purchasing and disbursement pay-out requests and correspondence, and responding to Owner inquiries.

§ 3.4 LABOR AND MATERIALS

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

§ 3.4.2 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 written consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

By making requests for substitutions hereunder, the Contractor:

- .1 represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
- .2 represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;
- .3 certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and
- .4 will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

§ 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 be responsible for any damages to property or injuries to persons, or to any other harm, caused by the Contractor's employees.

§ 3.4.4 After the Contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in Section 7.5.

§ 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 free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. 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, 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.~~

§ 3.6 TAXES

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

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new, unless otherwise required or permitted by the Contract Documents and that the Work will be free from faults and defects and in conformance with the Contract Documents. The warranty will not be affected by the specification of any product or procedure, unless the Contractor objects promptly to such product or procedure and advises the Architect of possible substitute products or procedures which will not affect the warranty. This warranty shall not be restricted by the limitations of any manufacturer's warranty. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective in the Owner's sole discretion. Inability or refusal of the Subcontractor or supplier responsible for the defective work to correct such work shall not excuse the Contractor from performing under the warranty. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 Unless an alternative guaranty is specified in a particular division of the Specifications that is longer in duration than one (1) year, the Work shall be guaranteed by the Contractor against defect in material and workmanship for a period of one (1) year from the date of final completion (date of issuance of final payment to the contractor).

§ 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. The Contractor shall secure all permits, licenses and inspections necessary for proper execution and completion of the Work that which are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded, which are legally required when bids are received.~~

§ 3.7.1.1 All cash deposits, bonds, fees, inspections, licenses, or permit fees shall be paid for by the Contractor.

§ 3.7.1.2 Prior to submission of all applications for permits, licenses or inspections the Contractor shall submit a copy of the application or written notice to the Owner for approval.

§ 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 observes that portions of the Contract Documents are at variance with applicable laws, statutes, ordinances, building codes, and rules and regulations, the Contractor shall promptly notify the Architect and Owner in writing to be addressed by the Architect and Owner. If the Contractor performs Work knowing it to be contrary to any 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 damages, losses, costs and expenses 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 21 days after first observance of the conditions, disturbed.~~ 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. The site conditions contemplated by this Section include, but are not limited to, materials containing asbestos, polychlorinated biphenyl (PCB), or hazardous materials as defined in the Contract Documents.

§ 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~~ competent, English speaking superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications by the superintendent shall be confirmed in writing. Other communications by the superintendent shall be similarly confirmed on written request in each case. Failure of the superintendent to supervise the job properly shall be deemed as a default under the Contract documents as determined by the Owner with the advice of the Architect.

§ 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, and Architect's written consent.

§ 3.9.4 The Contractor's superintendent must be dedicated solely to this project and must be at the project site each day and at all times that Work is being performed at the site, whether the work is performed by the Contractor's own forces or by any subcontractors. The superintendent must be at the project site from the first day of on-site activities until a minimum of fourteen (14) days after the date of Substantial Completion. Failure by the Contractor to provide full-time on-site supervision shall constitute grounds for termination of the Contract by the Owner with seven days written notice.

§ 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 ~~information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised~~ review the Contractor's Construction Schedule for the Work of the Contractor. Such Construction Schedule shall not exceed the completion dates, delivery dates or time limits included in the Contract Documents. The Construction Schedule, with the Owner's and Architect's review, shall be revised by the Contractor at appropriate 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.

§ 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, and keep current, for the Architect's record only, a schedule of submittals (the "Submittal Schedule") which is coordinated with the Contractor's Construction Schedule and allows the Architect reasonable time, as indicated in the Contract Documents, to review submittals. Neither the Contractor's preparation of the Submittal Schedule nor the Architect's receipt or review shall modify the Contractor's responsibility to make required submittals or to do so in a timely manner to provide for review in accordance with Section 4.2.7 as modified herein.~~

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect. ~~The Owner's or Architect's silence to a submitted schedule that exceeds time limits current under the Contract Documents shall not relieve the Contractor of its obligations to meet those limits, nor shall it make the Owner or Architect liable for any of the Contractor's damages incurred as a result of increased construction time or not meeting those time limits. Similarly, the Architect's or 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.~~

§ 3.10.4 At the time of each Application for Payment, the Contractor shall provide to the Owner and the Architect an update on the project schedule and a written status report, which includes a description of the progress of the Work and, of progress is behind schedule, the Contractor's plan to recover the original schedule. The report shall also include a summary of the Contractor's meetings with subcontractors.

§ 3.10.5 The Contractor shall hold meetings at least weekly (or at such intervals as are otherwise acceptable to the Owner and Architect at the site. The Contractor shall provide the subcontractors, Architect and the Owner with a schedule. The Contractor shall require subcontractors currently working at the site(s) to have a representative present for such meetings.

§ 3.10.6 Within twenty-one (21) days of the award of the Contract, the Contractor shall provide a written report to the Architect and the Owner that includes a list of the Contractor's suppliers, a list of materials and equipment to be purchased from suppliers and fabricators, the time required for fabrication, and the scheduled delivery dates for materials and equipment. Copies of the Contractor's purchase orders shall be delivered to the Architect and the Owner as soon as possible after receipt by the Contractor.

§ 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~~ These, along with all operating manuals for all equipment, shall be available to the Architect ~~and shall be at all times and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed, after completion of the Work but before the final Application for Payment.~~

§ 3.11.1 The Contractor shall maintain at the site(s) one record copy for the Owner and Architect the plans and specifications of concealed work, particularly concealed piping and conduit. Any deviations from conditions shown on the Contract Drawings shall be shown and dimensioned on these field record drawings. Contractor shall develop layout drawings for concealed work that is schematically indicated on Contract Drawings in order to have dimensioned layouts of such concealed work. This requirement does not authorize any deviations without approval of the Architect.

§ 3.11.1.1 The field information to be so marked shall include at a minimum:

- (1) Significant deviations of any nature made during construction;
- (2) Location of underground mechanical and electrical services, utilities, and appurtenances, referenced to permanent surface improvements.
- (3) Location of mechanical and electrical services, utilities, and appurtenances that are concealed in the building, referenced to accessible features of the building.

§ 3.11.2 The Contractor and their Subcontractors shall maintain at the site(s) an accurate record of deviations and changes from the Contract Documents which occur in the work; shall indicate all such deviations and changes on reproducible transparencies of the Contract Documents; and shall turn over to the Architect 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 electronic AutoCAD base plan backgrounds shall be furnished by the Architect. The cost of recording and transferring the changes or deviations to the transparencies shall be included in the contract price for the respective work. The as-built transparencies shall be delivered by the Contractor to the Architect prior to the final acceptance of the Project and issuance of final payment.

§ 3.11.2.1 From the field record prints of the Contract Drawings, the Contractor shall furnish and prepare on compact disk in AutoCAD format, a complete set of field record drawings, completely dimensioned to show all changes made during the course of the Work. Mechanical and Electrical field record drawing shall locate by dimensions each run of concealed pipe and conduit. Upon completion of the Work, the Contractor and each Subcontractor shall deliver and submit to the Architect a full set of all field record drawings, relating to the Work, on compact disk in AutoCAD format and two sets of full size prints.

§ 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 specify 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 limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents on the accuracy and completeness of such certifications.~~

§ 3.13 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.

§ 3.13.1 Only material and equipment which is to be used directly in the construction of this Project shall be brought to and stored on the job site by the Contractor. After equipment is no longer needed on this Project, it shall be promptly removed from the job site. Protection of all construction materials and equipment stored at the Job Site is the sole responsibility of the Contractor.

§ 3.13.2 The Contractor and its subcontractors, and their respective employees, agents, and consultants, shall not enter any part or portion of the building work sites when students are present without the Owner's written authorization.

§ 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 prior 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. Contractor's consent shall not be required.

§ 3.14.3 Only tradespersons skilled and experienced in cutting and patching shall perform such work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project. The Contractor shall remove and clean up hazardous materials in accordance with these General Conditions.

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

§ 3.15.3 All exterior and interior work shall be cleaned using specific materials as recommended for surfaces to be cleaned. Damage to any surfaces due to improper cleaning methods of materials shall be repaired to the satisfaction of the Architect and Owner, by the Contractor, at no cost to the Owner.

§ 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, thereof~~ including, but not limited to, attorney's fees, 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;~~ Documents except to the extent of Contractor's fault, 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 indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against law.~~ Contractor waives any right of contribution against and shall defend, indemnify and hold harmless Owner, any Owner's Representative, the Architect and their agents, consultants and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from or in connection with the performance of the Work, provided that any such claim, damage, loss or expense ~~is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a~~ (these are collectively referred to as "claims") is caused in whole or in part by any negligent act or omission of Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts they any of them may be liable, regardless of whether or not such claim, damage, loss or expense it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate,

abridge, or ~~reduce other rights or obligations of indemnity that would otherwise exist as to a~~ otherwise reduce any other right or obligation of indemnity or contribution which would otherwise exist as to any party or person described in this ~~Section 3.18.~~ Contract. The Contractor shall have exclusive responsibility to comply with the requirements of the Structural Work Act. The obligations of the Contractor under this Section 3.18.1 shall be construed to include, but not be limited to, injury or damage consequent upon failure to use or misuse by the Contractor, his agents, Sub-Contractors, 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 Owner under the requirements of the Illinois Structural Work Act. It is understood that this excludes use by Owner, Architect or his Agents or Employees.

§ 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.~~ The Contractor shall, and hereby covenants and agrees to indemnify, defend, save and hold harmless the following indemnitees: The Owner, its Architects, Board Members, Officers, Agents, and Employees, individually and collectively, from all claims, demands, actions and the like, of every nature and description, made or instituted, by Third Parties, arising or alleged to arise out of the work under this contract, as a result of any act or omission of either the Contractor or any Subcontractor, or any of their employees or agents. Contractor and Subcontractor shall name the Owner, its Architects, Board Members, Officers, Agents and Employees, individually and collectively, as additional insured as primary coverage without limitation on their general liability policies. Contractor and Subcontractor/s shall furnish Owner with copies of such policies prior to beginning any work.

§ 3.18.3 "Claims, damages, loses and expenses" as these words are used in this Contract shall be construed to include, but not be limited to (1) injury or damage consequent upon the failure of or use or misuse by Contractor, its Subcontractors, agents, servants or employees, of any hoist, rigging, blocking, scaffolding, or any and all other kinds of items of equipment, whether or not the same be owned, furnished or loaned by Owner; (2) all attorneys' fees and costs incurred in defense of the claim or in bringing an action to enforce the provision of this Indemnity or any other indemnity contained in the Contract Documents; and (3) all costs, expenses, lost time, opportunity costs, etc. incurred by the party being indemnified or its employees, agents or consultants.

§ 3.18.4 In the event that any party is requested but refuses to honor the indemnity obligations hereunder, then the party indemnifying shall, in addition to all other obligations, pay the cost of bringing any such action, including attorneys' fees, time expended by the party being indemnified and their employees in the defense of any litigation covered by this indemnity provision at their usual rates plus cost of travel, long distance telephone calls and reproduction of documents to the party requesting indemnity.

§ 3.18.6 Contractor shall include in each and every contract with any and all subcontractors and/or material suppliers performing Work and require each and every subcontractor and/or material supplier performing Work to agree to be bound by all of the provisions 3.18.1 through 3.18.9 under the Contract Documents.

§ 3.18.7 Contractor's indemnity obligations hereunder shall, but not by way of limitation, specifically include all claims and judgments which may be made against the indemnitees under federal or state law or the law of the other governmental bodies having jurisdiction, and further, against claims and judgments arising from violation of public ordinances and requirements of governing authorities due to Contractor's or Contractor's employees method of execution of the Work.

§ 3.18.9 The Contractor shall indemnify and hold harmless the Owner in the event of labor or trade union conflicts or disputes between the Contractor and subcontractors and their respective employees. The Contractor shall endeavor to adjust and resolve such conflicts and disputes which affect the timely completion of the Work. Such conflicts or disputes shall not be a basis or excuse for the violation of the Contract Documents by the Contractor or its subcontractors, and shall not provide the Contractor with relief from meeting all time limits for Substantial Completion or Final Completion. Labor or trade union disputes that effect production or delivery of materials or equipment, or their installation, shall be at no cost to the Owner. The Contractor shall notify the Architect and the

Owner in writing as soon as possible as to any labor or trade disputes which may affect the Work and its timely completion. In such event, the Contractor shall provide a written proposal to the Architect and the Owner which includes any comparable substitution(s) necessary to complete the Work.

§ 3.18.10 None of the foregoing provisions shall deprive the Owner or the Architect of any action, right or remedy otherwise available to them or either of them at law.

§ 3.19 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, 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, the Architect may require that other material or equipment of equal kind and quality be provided at no additional cost to the Owner.

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~~ Owner 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.

§ 4.1.4 The Architect's and their consultants' services will terminate sixty (60) days after (1) the date of Substantial Completion of the Work or (2) the anticipated date of Substantial Completion identified in Specifications, whichever is earlier. Any work required of the Architect and their consultants after this date will be back-charged to the Contractor by the Owner.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. 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, as agreed to by Owner and Architect~~ 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 Work to endeavor to determine that the Work, when completed, will be in~~ accordance with the Contract ~~Documents. Documents, and to endeavor to guard the Owner against defects and deficiencies in the Work.~~ However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not 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 Documents.~~

§ 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 separate contractors shall be through the Owner. However, this Section shall not be deemed to prohibit direct communication between the Owner and the Architect.

§ 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. The Contractor shall provide to the Architect (1) mechanics lien waivers, (2) certified payroll statements and documentation as per the Indiana Common Construction Wage Act and (3) sworn statements listing subcontractors and materialmen before issuing Payment Certificates, and if such sworn statement or waivers are not provided, the Architect's Certificates shall be conditioned upon and subject to the receipt of such waivers.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Any Work rejected by the Architect shall be reported promptly to the Owner in writing. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 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.

§ 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, but only for the limited purpose of checking for conformance with information given and the design concept expressed in 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, or~~ of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. The Contractor will give submittals to the Architect in a manner to allow for the Architect's reasonable prompt review and to allow for timely ordering of components of the Work to affect no delay in the Work.

§ 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~~. 9.10; however, the issuance of such final Certificate of Payment shall not bind the owner to any payment unless it accepts such final Certificate for Payment. Owner's acceptance shall not be unreasonably withheld. Additionally, the Architect shall review all warranties and related documents and provide a recommendation to the Owner as to whether they comply with the Contract Documents.

§ 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 initially interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If the Contractor submits such written request to the Architect, the Contractor will simultaneously provide a copy of such request to the Owner. The Architect will consult with the Owner regarding any request by the Contractor before responding to the Contractor.

§ 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~~faith and in the absence of negligence.

§ 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. The Architect will provide the Owner with a copy of any response provided pursuant to this Section.

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, Prior to executing the Contract, the Contractor~~ 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.~~

§ 5.2.1.1 In addition to the information which may be required prior to the execution of the Contract, not later than twenty-one (21) days after Notice of Award of the Contract, the Contractor shall furnish to the Owner through the Architect the names of persons or entities proposed as manufacturers for each of the products identified in the General Requirements and, where applicable, the name of the installing Subcontractor.

§ 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. All contracts between the Contractor and subcontractors shall be made in writing, shall be assignable to the Owner, and shall contain the following sentence, 'The Owner is an intended third party beneficiary of this subcontract.

§ 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 objection. No additional costs shall be allowed for a change required due to an objection by the Owner, Contractor, or Architect.~~

~~§ 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 without written approval of the Owner. The Contractor further acknowledges and agrees that after award of the Contract to the Contractor, any savings on changes to contracts with subcontractors or substitute subcontractors will be for the benefit of the Owner and will not be used for the benefit of the Contractor or to increase the Contractor's profit on the Project. The foregoing benefit to the Owner shall include any adjustment in the amount of the price of a contract to less than the quoted price of the subcontractor upon which the Contractor's fixed bid price or Contract Sum was based. Further, if a manufacturer or supplier of any machinery or equipment, including but not limited to heating and air conditioning units or systems, changes specifications or offers incentives, discounts or lower prices after award of the Contract to the Contractor, those savings will inure to the benefit of the Owner and not the Contractor, subcontractor, manufacturer or supplier.~~

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate ~~agreement, written where legally required for validity, written agreement,~~ the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, 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.

~~§ 5.3.1 The Contractor shall be responsible for any and all Subcontractors working under him and shall carry insurance for all Subcontractors or ensure that they are carrying it for themselves so as to relieve the Owner, Architect and Architect's Consultants of any and all liability.~~

~~§ 5.3.2 The Owner and Architect assume no responsibility for overlapping or omission of parts of the Work by various Subcontractors in their Contracts with the Contractor.~~

§ 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: subrogation, without altering the Owner's agreement with the Contractor.~~

§ 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 or 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 clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

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

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

§ 7.1.4 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 provided all reasonable costs for completing the work including overtime and acceleration costs are included in the Change Order.

§ 7.1.5 If a proposal for additional work is requested by the Owner from the Contractor 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, and bond and insurance costs.

§ 7.1.7 For any adjustments to the Contract Sum based on other than the unit price method, overhead, profit, and general conditions combined shall be calculated at the following percentages of the cost attributable to the change in the work:

- .1 For the Contractor for Work performed by the Contractor's own forces, ten percent of the cost.
- .2 For the Contractor, for Work performed by the Contractor's Subcontractors five percent of the amount due the Subcontractor.
- .3 For each Subcontractor or Sub-subcontractor involved, for Work performed by that Subcontractor's or Sub-subcontractor's own forces, ten percent of the cost.
- .4 For each Subcontractor, for Work performed by the Subcontractor's Sub-subcontractors, five percent of the amount due the Sub-subcontractor.
- .5 Costs to which overhead, profit, and general conditions is to be applied shall be determined in accordance with Sub-Sections 7.3.6.1 through 7.3.6.5.
- .6 When both additions and credits are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any;

§ 7.1.8 In order to facilitate checking of quotations for extras or credits, all proposals shall be accompanied by:

- .1 A complete itemization of costs including labor, material.
- .2 Subcontractor's, Sub-subcontractor's and material suppliers for their portions of the work itemized to include labor, material.
- .3 Labor costs shall be indicated hourly wage and fringe benefits. Labor hours shall be provided for each phase of the work.
- .4 Material costs shall include unit costs and units required where applicable.

§ 7.1.9 The Contractor understands that change orders to the contract which increase or decrease the cost by \$10,000 or more, or the time of completion by 30 days or more, will require written documentation by the Owner that the changes:

- .1 were not reasonably foreseeable at the time the contract was signed;
- .2 were not within the contemplation of the contract as signed; and
- .3 are in the best interest of the district or region and authorized by law.

§ 7.1.10 The Contractor shall provide written notice to the Architect and the Owner if overtime labor rates are included in the computation of the cost of a proposed Change Order or Construction Change Directive.

§ 7.1.11 In the event that the Contractor and the Owner do not reach agreement on a Change Order or a Construction Change Directive, the Owner may, in its discretion, delete the labor, materials and equipment that are the subject of the Change Order or the Construction Change Directive from the Work to be performed under the Contract Documents. The Owner shall receive credit from the Contractor for the labor, materials, and equipment, including Contractor overhead and profit attributable to the deleted work. The Owner may complete the deleted work through another contractor or subcontractor.

§ 7.2 CHANGE ORDERS

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

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

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 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. Upon resolution of exact scope, Contract Sum change, and Contract Time change, a Change Order shall be prepared incorporating the Construction Change Directive.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect 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, or if no such amount is set forth in the Agreement, a reasonable amount. 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~~ Actual costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
2. ~~Costs~~ Actual costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
3. Rental actual costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
4. ~~Costs~~ Actual costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
5. Additional actual costs of supervision and field office personnel directly attributable to the change. Cost of supervision, unless directly attributable to change, will not be allowable as an itemized cost for any additions (or credited for deletions) unless a change in the Contract Time is made.

Overtime when specifically authorized by the Owner shall be paid for by the Owner on the basis of a premium payment only, plus the cost of insurance and taxes based on the premium payment. Overhead and profit will not be paid by the Owner for overtime. Field tickets must be signed by the Owner or Architect for verification of overtime hours.

§ 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 computed in accordance with Section 7.3.7~~ 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, increase or decrease~~, if any, with respect to that change. Also, if the amount of either the credit or the addition is in dispute, the amount of the other, non-disputed item may not be included in Applications for Payment. Overhead and profit will be included in credits to the same extent they are included in additions.

§ 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.

§ 7.3.11 Change Orders that result in a net decrease in or credit to the Contract Sum must include a credit to the Owner for the Contractor's overhead and profit as described in Section 7.1.7.

§ 7.4 MINOR CHANGES IN THE WORK

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

§ 7.5 SUBSTITUTIONS

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 interpretation of code requirements or insurance regulations then existing.
- (b) Unavailability of specified products, through no fault of the Contractor.
- (c) Subsequent information discloses inability of specified products to perform properly or to fit in designated space.
- (d) Manufacturer/fabricator refuses to certify or guarantee performance of specified product as required.
- (e) When it is clearly seen, in the judgment of the Architect and with the Owner's approval, that a substitution would be substantially to the Owner's best interests, 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.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

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

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

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

§ 8.1.4 The term "day" as used in the Contract Documents shall mean ~~calendar day unless otherwise specifically defined~~ working day, excluding weekends and legal 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 knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. The Contractor shall bear all additional costs incurred to meet the Contract Time, which may require working overtime without additional compensation.

§ 8.2.4 The Contractor shall reimburse the Owner for all fees or expenses, including without limitation, the Architect, engineers and legal expenses, for additional services necessitated by Contractor's failure to obtain Substantial Completion within the time established in the agreement and for more than two (2) inspections for Substantial Completion or final inspection.

§ 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 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, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner ~~pending mediation and arbitration; or by other causes that the Architect determines~~ or by other causes which the Architect and Owner determine, in their sole

discretion, may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect and Owner may determine.

§ 8.3.2 ~~Claims relating to time shall be made in accordance with applicable provisions of Article 15. The Contractor shall not be entitled to recover from the Owner, and hereby waives all rights that it or its subcontractors or any other person may otherwise have to recovery, any costs, expenses and damages of any nature that it or its subcontractors or any other person may suffer by reason of delay in the performance of the Work or any portion thereof, the extension of Contract Time granted herein being the Contractor's sole and exclusive remedy.~~

§ 8.3.3 ~~The Contractor shall not be entitled to any increase in the Contract Sum as a result of any delays in the progress of the Work. The Contractor's sole remedy for delay shall be an extension of time. This Section 8.3 does not preclude recovery of damages for or delay by either party the Owner under other provisions of the Contract Documents.~~

§ 8.3.4 ~~Notwithstanding other provisions in this Contract, Contractor shall not be entitled to any recovery of damages arising out of any event or delay caused within Contractor's control and/or for "Acts of God", including without limitation adverse weather conditions (which shall include typical rain events that can be reasonably predicted through historical data) which prevents such early completion of the Work.~~

§ 8.3.5 ~~Where a delay occurs that is beyond the Contractor's control and when the delay is not reasonably unacceptable, the Contractor has an affirmative duty to mitigate the effect of that delay on the progress of the Work. An extension of the Substantial Completion date will not be granted to the extent that the Contractor breaches said duty to mitigate.~~

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

~~Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, At the pre-construction meeting, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and Owner and the Architect a detailed schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the 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.~~

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ~~ten~~ twenty (20) days before the Owner's submission date ~~for the School Board's review and approval of such payment at the next School Board meeting or, if the Owner's School Board approves otherwise, before the date~~ established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents. The form of Application for Payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet.

§ 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. However, this Section will not apply to routine retainage the Contractor intends to withhold from the Subcontractor pursuant to the Subcontract.

§ 9.3.1.3 No interest will be paid upon retention.

§ 9.3.1.4 Contractor shall submit all payment requests to the Architect for all work completed during the previous time period. Requests submitted late will not be processed until the following month. Contractor shall include the Contractor's waiver of lien for the full amount and partial subcontractor waivers of lien in the amounts of the previous payment request.

§ 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. Contractor shall submit requisitions from suppliers and Subcontractors to substantiate the amounts requested on the Application for Payment for materials or equipment stored on or off site. The Owner shall have no responsibility or liability to the Contractor for the safekeeping of materials and equipment stored at the site or 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.

§ 9.3.4 The Contractor shall submit his application for payment as outlined in Section 9.3 on the first of the month, and the Owner will make payment accordingly promptly after receipt of the Architect's Certificate. Each partial payment request shall be made monthly and Contractor shall request payment of ninety percent (90%) of the portion of the Contract Sum properly allocable to labor, materials and equipment incorporated in the work less the aggregate of previous payments in each case. The Owner reserves the right to reduce retainage prior to substantial completion. Retainage shall not be reduced below 5% until all closeout documents as required in the Instruments of Service have been received and reviewed by the Architect.

§ 9.3.5 Before each certificate for payment is issued, the Contractor shall furnish to the Architect a complete statement of the amounts due to Subcontractors, parties supplying material, and for his own materials and labor, on AIA Document G702 and G702A "Application and Certificate for Payment."

§ 9.3.6 A Sworn "Contractor's Affidavit" shall be submitted with each payment request in sufficient form for the Owner to determine Contractor's right to payment. Each payment request shall include executed waivers of lien in conformity with information set forth on a properly completed Contractor's Affidavit. In the event that the Owner is satisfied with Contractor's payment procedures, the Owner may accept partial waivers of lien of Subcontractors and suppliers who were included in the immediate preceding payment. The Contractor shall submit waivers on a current basis, but the Owner may allow Subcontractors and suppliers to be not more than one payment late with their partial waivers.

§ 9.3.7 Upon giving ten (10) days notice in writing to the Contractor, the full contract retainage may be reinstated and the retention restored to the basis established in Section 9.3.4 if the manner of completion of the work and its progress do not remain satisfactory to the Owner, or if any surety of Contractor withholds its consent.

§ 9.3.8 All material necessary for the construction of this Project, delivered upon the premises, shall not be removed from the premises without written consent of the Architect.

§ 9.3.9 The Contractor's request for final payment shall include: (1) the Contractor's Final Lien Waiver in the full amount of the contract; and (2) final lien waivers in the full amount of their contracts from all subcontractors and suppliers for which final lien waivers have not previously been submitted.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the 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, 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.

§ 9.5 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 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; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

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

§ 9.5.3 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 The Owner shall not be required to make payment unless in its own independent judgment it accepts the Architect's Certificate.

§ 9.6 PROGRESS PAYMENTS

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

§ 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. In the event that the Owner elects to utilize an escrow agent, the Owner and the escrow agent may elect to make payments due the Contractor to the Contractor and its subcontractors.

§ 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.

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

§ 9.7 FAILURE OF PAYMENT

~~If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven 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.~~

§ 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.

§ 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. With respect to Work enumerated on the list accompanying the Certificate of Substantial Completion, the guarantee or warranty period shall start at the time of subsequent acceptance of this Work in writing by Owner.

§ 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. The payment shall be sufficient to increase the total payments to 95 percent of the contract sum, less such amounts as the Architect shall determine for incomplete work and unsettled claims.

~~§ 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 and (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. 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 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.

§ 9.11 LIQUIDATED DAMAGES

The Contractor is solely responsible for substantially completing the Work by the scheduled Substantial Completion Dates for each Phase of the Work. This responsibility includes all work including that of the Contractor's forces, subcontractors and suppliers. The Contractor acknowledges that the Owner will suffer significant financial loss, and there will be disruption to the Owner, if the Project is not complete on or before the Substantial Completion Date for the work set forth in the Contract Documents. The Contractor further acknowledges that the measure of such loss and the disruption to the Owner would not be susceptible to precise calculation. To protect the Owner against said loss and disruption to the School District Community, the Owner and the Contractor hereby agree that the Contractor and the Contractor's Surety, if any, shall be liable for and shall pay to the Owner, Liquidated Damages of Five Hundred Dollars (\$500) for each calendar day of delay per each School Campus, per Phase in Substantial Completion. Substantial Completion for this project refers to all scheduled work being a minimum 99% complete.

§ 9.11.2 Payments of Liquidated Damages are in addition to other damages that may be incurred by the Owner and not a penalty. All such Liquidated Damages may be set-off against any monies that may be due the Contractor. The Owner's approval or making of progress payments or final payment, with or without knowledge that the Work was untimely, shall not constitute or be deemed a waiver of the Owner's rights or claims, or of the Owner's ability to receive Liquidated Damages under the Contract or common law.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor 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.

§ 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.

§ 10.2.5 The Contractor ~~shall~~ shall, at its sole cost and expense, 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.

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

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, 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.

§ 10.2.9 The Contractor, prior to commencing the work, shall submit to the Architect, in writing, a statement certifying that he is familiar with the Manual of Accident Prevention in Construction by the Associated General Contractors of America, current edition, and further that the Contractor will maintain at the project a copy of said publication and will strictly enforce the applicable requirements of same. Contractor will also state the name of the Contractor's Safety Engineer who will be responsible for enforcing all safety requirements.

§ 10.2.10 All Construction documents pertaining to this Work, and the joint and several phases of construction hereby contemplated, are to be governed, at all times, by applicable provisions of the Federal Law, including but not limited to the latest amendments of the following:

- .1 Williams Steiger Occupational Safety & Health Act of 1970 Public Law 91 596;
- .2 Part 1910 — Occupational Safety & Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;
- .3 Part 1518 — Safety & Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations.

§ 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.

§ 10.3.1.1 The Contractor shall not cause or permit any "Hazardous Materials" (as defined herein) to be brought upon, kept or used in or about the Projects site(s) except to the extent such Hazardous Materials: (1) are necessary for the prosecution of the Work; and (2) have been approved in writing by the Owner. Any Hazardous Materials allowed to be used on the Project site(s) shall be used, stored, and disposed of in writing as directed in writing by the Owner. Any Hazardous Materials allowed to be used in the Project site(s) shall be used, stored, and disposed of in compliance with all applicable laws relating to such Hazardous Materials. Any unused or surplus hazardous Materials, as well as, any other Hazardous Materials that have been placed, released, or discharged on the Project site(s) by the Contractor or any of its employees, agents, suppliers, or subcontractors, shall be removed from the Project site(s) at the earlier of (1) completion of the Work requiring the use of such Hazardous Materials; (2) the completion of the Work as a whole; or (3) within twenty-four (24) hours following the Owner's demand for such removal. Such removal shall be undertaken by the Contractor at its sole cost and expense and shall be performed in accordance with all applicable laws. The Contractor shall immediately notify the Owner of any release or discharge of any Hazardous Materials on the Project site(s). The Contractor shall provide the Owner with copies of all warning labels on products that the Contractor or any of its subcontractors will be using in connection with the Work, and the Contractor shall be responsible for making any and all disclosures required under applicable "Community Right to Know" or similar laws. The Contractor shall not clean or service any tools, equipment, vehicles, materials, or other items in such a manner as to cause a violation of any laws or regulations relating to Hazardous Materials. All residue and waste materials resulting from any such cleaning or servicing shall be collected and removed from the Project site(s) in accordance with all applicable laws and regulations. The Contractor shall immediately notify the Owner of any citations, orders, or warnings issued to or received by the Contractor, or of which the Contractor otherwise becomes aware, that relate to any Hazardous Materials on the Project site(s). Without limiting any other indemnification provisions pursuant to law or specified in this Agreement, the Contractor shall indemnify, defend (at the Contractor's sole cost, and with legal counsel approved by the Owner), and hold the Owner and Architect harmless from any and all claims, demands, losses, damages, disbursements, liabilities, obligations, fines, penalties, costs, and expenses for removing and remedying the effect of any Hazardous Materials on, under, from, or about the Project site(s), arising out of or relating to, directly or indirectly, the Contractor's or its subcontractor's failures to comply with any of the requirements herein. As used herein, the term "Hazardous Materials" means any hazardous or toxic substances, materials, and wastes listed in the United States Department of transportation Materials Table, or listed by the Environmental Protection Agency as hazardous substances, and all substances, materials, or wastes that are or become regulated under federal, state, or local law.

§ 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 and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or

~~expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.~~

§ 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.~~ ~~site.~~ 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 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

~~§ 10.3.6 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.~~

§ 10.4 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;~~ performed including private entities performing work at the site and exempt from the coverage on account of number of employees or occupation, which entities shall maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the project;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's ~~employees;~~ employees or persons or entities excluded by statute from the requirements of Section 11.1.1.1 but required by the contract documents to provide the insurance required by that Section;
- .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;~~ vehicle and coverage should be written on a comprehensive automobile policy which will include coverage for owned, non-owned and hired motor vehicles;
- .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 should be written on the comprehensive general liability basis, and shall include, but not be limited to the following sub-lines:
 - A. Premises and Operations including x, c, u coverages (explosion, collapse, underground).
 - B. Products and Completed Operations.
 - C. Independent Contractor's Protective.

D. Broad Form Comprehensive General Liability Endorsement:

1. Contractual Liability, including contractors' obligation under Section 3.18.
2. Personal Injury & Advertising Injury Liability
3. Premises Medical Payments
4. Fire Legal Liability - Real Property
5. Broad Form Property Damage Liability (including Completed Operations)
6. Incidental Medical Malpractice Liability
7. Additional Persons Insured, including employees for personal and advertising injury.
8. Extended Bodily Injury Liability
- .10 If liability insurance is written under the new simplified form - Commercial General Liability, the above listed coverages should be included.
- .11 If the General Liability coverages are provided by a Commercial General Liability Policy on a claims-made basis, the policy date or retroactive date shall predate the contract; the termination date of the policy shall be no earlier than the termination date of coverages required to be maintained after final payment, certified in accordance with Section 9.10.2, and an extended period endorsement "Supplemental Tail," must be purchased.
- .12 In any and all claims against the Owner or the Architect, or any of their agents or employees, by any employee or Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the insurance obligation under this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or subcontractor under the Worker's Compensation Act, disability benefit acts or other employees benefits acts.
- .13 The General Liability coverages shall be provided by a commercial General Liability Policy on an occurrence basis.

§ 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 60 days after the date of final completion or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.~~ 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.

§ 11.1.2.1 The insurance required by Section 11.1.1 shall be written for not less than the following limits, or greater if required by law:

1. Workers' Compensation, Occupational Disease and Employer's Liability Insurance:
 - a. State: Statutory limits
 - b. Applicable Federal (e.g., Longshoremen's): Statutory limits
 - c. Employer's Liability
 - \$1,000,000 Per Accident
 - \$1,000,000 Disease, Policy Limit
 - \$1,000,000 Disease, Each Employee
- 2A. If written under Comprehensive General Liability Policy Form (including sub-lines specified in Section 11.1.1.9)
 - a. Bodily Injury:
 - \$1,000,000 Each Occurrence
 - \$2,000,000 Aggregate
 - b. Property Damage:
 - \$1,000,000 Each Occurrence
 - \$2,000,000 Aggregate
 - c. Bodily Injury and Property Damage combined:
 - \$1,000,000 Each Occurrence
 - \$2,000,000 Aggregate
 - d. Personal Injury:
 - \$1,000,000 Aggregate

- e. Products and Completed Operations to be maintained for one year after final payment:
\$1,000,000 Aggregate
 - f. Property Damage Liability Insurance shall provide X, C and U coverages.
 - g. Broad Form Property Damage Coverage shall include Completed Operations.
- 2B. If written under Commercial General Liability Policy Form.
- a. \$2,000,000 General Aggregate
 - b. \$1,000,000 Products Completed Operations Aggregate
 - c. \$1,000,000 Personal and Advertising Injury
 - d. \$1,000,000 Each Occurrence
 - e. \$50,000 Fire Damage (any one fire)
 - f. \$5,000 Medical Expense (any one person)
3. Contractual Liability:
- a. Bodily Injury:
\$1,000,000 each occurrence
\$2,000,000 aggregate
 - b. Property Damage:
\$1,000,000 each occurrence
\$2,000,000 aggregate
4. Personal Injury, with Employment Exclusion deleted:
- a. \$1,000,000 aggregate
5. Business Automobile Liability (including owned, non-owned and hired vehicles):
- a. Automobile Liability:
 - i. Bodily injury:
\$1,000,000 each person
\$1,000,000 each occurrence
 - ii. Property Damage:
\$1,000,000 Each Occurrence
\$1,000,000 Combined Single Limit
6. Umbrella Excess Liability:
\$2,000,000 Over Primary Insurance
\$10,000 Retention for Self-Insured Hazards
Each Occurrence

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness. On the Certificate of Insurance, delete in the cancellation provision the following words, 'Endeavor to' and 'but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives.'

§ 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.

§ 11.1.5 The insurance company issuing the comprehensive general liability insurance coverage required for the performance of this contract shall be licensed to do business in Illinois with Best's Insurance Guide (current edition) rating of "A" or better and satisfactory to the Owner.

§ 11.1.6 If the insurance is written on the Comprehensive General Liability policy form, the Certificates shall be AIA Document G705, Certificate of Insurance. If this insurance is written on a Commercial General Liability policy form, ACCORD form 25S will be acceptable. These certificates shall specifically state that the Owner, his representatives, and the Architect are protected by the Contractor's insurance against all liabilities as spelled out in Par. 3.18 of AIA Doc. A201, as modified hereinabove.

§ 11.2 OWNER'S LIABILITY INSURANCE

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

§ 11.2.1. The Contractor shall purchase and maintain insurance covering the Owner's contingent liability for claims which may arise from operations under the contract and that will protect the Owner and the Architect and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees and all other defense costs whether in legal or administrative actions.

§ 11.2.2 In any and all claims against the Owner or the Architect or any of their agents or employees by any employee of the contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the insurance obligation under this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the contractor or any subcontractor under Workmen's Compensation Acts, disability benefit acts or other employee benefit acts.

§ 11.2.3 The Contractor shall give the Owner the original policy and shall furnish the Architect memorandum copies of said policy. The Owner and Architect shall be the named insureds in this Protective Liability Policy. The Contractor shall protect the Owner and the Architect and their agents and employees from expenses, including attorney's fees, arising out of or resulting from the performance sickness, disease, or death, or injury to, or destruction of any tangible property (other than the Work itself) including the loss of use therefrom that is caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether it is caused in whole or in part by a party to whom insurance is afforded pursuant to this Section.

§ 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. The Builder's Risk Insurance is required and shall be purchased and maintained by the Owner until Substantial Completion.~~

§ 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. The policy shall be a Completed Value All Risk Builder's Risk policy and shall cover all work (including that of all contractors) in the course of construction excluding temporary structures and materials used in the construction process stored on or within one hundred feet of the construction site and while awaiting installation. The policy shall be written in an amount equal to 100% of the total sum of all contracts. However, the policy is based on a \$5,000 deductible, applicable to all losses for each occurrence. Therefore,

the Contractor shall be solely responsible for any and all losses up to \$5,000. Losses are adjustable with and payable to the Owner for his own account.

~~§ 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. Coverage shall include, but not be limited to:~~

- ~~A. All Risk of Direct Physical Loss, including Fire and Extended Coverage (Lightning, wind storm, hail, explosion, riot, civil commotion, aircraft, vehicle and smoke).~~
- ~~B. Vandalism and Malicious Mischief.~~

~~§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles. Coverage shall not extend to:~~

- ~~A. The Contractors', Subcontractors', or the Architect's/Engineer's Tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring and other similar items commonly referred to as construction equipment, which may be on the site and the capital value of which is not included in the Work.~~
- ~~B. Property owned by employees of any of the foregoing.~~
- ~~C. Vehicles of any kind.~~
- ~~D. Trees and shrubs.~~
- ~~E. Drawings and specifications.~~

~~§ 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.~~

~~§ 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. The policy by its terms or endorsement shall specifically permit and allow for beneficial or partial occupancy prior to completion or acceptance of the project by the Owner.~~

~~§ 11.3.1.6 The prompt repair or reconstruction of the Work as a result of any insured loss or damage shall be the Contractor's responsibility and shall be accomplished at no additional cost to the Owner or Architect. The contractor shall furnish the proper assistance in the adjustment and settlement of any loss. Loss will be adjustable with and payable to the party purchasing the Builder's Risk Insurance who shall be responsible for apportioning the loss proceeds to each and every entity involved in the loss to the extent of his interest. The policy shall contain a provision that the policy will not be canceled, changed or altered until at least 30 calendar days prior written notice has been given to the named insured.~~

§ 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.~~

~~§ 11.3.7 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.~~ reach. 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 the 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.~~ insurers."

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 ~~The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.~~ Contractor shall furnish a Performance Bond and

Labor and Material Payment Bond in the amount of one hundred percent (100%) of the Contract Sum. Owner requires that the bond surety must carry a BEST RATING of A and that the Owner has no objection to the bond surety.

§ 11.4.2 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. The Contractor shall deliver the required bonds to the Owner not later than ten days following the date of notification of the Award of Contract or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.

§ 11.4.3 The Contractor shall require the attorney in fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney. Such bonds shall be in the form of American Institute of Architect's Document A-311 or a similar form worded exactly the same as Doc. A-311 and shall bear the same date as, or a date subsequent to, the date of the Contract. The bonds shall be issued by a bonding company licensed to operate in the State of Indiana and approved by the Owner.

§ 11.4.4 The failure of the Contractor to supply the required bonds within 10 days after the prescribed Agreement forms are presented for signature, or if the bonding company finds that the Contractor is NOT bondable, shall constitute a default, and the Owner may award the Contract to the next responsible low bidder.

§ 11.4.5 If at any time the Owner becomes dissatisfied with any Surety or Sureties then upon the Bonds, or for any other reason such Bonds shall cease to be adequate security for the Owner, the Contractor shall, within five (5) days after notice to do so, substitute acceptable Bonds in such forms and sum and signed by such other Sureties as may be satisfactory to the Owner. No further payments shall be deemed due nor shall be made until the new Sureties shall have qualified.

§ 11.4.6 Whenever the Contractor shall be and is declared by the Owner to be in default under the Contract, the Surety and Contractor are each responsible to make full payment to the Owner for any and all additional services of the Architect as which are required as a result of the Contractor's default and in protecting the Owner's right under the Agreement with the Contractor.

§ 11.4.7 The Contractor must within ten (10) days after the execution of this Agreement furnish a Payment Bond agreeing to pay not less than the prevailing wage for work to be performed in accordance with the Contract and the laws of the State of Indiana, and agreeing to pay all sums of money due for labor, materials, apparatus, fixtures or machinery and transportation with respect thereto, as in said Payment Bond provided, each dated the same day as the Agreement, in the forms prescribed by the Owner and each in an amount equal to the Contract Sum with a corporate Surety or Sureties acceptable to the Owner authorized to do business in the State of Indiana. These Bonds shall be maintained by the Contractor and shall remain in full force and effect until final acceptance of the work by the Owner or sixty (60) days following the date of Final Payment, whichever occurs later. The Contractor shall agree and shall cause the Surety to agree to be bound by each and every provision of the Contract Documents.

§ 11.4.8 In the event the Surety will 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 shall agree forthwith upon request of the Owner to furnish and maintain other corporate Surety with respect to such bonds satisfactory to the Owner.

§ 11.5 ADDITIONAL INSURANCE REQUIREMENTS

§ 11.5.1 The Contractor is responsible for determining that subcontractors are adequately insured against claims arising out of or relating to the Work. The premium cost and charges for such insurance shall be paid by each subcontractor.

§ 11.5.2 The limits of liability as stated may be arrived at using a Split-Limit or a Combined Single Limit basis. However, the total limit of liability shall not be less than that stated in the requirements.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

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

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, 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~~AFTER FINAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of ~~Substantial~~ Final 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 at the Contractor's sole expense 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. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. 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 one-year period for correction of Work shall be extended with respect to portions of Work first performed after ~~Substantial-Final~~ Completion by the period of time between ~~Substantial-Final~~ Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 ~~The one year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2. In the case of any work performed in correcting defects pursuant to guarantees provided or referred to by this Article 12, the guarantee period shall begin anew from the date of the completion of such work.~~

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

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, 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~~ Documents and pay all attorney's fees and expenses related thereto, immediately upon demand.

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

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the ~~law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.~~ Laws of Indiana.

§ 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

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving 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.

§ 13.4.3 The Owner and the Architect reserve the right to accept or reject any substitutions bid upon. If substitutions are not specifically accepted in writing, materials specified as "standard" shall be used in construction of this project.

§ 13.4.4 Any material specified by reference to the number, symbol or title of specific standards, such as Commercial Standards, Federal Specifications, trade association standards, or similar standards, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the Instruments of Service, except as limited to type, class or grade, or modified in such reference by a given date. The standards related to, except as modified in the Specifications, shall have full force and effect as though printed in the Specifications.

§ 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 Contractor'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. Notwithstanding any other term or provision in this Article 13 to the contrary, in the event that any testing or inspection of the Work or any part thereof reveals defects in materials or workmanship, then the Contractor shall remedy such defects and shall bear all costs and expenses associated with such testing which is related to determining whether such defects have been properly remedied.

§ 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 from time to time at the place where the Project is located. Any references in this agreement to interest being assessed against the Owner are hereby deleted.~~

~~§ 13.7 TIME LIMITS ON CLAIMS~~

~~The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.~~

§ 13.8 REGULATIONS

§ 13.8.1 The Contractor and/or Subcontractor warrant/s that s/he is familiar with and s/he shall comply with Federal, State and local laws, statutes, ordinances, rules and regulations, School Board Rules and Policies, and the orders and decrees of any courts or administrative bodies or tribunals in any manner affecting the performance of the contract including without limitation Workmen's Compensation Laws, minimum salary and wage statutes and regulations, laws with respect to permits and licenses and fees in connection therewith, laws regarding maximum working hours, and, without limitation, such other laws and regulations as are specifically described below. Additionally, Contractor and subcontractor warrant that s/he shall comply with any amendments to such Federal, State and local laws, statutes, ordinances, rules and regulations that are enacted thereafter during the performance of the Work and under this Contract. To the extent that there are any violations of any of the applicable laws, rules, regulations and/or court orders/decrees mentioned herein, Contractor and Subcontractor shall be responsible for indemnifying and holding both the Owner and Architect free and harmless from all costs, fees and expenses incurred, directly or indirectly and including without limitation attorneys' fees, by the Owner or the Architect in responding to and complying with demands made by any of the governmental departments/agencies and/or the courts, or an aggrieved employee or person and such amounts may be withheld from the payments to be made on the project. 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 any compliance with the applicable laws, rules and regulations referenced herein. No plea of misunderstanding or ignorance thereof will be considered.

§ 13.8.1.1 Whenever required or upon the request of the Architect or Owner, the Contractor or subcontractor shall furnish the Architect and the Owner with satisfactory proof of compliance with said Federal, State and local laws, statutes, ordinances, rules, regulations, orders, and decrees.

§ 13.8.2 The Contractor and Subcontractors shall carefully examine the Occupational Safety and Health Act of 1970, published in May 1971, as issued by the Federal Register (OSHA), and the specific regulations governing procedures, techniques, safety precautions, equipment design, and the configuration of the same as required under this Act and the Contractor agrees as evidenced by his submission of a bid to comply with all terms of the Act and to perform and complete in a workmanlike manner all work required in full compliance with said Act. The Contractor is responsible to comply with OSHA and its regulations as amended in performing any work under the Contract Documents.

§ 13.8.3 The Contractor shall comply with all federal, state and local non-discrimination laws:

§ 13.8.3.2.1 Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, creed, sex, marital status, national origin or ancestry, age, citizenship, physical or mental handicap or disability, military status, unfavorable discharge from military service or arrest record status; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.

§ 13.8.3.2.2 Contractor, 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.

§ 13.8.15 No Smoking. In accordance with the Owner's Policy, smoking is prohibited on all School Corporation property.

§ 13.8.16 Concurrent with the execution of this Contract, the Contractor has executed the Certificate of Eligibility.

§ 13.8.17 The Contractor understands and acknowledges that its work, in whole or in part, will be performed on public school property where there may be direct, daily contact with school students. The Contractor further understands and acknowledges that the State of Indiana requires that all employees of vendors, licensees, contractors or others having direct, daily contact with students are subject to a criminal background check and may not be listed on the State Sex Offender Registry. Prior to allowing any of its employees who will be performing the scope of work access to school property, the Contractor agrees to provide the Owner, at the sole cost of the Contractor with the following:

- (1) Evidence that each employee, agent, contractor or other person performing work on school property under this Agreement was subjected to a criminal background check in conformity with I.C. 20-26-5-10; that said persons are not listed on said Registry; and said persons have no criminal convictions for the offenses listed under I.C. 20-26-5-11(6);
- (2) The Contractor will provide the Owner, upon request, a copy of the criminal background check conducted on each such person.

In the event the Contractor plans to subcontract with or use the services of another person or firm that may have direct, daily contact with students on school property, in order to fulfill its obligations under its Agreement with the Owner then in that event the Contractor will require all such persons or firms to comply with the provisions of this paragraph and I.C. 20-26-5-10.

In the event the Contractor fails to comply with the provisions of this paragraph and I.C. 20-26-5-10, and as a result a suit or claim is instituted by a student for harm caused by an employee of the Contractor, or caused by an employee of a subcontractor to the Contractor, then in that event the Contractor agrees to fully defend and indemnify, including reimbursement of attorney's fees and costs, the Owner against any such claims.

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.~~

~~§ 14.1.2 The Contractor may terminate the Contract if, 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, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365 day period, whichever is less.~~

~~§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 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 60 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 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;~~
- ~~.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.~~

~~§ 14.2.1 If 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 after the date of said filing, or if the Contractor admits in writing his inability to pay his debts generally as they become 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; or if a receiver of all or any substantial portion of the Contractor's properties is appointed; or if the Contractor abandons the Work; or if he fails, except in cases for which extension of time is provided, to prosecute promptly and diligently the Work or to supply enough properly skilled workmen or proper materials for the Work; or if he submits an Application for Payment, sworn statement, waiver of lien, affidavit or document of any nature whatsoever which is intentionally falsified; or if he fails to make prompt payment to Subcontractors or for materials or labor or otherwise breaches his obligations under any subcontract with a Subcontractor; or if a mechanic's or material man's lien or notice of lien is filed against any part of the Work or the site of the Project and not promptly bonded or insured over by the Contractor in a manner satisfactory to the Owner; or if the Contractor disregards any laws, statutes, ordinances, rules, regulations or orders of any governmental body or public or quasi-public authority having jurisdiction of the Work or the site of the Project; or if he otherwise violates any provision of the Contract Documents; then the Owner, without prejudice to any right or remedy available to the Owner under the Contract Documents or at law or in equity, the Owner may, after giving the Contractor and the surety~~

under the Performance Bond and under the Labor and Material Payment Bond described in Section 11.5, 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 after 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 or 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. The Owner's right to terminate the Owner-Contractor Agreement pursuant to this Section 14.2.1 shall be in addition to and not in limitation of any rights or remedies existing hereunder or pursuant hereto or at law or in equity.

§ 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 all costs to the Owner of completing the Work, then the Contractor shall be paid for all Work performed by the Contractor to the date of termination. If such costs to the Owner of completing the Work exceed such~~ unpaid balance, the Contractor shall pay the difference to the ~~Owner. The amount~~ Owner immediately upon the Owner's demand. The costs to the Owner of completing the work 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 must pay by reason of a delay in completion 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, if any, to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, shall be certified by the Architect, upon application, in the manner provided in Section 9.4, and this obligation for payment shall survive termination of the Contract.

§ 14.2.5 The Owner may, upon seven (7) days written notice to the Contractor, terminate the Agreement between the Owner and Contractor without cause. Upon written request and submittal of the appropriate documentation as required by the Owner, the Owner shall pay the Contractor for all work performed by the Contractor to the date of termination that has been approved by the Owner. The Owner may, upon the Contractor executing such a confirmatory assignments as the Owner shall request, accept and assume all of the Contractor's obligations under all subcontracts executed in accordance with the terms of the Contract Documents that may accrue after the date of such termination and that the Contractor has incurred in good faith in connection with the Work. Upon receipt of notice of termination, the Contractor shall cease all operations on the date specified by the Owner, terminate subcontracts not assumed by the Owner, make no further orders of materials or equipment, complete work not terminated (if any), and provide such reports as may be requested by the Owner and the Architect as to the status of the Work and the Work remaining to be completed. The Owner's right to terminate the Contract under this Section shall be in addition to, and not in limitation of, its rights to stop the Work without terminating 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, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties to the Contract seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party 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-claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim-given within seven (7) calendar days after the event giving rise to the claim. The Contractor's claim shall include an estimate of cost and of probable effect of the delay on the progress of the Work. In the case of a continuing delay, only one Claim-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.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor ~~and Owner waive Claims against each other~~ waives Claims against the Owner and Architect for consequential damages arising out of or relating to this Contract. This ~~mutual~~-waiver includes

- ~~.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and~~
- ~~.2~~ damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This ~~mutual~~-waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, 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 parties, subject to litigation.~~

~~§ 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 except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.~~

~~§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 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 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.~~

~~§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.~~

~~§ 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.~~

ARTICLE 16 LIMIT TO AVOID INCORPORATION OF RESPONSIBILITY BY REFERENCE

~~§ 16.1 Where any specification which is incorporated herein by reference, through the words "and/or as directed by the Architect," or phrases having a similar effect appear to give the Architect the right to direct something other than that specified, the Architect has in fact no such right to except as it may be established in specific instances in portions of this Instruments of Service other than in said specifications.~~

ARTICLE 17 INCORPORATION OF CONTRACT TERMS WITH SUBCONTRACTORS

~~§ 17.1 Contractor agrees that s/he will be responsible to incorporate all of the terms and conditions herein, including all amendments to this Contract, with any and all of the Subcontractors as well as any Subcontractors retained by Subcontractors. Contractor acknowledges that it is the Owner's intent that all of the terms and conditions herein, including all amendments to this Contract, will be adhered to by the Contractor and all Subcontractors performing any Work in this project.~~

~~§ 15.4.4.3 The Owner 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.~~

RESPONSIBLE BIDDER FORM

Duneland School Corporation

Responsible Bidding Practices Submission Form

**Refer to the Duneland School Corporation "Policy to establish Responsible Bidding Practices"*

Project: Duneland School Corporation – 2018 Additions at Brummitt Elementary School.

Bid Opening Date: January 31, 2018.

Name of Contractor:

Address:

Telephone:

Name of Primary Contact:

Category of Work:

Contractors proposing to submit bids on any Duneland School Corporation ("School") project estimated to be at least one hundred fifty thousand dollars (\$150,000) or more must, prior to the opening of bids, submit a statement made under oath and subject to perjury laws, the following:

1. Attach to this Form a Certificate of Good Standing from the Indiana Secretary of State dated within the last 60 days. (This requirement shall not apply if the bidder is an individual, sole proprietor or partnership.)
2. List all names previously used by the bidder within the last five (5) years:

3. Within the last five (5) years, has the bidder been determined by a court or governmental agency to be in violation of any federal, state, or local laws, including violations of contracting or anti-trust laws, tax or licensing laws, the Occupational Safety and Health Act (OSHA) violations, federal Davis-Bacon Act violations or violations of the Indiana Common Construction Wage Act? If so, identify the date of the violation and identify the court or agency issuing the determination.

SECTION 00820

RESPONSIBLE BIDDER FORM

4. State whether the bidder intends to employ its own employees or whether the bidder intends to utilize subcontractors to be utilized by the bidder for the project. If the bidder intends to use subcontractors for the project, identify all subcontractors the bidder intends to utilize.

5. Provide evidence of the bidder's participation in apprenticeship and training programs applicable to the work to be performed on the project which are approved by and registered with the United States Department of Labor's Office of Apprenticeship or any similar organization. Include copies of all applicable certificates or standards for such training programs.

6. Provide a copy of the bidder's workplace drug-testing policy that covers all employees of the bidder and meets or exceeds the requirements of Indiana Code 4-13-18.

7. Identify, by name and description of experience, each of the bidder's project managers and superintendents that bidder intends to assign to work on the project.

8. If applicable, identify all professional or trade licenses required by law to be held, for any trade or specialty area for which the bidder seeks a contract award.

9. If applicable, state whether any professional or trade license held by the bidder, or any directors, officer, or manager employed by the bidder, has been suspended or revoked within the last five (5) years.

10. Provide evidence that the surety company utilized by the bidder is on the United States Department of Treasury's Listing of Approved Securities.

11. Identify any federal, state, or local tax liens or delinquencies owed by the bidder to any federal, state, or local taxing body within the last five (5) years.

SECTION 00820

RESPONSIBLE BIDDER FORM

VERIFICATION

I swear or affirm, under the penalties for perjury, that the foregoing information is true and that I am duly authorized by the bidder to make the representations herein. I understand and acknowledge that any material changes to the bidder's status or as to any of the information provided on this Form must be reported to the School Corporation within ten (10) days from the date of the occurrence or the change of status and that the School Corporation reserves the right to request additional information and verification of any of the information submitted pursuant to this Form.

Bidder: _____

By: _____

Its: _____

Date: _____

**A Policy to Establish Responsible Bidding Practices and
Submission Requirements for Submitting Bids to Perform Construction Work**

WHEREAS, the Duneland School Corporation is required by law to award capital improvement contracts to the "lowest responsive and responsible" bidder; and,

WHEREAS, the Duneland School Corporation, based upon its experience, has determined that quality workmanship, efficient operation, safety, and timely completion of projects requires all bidders meet certain minimum requirements in order to be a "responsive and responsible" bidder; and,

WHEREAS, applicable state law also requires that bidders meet certain minimum requirements in order to be a "responsive and responsible" bidder; and,

WHEREAS, the Duneland School Corporation seeks to enhance its ability to identify "responsive and responsible" bidders on all School construction projects by institution of more comprehensive submission requirements which are in compliance with Indiana State law; and,

WHEREAS, the "Responsible Bidding Practices and Submission Requirements" policy will preserve administrative resources by insuring that only qualified contractors and subcontractors are awarded contracts on public works construction projects; and,

WHEREAS, the "Responsible Bidding Practices and Submission Requirements" policy will assure efficient use of taxpayer dollars, will promote public safety and is in the public interest.

THEREFORE, this Policy, which is entitled "Responsible Bidding Practices and Submission Requirements for Submitting Bids to Perform Construction Work," is hereby adopted and reads as follows:

I. Bid Submission Requirements

Contractors proposing to submit bids on any Duneland School Corporation ("School") project estimated to be at least one-hundred fifty thousand dollars (\$150,000.00) or more must, prior to the opening of bids, submit a statement made under oath and subject to perjury laws, on a form designated by the School and must include:

- (A) A copy of a print-out of the Indiana Secretary of State's on-line records for the bidder dated within sixty (60) days of the submission of said document showing that the bidder is in existence, current with the Indiana Secretary of State's Business Entity Reports, and eligible for a certificate of good standing. If the bidder is an individual, sole proprietor or partnership, this subsection shall not apply;
- (B) A list identifying all previous names used by the bidder;
- (C) A list of all determinations by a court or governmental agency for violations of federal, state, or local laws including, but not limited to violations of contracting or antitrust laws, tax or licensing laws, environmental laws, the Occupational Safety and Health Act (OSHA), or federal Davis-Bacon and related Acts;

- (D) A statement on staffing capabilities, including labor sources;
- (E) Evidence of participation in apprenticeship and training programs, applicable to the work to be performed on the project, which are approved by and registered with the United States Department of Labor's Office of Apprenticeship, or its successor organization. The required evidence includes a copy of all applicable apprenticeship certificates or standards for these training programs;
- (F) A copy of a written plan for employee drug testing that: (i) covers all employees of the bidder who will perform work on the public work project; and (ii) meets, or exceeds, the requirements set forth in IC 4-13-18-5 or IC 4-13-18-6;
- (G) The name and description of the management experience of each of the bidder's project managers and superintendents that bidder intends to assign to work on the project;
- (H) Proof of any professional or trade license required by law for any trade or specialty area in which bidder is seeking a contract award; and disclosure of any suspension or revocation within the previous five years of any professional or trade license held by the company, or of any director, office or manager employed by the bidder;
- (I) Evidence that the contractor is utilizing a surety company which is on the United States Department of Treasury's Listing of Approved Sureties; and
- (J) A written statement of any federal, state or local tax liens or tax delinquencies owed by the bidder to any federal, state or local taxing body in the last five years.

The School reserves the right to demand supplemental information from the bidder, (additional) verification of any of the information provided by the bidder, and may also conduct random inquiries of the bidder's current and prior customers.

II. Post-Bid Submissions from Subcontractors

All bidders shall provide a written list that discloses the name, address, and type of work for each first-tier subcontractor from whom the bidder has accepted a bid and/or intends to directly contract with or hire on any part of the public work project, including individuals performing work as independent contractors, within five (5) business days after the date the bids are due.

In addition, each such subcontractor contracting directly with the bidder shall be required to adhere to the requirements of Section I of this Ordinance as though it were bidding directly to the School, except that such subcontractors shall submit the required information (including the name, address, and type of work for each of their subcontractors) to the successful bidder no later than five (5) business days after the subcontractor's first day of work on the public work project and the bidder shall then forward said information to the School. Payment shall be withheld from any subcontractor contracting directly with the bidder who fails to timely submit said information until such information is submitted and approved by the School.

Upon request, the School may require any subcontractors to provide the required information (including name, address, type of work on the project and the name of the subcontractor with whom the subcontractor has a direct contract). Payments shall be withheld from any

subcontractor who fails to timely submit this information until this information is submitted and approved by the School. Additionally, the School may require the successful bidder and relevant subcontractor to remove the nonresponsive or non-responsible subcontractor from the project and replace it with a responsive and responsible subcontractor.

Failure of a subcontractor to submit the required information shall not disqualify the successful bidder from performing work on the project and shall not constitute a contractual default and/or breach by the successful bidder. However, the School may withhold all payments otherwise due for work performed by a subcontractor, until the subcontractor submits the required information and the School approves such information. The School may also require that successful bidder to remove the subcontractor from the project and replace it with a responsive and responsible subcontractor.

The disclosure of a subcontractor ("Disclosed Subcontractor") by a bidder or a subcontractor shall not create any rights in the Disclosed Subcontractor. Thus, a bidder and/or subcontractor may substitute another subcontractor ("Substitute Subcontractor") for a Disclosed Subcontractor by giving the School written notice of the name, address, and type of work of the Substitute Subcontractor. The Substitute Subcontractor is subject to all of the obligations of a subcontractor under this Ordinance.

III. Validity of Pre-Qualification Classification

Upon designation by the School that a contractor's or subcontractor's submission in anticipation of a bid is complete and timely, and upon any further consideration deemed necessary by the School, the contractor or subcontractor may be pre-qualified for future School public works projects. A contractor's classification as "qualified" shall exempt the contractor or sub-contractor from the comprehensive submission requirements contained herein for a period of twelve (12) months. Thereafter, contractors or subcontractors who are pre-qualified must submit a complete application for continuation of "pre-qualified" standing, on a form provided by the School, (also referred to as the "short form") by December 31st for the upcoming calendar year. Failure by any pre-qualified contractor or subcontractor to timely submit its complete application for continuation of "pre-qualified" standing shall result in automatic removal of the designation, effective January 1 of the upcoming year. However, the "removed" contractor or subcontractor shall still be permitted to bid on School public works projects.

Any material changes to the contractor's status, at any time, must be reported in writing within ten (10) days of its occurrence to the School. The pre-qualification designation is solely within the discretion of the School and the School specifically reserves the right to change or revoke the designation for a stated written reason(s).

Denial of pre-qualification shall be in writing and shall be forwarded to the contractor within seven (7) working days of such decision. Any contractor denied or losing pre-qualification status may request reconsideration of the decision by submitting such request in writing to the School within five (5) business days of receipt of notice of denial.

IV. Incomplete Submissions by Bidders

It is the sole responsibility of the potential bidder to comply with all submission requirements applicable to the bidder in section I above by no later than the public bid opening. Post-bid

submissions must be submitted in accordance with section II above. Submissions deemed inadequate, incomplete, or untimely by the School may result in the automatic disqualification of the bid.

V. Responsive and Responsible Bidder Determination

The School, after review of complete and timely submissions, shall, in its sole discretion, after taking into account all information in the submission requirements, determine whether a bidder is responsive and responsible. The School specifically reserves the right to utilize all information provided in the contractor or subcontractor's submission or any information obtained by the School through its own independent verification of the information provided by the contractor.

VI. Certified Payroll

For projects in which the cost is at least \$150,000, the successful bidder and all subcontractors working on a public work project shall submit a certified payroll report utilizing the federal form now known as a WH-347 which must be prepared on a weekly basis and submitted to the School within ten (10) calendar days after the end of each week in which the bidder or subcontractor performed its work on the public work project. These certified payroll reports shall identify the job title and craft of each employee on the project, e.g. journeyman electrician or apprentice electrician.

The School may withhold payment due for work performed by a bidder if the bidder fails to timely submit its certified payroll reports until such time as such certified payroll reports are submitted. The School may also withhold payment due for work performed by a subcontractor if the subcontractor fails to timely submit its certified payroll reports until such time as such certified payroll reports are submitted. The School shall not withhold payment to a bidder for work performed by the bidder or for work performed by subcontractors who have submitted their certified payroll reports, because one or more other subcontractors failed to timely submit their certified payroll reports.

VII. Public Records

All information submitted by a bidder or a subcontractor pursuant to this Policy, including certified payrolls, are public records subject to review pursuant to the Indiana Access to Public Records law (IC 5-14-3).

VIII. Penalties for False, Deceptive, or Fraudulent Statements/Information

Any bidder that willfully makes, or willfully causes to be made, a false, deceptive or fraudulent statement, or willfully submits false, deceptive or fraudulent information in connection with any submission made to the School shall be disqualified from bidding on all School projects for a period of three years.

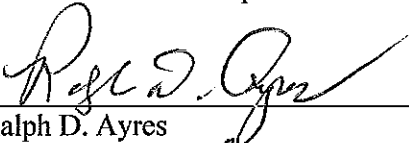
IX. Conflicting Policies

Any Policy or provision of any Policy in conflict with the provisions of this Policy is hereby repealed.

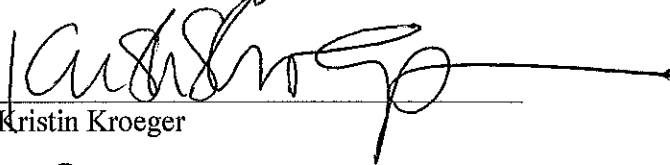
X. Severability

If any provision of this Policy is found to be invalid, the remaining provisions of this Policy shall not be affected by such a determination. These other provisions of this Policy shall remain in full force and effect without the invalid provision.

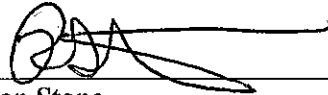
This Policy, which is entitled "Responsible Bidding Practices and Submission Requirements for Submitting Bids to Perform Construction Work," is hereby adopted by the Duneland School Corporation on the 12th day of January 2016.



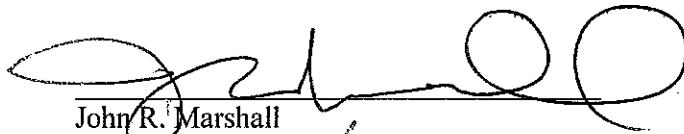
Ralph D. Ayres



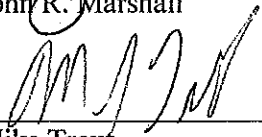
Kristin Kroeger



Ron Stone



John R. Marshall



Mike Trout

SECTION 01100

SUMMARY

PART 1 – GENERAL

1.1 PROJECT

- A. Project Name: 2018 Additions at Brummitt Elementary School.
- B. Owner's Name: Duneland School Corporation.
- C. The Project consists of the construction of :
 - 1. Concrete Foundations and Slabs.
 - 2. Steel Structure.
 - 3. Masonry exterior walls
 - 4. Ceiling and Light Fixtures
 - 5. Roofing
- D.

1.2 CONTRACT DESCRIPTION

- A. Work covered by Contract Documents: As defined in contract documents.
- B. Definitions. The following terms are used throughout the Contract Documents. The work will be governed in accord with the definitions.
 - 1. Fabricated: Fabricated pertains to items specifically assembled or made of selected materials or components to meet individual design requirements.
 - 2. Manufactured: Manufactured means standard units, usually mass produced by an established manufacturer of the respective item.
 - 3. Provide: Provide means furnish and install.
 - 4. Shop fabricated or shop made: Shop fabricated or shop made refers to items made by a Contractor or Subcontractor in their own Shop.
- C. Insurance
 - 1. Designated Purchaser:
 - a. Owner shall purchase and maintain Builder's Risk Insurance in accord with the General Conditions.
 - b. The Owner's insurance will be subject to a deductible of \$ 5,000 per occurrence.
- D. Contracts
 - 1. The Owner will award a single construction contract for all work specified in the Contract Documents.
 - 2. Upon award of the construction contract, the owner will issue a Letter of Intent to award a Construction Contract to the approved contractor. This Letter of Intent shall serve as a notice to proceed with the project according to the terms and conditions set forth in the Contract Documents, until the work under Contract Documents is completed. . The contractor shall commence all construction services as specified in the contract documents upon receipt of the Letter of Intent.

1.3 DUTIES OF CONTRACTOR

- A. The contractor shall be responsible for providing and paying for:
 - 1. Labor, materials and equipment.
 - 2. Tools, construction equipment and machinery.
 - 3. Temporary water, heat and other utilities required for construction.
 - 4. Other facilities and services necessary for proper execution and completion of work.
- B. The Architect will submit for the State of Indiana Design Release (ACDR) permit, and the Owner will pay the permit costs.
- C. The contractor shall be responsible for, and submit, for the local municipality main building permit, and the Owner will pay the permit costs.
- D. The contractor shall be responsible for paying and securing all other permits, governmental fees and licenses necessary for the proper execution and completion of the Project.
- E. The contractor shall comply with all codes, ordinances, rules, regulations, orders and other legal requirements of the public authorities which govern the performance of the work under the Contract Documents.
- F. The contractor shall coordinate, and have completed, all inspections required by public authorities

SECTION 01100

SUMMARY

relating to the performance of the work under the Contract Documents.

- G. The contractor shall have duty to promptly submit written notice to the Architect of any known or observed variances of the Contract Documents from legal requirements that may govern the work. Upon notice to the Architect, appropriate modifications will be made to the Contract Documents to account for the legal requirements. In the event the contractor fails to provide notice of any variances, he shall assume responsibility for any work known to be contrary to those legal requirements.
 - 1. The contractor shall enforce strict discipline and maintain good order among employees and subcontractors. Contractor shall not employ unfit person of those not skilled in the assigned task
- H. The contractor acknowledges that the Project is exempt from all State and Local use taxes. It shall be the duty of the contractor to: 1) obtain a sales tax exemption certificate number from the Owner; 2) place exemption certificate number on invoices for materials incorporated in work; 3) furnish copies of invoices to Owner upon request 4) file a notarized statement that all purchases made under exemption certificate were entitled to be exempt with Owner upon completion of work; and 5) pay any penalties assessed for the improper use of exemption certificate number.

1.4 OWNER OCCUPANCY

- A. The date of Substantial Completion shall be no later than August 1, 2018, 5:00 p.m. Note: Substantial Completion for this project refers to all scheduled work being a minimum 99% complete.
- B. The date of Final Completion shall be no later than September 4, 2018, 5:00 p.m. Note: Final Completion for this project refers to all scheduled work, punch list and closeout items being 100% complete.
- C. The Architect's and their consultants' services will terminate sixty (60) days after (1) the date of Substantial Completion of the Work or (2) the anticipated date of Substantial Completion identified in Specifications, whichever is earlier. Any work required of the Architect and their consultants after this date will be back-charged to the contractor by the Owner.
- D. Refer to General Conditions for Liquidated Damages.

1.5 JOB OPERATIONS

- A. Project Security:
 - 1. The contractor shall provide necessary precautions such as fences or barriers to protect Owner's personnel or members of the general public in the areas in which construction activity is on-going.
 - 2. The contractor shall securely close-off all areas of construction after working hours to prevent entry by unauthorized persons.
- B. Project Hours:
 - 1. No time restrictions will be implemented. However, at any time, the Owner may choose to restrict work hours if the Owner/District feels the contractor is causing disruption to the learning environment, etc.
 - 2. Note: Village/County noise ordinance any day of the week (call to verify times).

1.6 WORK LIMITATIONS

- A. All spaces around where work will be done may be occupied by Owner's personnel. Contractor shall limit the scope of its work during times of owner occupancy to prevent disturbing Owner.
- B. Contractor shall schedule work in such a manner as to not disrupt mechanical or electrical systems for the existing adjacent buildings during times of Owner occupancy.
- C. Contractor shall give Owner a minimum of three (3) days' notice before commencing work in Owner occupied area.

1.7 CONTRACTOR USE OF SITE AND PREMISES

- A. Contractor shall confine work at the Project site as permitted by: 1) Law; 2) Permits; 3) the Contract Documents; 4) As instructed by Owner or Owner's representative; and 5) As required for Owner's use of adjacent facilities.

SECTION 01100

SUMMARY

- B. Confer with Owner's representative and obtain full knowledge of all Project site rules and regulations affecting work.
- C. Contractor shall conform to the Project Site rules and regulations while engaged in its work.
- D. Contractor acknowledges that the Project Site rules and regulations take precedence over other rules and regulations that may exist outside such jurisdiction.
- E. Contractor shall be obligated to permit the Owner's representative to examine the contractor's list of employees, including those of his subcontractors and their agents, working on the Project Site. Contractor shall
 - 1. Keep all vehicles, mechanized or motorized equipment locked and secured at all times when parked and unattended on Owner's premises.
 - 2. Contractor shall not, under any circumstance, leave any vehicle unattended with its motor or engine running, or with its ignition key in place.
 - 3. All traffic control subject to Owner's representative's approval.
- F. Do not unreasonably encumber site with materials or equipment.
- G. Contractor shall assume full responsibility for protection safety and safekeeping of products stored on premises.
- H. Contractor shall move all stored products or equipment which interferes with operations of Owner or other subcontractors.
- I. Contractor shall obtain and pay for the use of additional storage or work areas needed for operations.
- J. Contractor shall limit use of the Project Site for work and storage to areas depicted in the drawing or area approved in advance by Owner.
- K. The contractor acknowledges that adjacent sites may be used by the Owner or members of the general public requiring contractor to maintain appropriate safety measures.
- L. The contractor shall provide access to and from the Project Site as required by law and by Owner:
- M. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.

1.8 SUBSTANCE ABUSE PREVENTION POLICY

- A. Pursuant to the Substance Abuse Prevention on Public Works Act (820 IL CS 265/1, et seq.), employees of the contractor and employees of the contractor and employees of any subcontractor are prohibited from the use of drugs or alcohol , as defined in the Act, while performing on any public works project.
- B. The contractor and any subcontractor shall file with the public body engaged in the construction of the public works: a copy of the substance abuse prevention program along with a cover letter certifying that their program meets the requirements of the Act or a letter certifying that the contractor or subcontractor has a collective bargaining agreement in effect dealing with the subject matter of this Act. A certification form is attached and must be completed by the contractor and each subcontractor to this contract.

1.9 WORK SEQUENCE

- A. Construction services as specified herein shall commence upon issuance of the Letter of Intent to Award a Construction Contract.
- B. Certificate of Insurance and all Bonds to be submitted to the Architect within 3 business days upon issuance of the Letter of Intent.
- C. All Shop Drawings to be submitted to the Architect within 21 calendar days upon issuance of the Letter of Intent.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01200

PRICE AND PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Change order procedures.

1.2 RELATED SECTIONS

- A. Section 01210 - Allowances: Payment procedures relating to allowances.
- B. Section 01270 - Unit Prices: Monetary values of unit prices, payment and modification procedures relating to unit prices.
- C. Section 01780 - Closeout Submittals.

1.3 SCHEDULE OF VALUES

- A. Submit a printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet or Architect approved similar.
- B. Submit Schedule of Values in duplicate within 15 days after of the Letter of Intent.
- C. Include in each line item, the amount of Allowances specified. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- D. Submit separate quantities and amounts for material and labor for each respective line item.
- E. Revise schedule to list approved Change Orders, with each Application For Payment.
- F. Support values given with data to substantiate their correctness.
- G. Submit quantities of designated materials.
- H. List quantities of materials specified under unit prices.
- I. Include in the line items a total amount of Contractor's overhead and profit.
- J. Payment for materials stored on or off site will be limited to those materials listed separately in Schedule of Values.
- K. Form of Submittal
 - 1. Submit typewritten Schedule of Values on 8-1/2 x 11 paper format.
 - 2. Utilize the Table of Contents of this Project Manual.
 - 3. Identify each line item with number and title of the specification Section.
 - 4. Separate costs under the various phases.
- L. Preparation
 - 1. Itemize separate line cost for each of following cost items:
 - a. Overhead and profit.
 - b. Bonds.
 - c. Insurance.
 - d. General Requirements.
 - e. Site mobilization.
 - 2. Itemize separate line item cost for work specified in each section of the specifications. Identify work of:
 - a. Contractor's own labor forces.
 - b. All subcontractors.
 - c. All major suppliers of products or equipment.
 - 3. Break down installed costs into:
 - a. Delivered cost of product, with taxes paid.
 - b. Labor cost.
 - 4. For each line item which has an installed value of more than \$10,000.00 break down costs to list amount of labor and amount of materials under each item.
 - a. Contractor, subcontractor or supplier.
 - b. Specification section number.
 - c. Description of work or material.
 - d. Quantity.
 - e. Unit Price.
 - f. Scheduled value.

SECTION 01200

PRICE AND PAYMENT PROCEDURES

- g. % of Contract.
- 5. Round off figures to nearest ten dollars.
- 6. Make sum of total costs of all items listed in Schedule equal to total contract sum.
- M. Review and Resubmittal
 - 1. After review by Architect, revise and resubmit Schedule as directed by Architect.
 - 2. Follow original submittal procedure.
- N. Update
 - 1. Update Schedule of Values when:
 - a. Change in cost occurs.
 - b. Change of subcontractor or supplier occurs.
 - c. Change of product or equipment occurs.
 - 2. Provide written justification for any changes requested by contractor.

1.4 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Present required information in typewritten form.
- C. Form: AIA G702 Application and Certificate for Payment and AIA G703 - Continuation Sheet including continuation sheets when required or Architect approved equal.
- D. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.
 - 8. Percentage of Completion
 - 9. Balance to Finish.
 - 10. Retainage.
- E. Each item on the application for payment shall include retainage in the amount of 10% of the total work completed and stored to date of application. Upon reaching Substantial Completion, and with prior authorization of the Owner and the Architect, the retainage may be reduced to 5% for each item that is deemed substantially complete on the subsequent application for payment.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products
- H. List each authorized Change Order as a separate line item, for each respective subcontractor or material supplier listing Change Order number and dollar amount as for an original item of Work.
- I. Submit three pencil copies of each Application for Payment for review and approval by Architect and Owner.
- J. Revise Application and Certificate of payment as directed by Architect.
- K. Once pencil copy has been approved by Architect, send three copies along with supporting documentation to the corporate office of the Architect.
- L. Include the following with the application:
 - 1. Transmittal letter as specified for Submittals in Section 01300.
 - 2. Construction progress schedule, revised and current as specified in Section 01300.
 - 3. Current construction photographs specified in Section 01300.
 - 4. Partial release of liens from Contractor for current period.
 - a. Release of liens to be provided on forms approved by the Architect prior to the first payment being submitted.
 - 5. Partial release of liens from all Subcontractors and vendors from prior period.
 - a. Release of liens to be provided on forms approved by the Architect prior to the first payment being submitted.
 - 6. Affidavits attesting to off-site stored products, with original invoices. Statement of transfer of title upon payment and insurance coverage specifically identifying stored items.

SECTION 01200

PRICE AND PAYMENT PROCEDURES

- M. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.5 CERTIFIED PAYROLL FOR PUBLIC WORKS PROJECTS

- A. Effective August 10, 2005 the Public Act 94-0515 amended the Prevailing Wage Act., all contractors and their subcontractors who are engaged in public works projects must provide a certified monthly payroll report either in person, by mail or electrically for the Owner's records.
- B. Each Contractor or Subcontractor performing Work on this Project shall comply in all respects with all laws governing the employment of Labor, Social Security, and Unemployment Insurance of both the State and Federal government. There shall be paid to each employee engaged in Work under this Contract at the site of the Project, no less than the minimum wage for the classifications of labor employed in compliance with 820 ILCS 130/1 et seq.. as now existing or hereafter amended.
- C. In accordance with 820 ILCS 130/5, the Contractor and each subcontractor shall 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, 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 each work day.
- D. The Contractor and each subcontractor shall submit monthly, in person, by mail, or electronically a certified payroll to the District. The certified payroll shall consist of a complete copy of the records. The certified payroll shall be accompanied by a statement signed by the contractor or subcontractor which avers that:
 - 1. such records are true and accurate;
 - 2. the hourly rate paid to each worker is not less than the general prevailing rate of hourly wages required; and
 - 3. the contractor or subcontractor is aware that filing a certified payroll that he or she knows to be false is a class B misdemeanor.
- E. Upon 2 business days notice, the contractor and each subcontractor shall make available for inspection for the records to the District, its officers and agents, and to the Director of Labor and his deputies and agents at all reasonable hours at a location within the State. The Contractor and each subcontractor shall permit his/her employees to be interviewed on the job, during working hours, by compliance investigators of the Department or the Department of Labor.

1.6 CHANGE ORDER PROCEDURES

- A. Promptly implement Change Order procedures.
 - 1. Provide full written data required to evaluate changes.
 - 2. Maintain detailed records of work done on time-and-material/force account basis.
 - 3. Provide full documentation to Architect.
- B. Designate in writing the member of Contractor's organization:
 - 1. Who is authorized to accept changes in Work.
 - 2. Who is responsible for informing others in Contractor's employ of authorization of changes in Work.
 - 3. If other than the Owner, the Owner will designate in writing the person(s) authorized to execute Change Orders.
- C. Initiation of Contract Changes:
 - 1. Requests for change by the Contractor shall be initiated in writing.
 - 2. Subcontractors initiating a request for change shall direct their requests to the Contractor.
 - 3. The Architect will review and direct the Contractor's requests for change to the Owner or Owner's Representative with recommendations.
 - 4. Requests for change affecting contract sum or contract completion shall be made prior to starting any changes to the construction work or purchasing of materials. Failure to make appropriate written requests will invalidate any claims for additional costs or time for said work.

SECTION 01200

PRICE AND PAYMENT PROCEDURES

- D. Owner Authorizes:
 - 1. The Owner or Owner's Representative, having considered the necessity of the requested change and availability of funds will authorize the Architect to prepare a request for proposal (RFP).
- E. Architect Prepares Request for Proposal:
 - 1. The Architect, following consultation with the Contractor regarding subcontracts which will be affected by the proposed change, will prepare a RFP for Contractor response.
 - 2. Two sets of the RFP and Supplemental Drawings and Specifications for each proposed change are transmitted to the Contractor.
- F. Contractors Prepare Proposals:
 - 1. Detailed Breakdown of Material Equipment and Labor:
 - a. The Contractor or Subcontractor whose work is affected by a proposed change shall prepare a proposal for change.
 - b. The detailed breakdown shall be prepared in accordance with the Contract Documents.
 - c. If a change affects work covered by agreed on prices, such prices shall be used as the basis for adjustments to the contract sum.
 - d. In all other cases, adjustments to the contract sum shall be based on the Contractor's direct cost, including costs of material, labor, equipment, bonds and taxes as applicable.
 - e. Labor rates shall be itemized on the detailed breakdown indicating the trade base wage rate, total union fringe benefits, FICA, unemployment compensation insurance and workmen's compensation insurance. Labor charges shall not include costs for inefficiencies of construction supervision or labor.
 - f. Change order adjustments to the contract developed above shall include amounts for overhead and profit which do not exceed average amounts indicated in the Schedule of Values, or an amount of 15%, whichever is less, and that no overhead and profit shall be deducted from the total price for changes reducing the cost of the contract. If the changed work is performed by a subcontractor, no more than 10% may be added to the subcontractor's costs for overhead and profit. An additional not to exceed 5% may be included for the Contractor's overhead and profit on all work provided directly by a subcontractor employed on the project.
- G. Contractor Reviews:
 - 1. Reviews: The Contractor shall review all proposals for:
 - a. Conformance with the RFP to ensure that all items and only those items of work affected by the proposed change are included.
 - b. Assurance that the proposals are submitted in conformance with the Contract Documents.
 - 2. Transmittal: The Contractor shall forward to the Architect three complete sets of proposals with its recommendation regarding the proposal.
 - a. In making recommendations, the Contractor shall certify that the price is appropriate and if it is not appropriate, shall state the reasons for not certifying the price.
 - b. Proposals, complete with all required information, shall be submitted to the Architect within three weeks of the date of the RFP in order to receive further consideration.
- H. Architect Reviews:
 - 1. The Architect reviews the Contractor's proposals for completeness and conformance with the RFP and Contract Documents. Proposals which are incomplete or have inadequate detailed breakdowns will be returned to the Contractors for resubmission.
 - 2. The Architect will review and, when appropriate, approve all price proposals recommending Owner approve issuance of a change order.
 - 3. When the Architect considers the costs or quantities to be inappropriate to the work requested, the Architect will notify the Contractor in writing of the concerns and the Contractor will provide the necessary backup materials to justify the submittal or modify the submittal.
 - 4. Submittals not properly justified will not be forwarded to the Owner and written notice as to the reasons will be forwarded to the Contractor. After 30 days of said written notification and no further response by the Contractor, the request will be considered inappropriate and will

SECTION 01200

PRICE AND PAYMENT PROCEDURES

receive no further consideration.

- I. Architect Issues Change Order:
 - 1. The Architect, having received what is believed to be an appropriate and acceptable Contractor proposal for the proposed change and having received Owner's approval to issue a change order, the Architect will issue a Change Order.
 - 2. The Change Order package prepared by the Architect for submittal to the Owner shall contain the following items:
 - a. Three originals of the Change Order form with appropriate original signatures, along with supporting documentation including, but not limited to:
 - 1) Request for Proposal with signatures.
 - 2) Pristine copy of drawings and specifications.
 - 3) On changes initiated by the Architect, a letter explaining the circumstances related to the need for the change.
 - 4) On Owner requested Change Orders, a letter of request signed by the Owner's Representative.
 - 5) Change Order Authorization Form for Owner's Signature and permanent record in accord with Public Act 85-1295. When required on public work--for changes greater than \$10,000.00 or 30 Days.
- J. Owner Approves or disapproves Change Order: For change in Contract Sum and/or Contract Time.
- K. One copy of approved Change Order with original signatures will be returned to the Contractor, or notice and explanation as to why it has been rejected will be forwarded to the Contractor.

1.7 APPLICATION FOR FINAL PAYMENT

- A. Submit all closeout documents and comply with all requirements as put forth in Section 01780 - Closeout Submittals.
- B. Once closeout submittal have been approved by Architect, prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due; including properly executed Consent of Surety.
- C. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified in Section 01780.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01210

ALLOWANCES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Cash allowances.
- B. Payment and modification procedures relating to allowances.

1.2 RELATED SECTIONS

- A. Section 01200 - Price and Payment Procedures: Additional payment and modification procedures.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.
- D. Any unused allowance funds will be credited back to Owner by Change Order prior to close out.

1.4 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- C. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- D. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.
- B. Architect Responsibilities:
 - 1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
 - 2. Select products in consultation with Owner and transmit decision to Contractor.
 - 3. Prepare Allowance Authorization.
- C. Contractor Responsibilities:
 - 1. Assist Architect in selection of products, suppliers, and installers.
 - 2. Obtain proposals from suppliers and installers and offer recommendations.
 - 3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
 - 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.

1.6 CASH ALLOWANCES

- A. Costs Included in cash allowances:
 - 1. Allowances shall cover the cost to the Contractor of materials and equipment delivered to the site and all required taxes, less applicable trade discounts.
 - 2. Contractor's costs for unloading and handling at the site, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Base Bid and not in the allowances.

SECTION 01210

ALLOWANCES

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Cash Allowance: Include contingency allowance of \$10,000 for use according to owner's instructions.
- B. Allowance No. 2: Testing and Inspection Allowance: Include the sum of \$5,000 for payment of inspecting and testing services specified in Section 01400.

END OF SECTION

SECTION 01270

UNIT PRICES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. List of unit prices, for use in preparing Bids.
- B. Measurement and payment criteria applicable to Work performed under a unit price payment method.
- C. Defect assessment and non-payment for rejected work.

1.2 RELATED SECTIONS

- A. Unit prices listed on Bid Form

1.3 COSTS INCLUDED

- A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.4 APPLICATION

- A. Enter unit prices for each work item in Bid Form in space provided. Omission may result in rejection of bid.
- B. Contractor shall take all measurements and compute quantities. Measurements and quantities will be verified by field measurement or assessment.

1.5 UNIT QUANTITIES SPECIFIED

- A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.6 MEASUREMENT OF QUANTITIES

- A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.
- B. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect.
 - 1. Contractor shall provide necessary equipment, workers, and survey personnel as required at no additional cost to Owner.
- C. Measurement Devices:
 - 1. Weight Scales: Inspected, tested and certified by the applicable state Weights and Measures department within the past year.
 - 2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
 - 3. Metering Devices: Inspected, tested and certified by the applicable State department within the past year.
- D. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
- E. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
- F. Measurement by Area: Measured by square dimension using mean length and width or radius.
- G. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
- H. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.
- I. Perform surveys required to determine quantities, including control surveys to establish measurement reference lines. Notify Architect prior to starting work.
- J. Contractor's Engineer Responsibilities: Sign surveyor's field notes or keep duplicate field notes, calculate and certify quantities for payment purposes.

1.7 PAYMENT

SECTION 01270

UNIT PRICES

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work which is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit sum/price.
- B. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from the transporting vehicle.
 - 4. Products placed beyond the lines and levels of the required Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected Products.

1.8 DEFECT ASSESSMENT

- A. Replace Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of Owner, it is not practical to remove and replace the Work, Owner will direct one of the following remedies:
 - 1. The defective Work may remain, but the unit sum/price will be adjusted to a new sum/price at the discretion of Owner.
 - 2. The defective Work will be partially repaired to the instructions of the Owner, and the unit sum/price will be adjusted to a new sum/price at the discretion of Owner.
- C. The individual specification sections may modify these options or may identify a specific formula or percentage sum/price reduction.
- D. The authority of Architect to assess the defect and identify payment adjustment is final.

1.9 SCHEDULE OF UNIT PRICES

- A. Contractor shall include unit prices in Bid Form for specified item.
 - 1. Structural Fill - CA-6: refer to Section 02316 for description.
 - 2. Graded Granular Fill - CA-6: refer to Section 02316 for description.
 - 3. Open Granular Fill - CA-7: refer to Section 02316 for description.
 - 4. Concrete Fill - Lean Concrete: refer to Section 02316 for description.
 - 5. Remove Unsuitable Material:

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01300

ADMINISTRATIVE REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Site mobilization meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Progress photographs.
- F. Coordination drawings.
- G. Submittals for review, information, and project closeout.
- H. Number of copies of submittals.
- I. Submittal procedures.

1.2 RELATED SECTIONS

- A. Document 00700 - General Conditions: Dates for applications for payment.
- B. Section 01100 - Summary: Stages of the Work, Work covered by each contract, occupancy,.
- C. Section 01200 - Price and Payment Procedures:
- D. Section 01325 - Construction Progress Schedule: Form, content, and administration of schedules.
- E. Section 01700 - Execution Requirements: Additional coordination requirements.
- F. Section 01780 - Closeout Submittals: Project record documents.

1.3 PROJECT COORDINATION

- A. Project Coordinator: Contractor.
- B. Cooperate with the Contractor in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Contractor.
- D. Comply with procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Contractor for use of temporary utilities and construction facilities.
 - 1. Direct and check-out of utilities, operational systems and equipment.
 - 2. Record dates of start of operation of systems and equipment.
- F. Coordinate field engineering and layout work under instructions of the Contractor.
- G. Develop and implement procedure for review and processing of applications for progress and final payments: Submit recommendation to Architect for Certification to Owner for Payment.
- H. Establish on-site lines of authority and communication; schedule and conduct project meetings among:
 - 1. Owner's Representative.
 - 2. Architect.
 - 3. Subcontractors.
- I. Cost Control:
 - 1. Maintain cost accounting records for authorized work performed under Unit Costs.
 - 2. Develop and implement procedure for review and processing of applications for progress and final payments: Submit recommendation to Architect for Certification to Owner for Payment.
- J. Administer processing of:
 - 1. Shop drawings, product data and samples.
 - 2. Field drawings.
 - 3. Coordination drawings.
 - 4. Closeout submittals.
- K. Maintain Reports and Records at Job Site:
 - 1. Daily log of progress of work, available to Architect and Owner.
 - 2. Verify that all subcontractors maintain record documents on a current basis.

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ADMINISTRATIVE REQUIREMENTS

3. At completion of Project, assemble record documents from all subcontractors and deliver to the Architect in accordance with Section 01780.
4. Assemble documentation for handling of claims and disputes.
- L. Contractor to verify that specified cleaning is done during progress of work and at the completion of each subcontractor's work.
- M. Make the following types of submittals to Architect through the Project Coordinator:
 1. Requests for interpretation.
 2. Requests for substitution.
 3. Shop drawings, product data, and samples.
 4. Submittals for information.
 5. Test and inspection reports.
 6. Design data.
 7. Manufacturer's instructions and field reports.
 8. Applications for payment and change order requests.
 9. Progress schedules.
 10. Coordination drawings.
 11. Closeout submittals.
- N. Upon contractor's determination of Substantial Completion of work or portion thereof, notify Architect in writing as to project status and request inspection and compilation of punch list of incomplete or unsatisfactory items.
- O. Upon Architect's Certification of Date of Substantial Completion, supervise correction and completion of work within specified period.
- P. Upon Contractor's determination that Work is finally complete:
 1. Submit written notice to Architect and Owner, that Work is ready for final inspection.
 2. Secure and transmit to Architect required closeout submittals as put forth in Section 01780.
- Q. Contractor to turn over to Architect for approval all items for closeout as put forth in Section 01780.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION

3.1 PRECONSTRUCTION MEETING

- A. Architect will schedule a meeting within 10 days of date of Letter of Intent.
- B. Attendance Required:
 1. Owner.
 2. Architect.
 3. Contractor:
 4. Field Superintendent
 5. Project Manager
 6. Safety Representative.
 7. Contractor's Major Subcontractors.
- C. Minimum Agenda:
 1. Items required to be submitted by Contractor at Preconstruction Meeting:
 - a. Fully executed bonds and Insurance Certificates
 - b. List of major Subcontractors and suppliers.
 - c. Tentative construction schedule.
 - d. Letter from Project Safety Representative certifying that he/she will be empowered as the Contractor's Safety Engineer, is responsible for enforcing all safety requirements and is familiar with the Manual of Accident Prevention in Construction by the Associated General Contractors of America, current edition, and further that the Contractor will maintain at the project a copy of said publication and will strictly enforce the applicable requirements of same.

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ADMINISTRATIVE REQUIREMENTS

2. Distribute and discuss documents required to be submitted by Contractor at Preconstruction meeting.
3. Execution of Owner-Contractor Agreement.
4. Identify critical work sequencing.
5. Discussion of schedule of values, and progress schedule.
6. Discussion of list of Subcontractors, list of Products, schedule of values, and progress schedule.
7. Designation of responsible personnel representing the parties to Contract; Owner, Architect and Contractor.
8. Establish chain of Authority.
9. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
10. Scheduling.
 - a. Discuss major equipment deliveries and priorities.
11. Review of use of premises:
 - a. Office and storage areas.
 - b. Access to site and facilities.
12. Owner's requirements.
13. Security procedures.
14. Review requirements of and procedures for maintaining record documents.
15. Architect will record minutes and distribute copies within five days after meeting to participants, with copies to Contractor, Owner, participants, and those directly affected by decisions made.

3.2 SITE MOBILIZATION MEETING

- A. Contractor will schedule a meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
 1. Contractor.
 2. Owner.
 3. Architect.
 4. Special Consultants.
 5. Contractor's Superintendent.
 6. Major Subcontractors.
 7. Safety Representative.
- C. Agenda:
 1. Use of premises by Owner and Contractor.
 2. Owner's requirements and occupancy prior to completion.
 3. Construction facilities and controls provided by Owner.
 4. Temporary utilities provided by Owner.
 5. Survey and building layout.
 6. Security and housekeeping procedures.
 7. Schedules.
 8. Application for payment procedures.
 9. Procedures for testing.
 10. Procedures for maintaining record documents.
 11. Requirements for start-up of equipment.
 12. Inspection and acceptance of equipment put into service during construction period.
 13. Establish safety and first aid procedures.
 14. Procedures and reviews of mock-up panels.
- D. Contractor will record minutes and distribute copies within five (5) days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

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ADMINISTRATIVE REQUIREMENTS

3.3 PROGRESS MEETINGS

- A. Contractor will schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.
- B. Contractor will make arrangements for meetings, prepare agenda with copies for participants 5 business days in advance of meeting date, preside at meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems which impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to Work.
 - 14. Process Payment Requests Monthly.
- E. Contractor shall record minutes and distribute copies within Five (5) calendar days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 CONSTRUCTION PROGRESS SCHEDULE - See Section 01325

3.5 PROGRESS PHOTOGRAPHS

- A. Provide photographs of site and construction throughout progress of Work
- B. Take photographs as evidence of existing project conditions.

3.6 COORDINATION DRAWINGS

- A. Conduct coordination meetings in accordance with each respective section as work progresses. Contractor shall coordinate with Architect for such meetings.
- B. Provide information required by Contractor for preparation of coordination drawings.
- C. Review drawings prior to submission to Architect.

3.7 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01780 - CLOSEOUT SUBMITTALS.

3.8 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.

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3. Test reports.
 4. Inspection reports.
 5. Manufacturer's instructions.
 6. Manufacturer's field reports.
 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.9 SUBMITTALS FOR PROJECT CLOSEOUT

- A. When the following are specified in individual sections, submit them at project closeout:
1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Lien Waivers.
 6. Other types as indicated.
- B. Submit for Owner's benefit during and after project completion.

3.10 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review or for information:
1. The Contractor has the option of providing Submittals for review or for information either as a hard copy or electronically as outlined below.
 2. If Submittal is provided as a hard copy:
 - a. Submit the number of copies which the Contractor requires, plus three copies which will be retained by the Architect.
 3. If Submittal is provided electronically:
 - a. Deliver one copy of submittal to Architect via email or Compact Disc in PDF file format.
 - b. At Architect's discretion, the reviewed submittal, with any corrections, will be returned as one electronic copy in PDF format, or as one hard copy delivered to the Contractor.
- B. Documents for Project Closeout: Shall be submitted as hard copies only. Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
1. After review, produce duplicates.
 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.11 SUBMITTAL PROCEDURES

- A. Sequentially number the transmittal form and clearly indicate the respective specification section number for reference. Revise submittals with original number and a sequential alphabetic suffix.
- B. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- C. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- D. Deliver submittals to Architect at business address or via email.
- E. Schedule submittals to expedite the Project, and coordinate submission of related items.
- F. For each submittal for review, allow 10 days excluding delivery time to and from the Contractor.
- G. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- H. Provide space for Contractor and Architect review stamps.
- I. Shop drawings which incorporate, in part or in whole, direct reproductions of the contract documents, are not acceptable and will be returned, without review, to the contractor, for resubmittal.
- J. All shop drawings which are poorly prepared or hand written will be returned, without review, to the contractor for resubmittal. Architect's determination of properly prepared shop drawings is

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final.

K. Electronic Media/Files

1. Construction drawings for this project have been prepared by the Architect and Engineer utilizing the following Computer Aided Drawing (CAD) System: Auto Cad Release 2015.
2. Contractors and Subcontractors may purchase electronic media files of the Contract Documents. Selected sheets will cost \$250 for all sheets within a single discipline.
3. Upon request to purchase electronic media or files, the Contractor shall complete the "Request for Electronic Drawing Files" issued by the Architect and issue the appropriate fee to the Architect.
4. Sheets can be formatted to provide background information only, background plus various layers of equipment; or of complete sheets as issued for construction.
5. The Contractor may utilize these CAD Drawings in the preparation of their Shop Drawings and as built drawings only.
6. The information issued is provided in a good faith effort to expedite the Project and simplify the efforts of the Contractor with no guarantee by the issuer as to the accuracy or correctness of the information provided. The Architect accepts no responsibility or liability for the Contractor's or subcontractor's use of these CAD documents.
7. The use of these CAD documents by the Contractor(s) does not relieve them of their responsibility to field measure existing conditions and to properly fit the work to the Project.
8. These documents will be provided when purchased for the convenience of the Contractor and this Project. Ownership and use of the issued documents are governed by the terms of the General Conditions.

L. Submittals

1. **Submit all submittals within 21 calendar days after date of Letter of Intent.** Failure to do so may cause scheduled contractor payments to be withheld.
2. **Submit all manufacturer's letter's confirming prompt ordering of all material and equipment within 21 calendar days after date of Letter of Intent.** Failure to do so may cause scheduled contractor payments to be withheld. Confirmation Letters are to include the following:
 - a. Order date.
 - b. Manufacturing date.
 - c. Delivery date.
 - d. Confirmation that no factors will deter delivery on schedule.
 - e. Any other pertinent information.
3. Submit four prints of shop drawings, and number of copies of product data and samples which Contractor requires for distribution and future submission under Section 01700 plus one copy which will be retained by Architect.
4. Submit number of samples specified in each of specification sections.
5. Accompany submittals with transmittal letter, in duplicate, containing:
 - a. Date.
 - b. Project title and number.
 - c. Contractor's name and address.
 - d. Relevant Specification section number.
 - e. The number of shop drawings, product data and samples submitted.
 - f. Notification of any deviations from Contract Documents.
 - g. Other pertinent data.
6. Submittals shall include:
 - a. Date and revision dates.
 - b. Project title and number.
 - c. Names of:
 - 1) Architect
 - 2) Architect's consultant(s)
 - 3) Subcontractor
 - 4) Sub-subcontractor.
 - 5) Supplier.

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- 6) Manufacturer.
- 7) Separate detailer when pertinent.
- d. Identification of product or material.
- e. Relation to adjacent structure or material.
- f. Field dimensions, clearly identified as such.
- g. Specification section and page number.
- h. Specified standards, such as ASTM number or Federal Specification.
- i. A blank space, 4" x 6" for Architect's stamp.
- j. Identification of previously approved deviation(s) from Contract Documents.
- k. Identification of color selections required and color selection charts.
- 7. All shop drawing submittals received by the Architect which do not bear the contractor's approval stamp and initials or signatures will be returned, without review, to the contractor, for resubmittal.
- 8. All shop drawing submittals which do not contain a reproducible transparency set of the submittal will be returned without review, to the contractor, for resubmittal.
- M. Resubmission Requirements
 - 1. Shop Drawings:
 - a. Definition: Shop Drawings are original drawings prepared by Contractor, subcontractor, sub-subcontractor, supplier or distributor, which illustrates some portion of the work, showing fabrication, layout, setting or erection details.
 - b. Revise initial drawings as directed and resubmit in accordance with submittal procedures.
 - c. Indicate on drawings all changes which have been made in addition to those requested by Architect.
 - d. Clearly indicate by revision number and date, each resubmittal of each shop drawing.
 - e. When revised for resubmission, identify all changes made since previous submission.
 - f. Shop drawings which incorporate, in part or in whole, direct reproductions of the contract documents, will NOT be accepted and will be returned without review.
 - 2. Product data and samples: Submit new data and samples as specified for initial submittal.
 - 3. Make all resubmittals within 10 business days after date of Architect's previous review.
- N. Distribution of Submittals After Review
 - 1. Contractor will distribute copies of shop drawings and product data which carry Architect's stamp to:
 - a. Contractor's file.
 - b. Job site file.
 - c. Record documents file.
 - d. Subcontractors.
 - e. Suppliers.
 - f. Fabricators.
 - g. Other contractors as required.
 - 2. Distribute samples as directed in accordance with Contract Documents.
 - 3. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- O. Contractor Responsibilities
 - 1. Review shop drawings, product data and samples prior to submission to the next level of authority.
 - 2. Verify:
 - a. Field dimensions and drawing dimensions.
 - b. Field construction criteria.
 - c. Catalog numbers and similar data.
 - d. Compliance of items submitted with Contract Documents.
 - e. Dimensions and elevations requirements necessary to properly install product.
 - 3. Coordinate each submittal with requirements of:
 - a. The Work.
 - b. The Contract Documents.

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ADMINISTRATIVE REQUIREMENTS

- c. The work of other subcontractors.
- 4. Contractor's responsibility for errors and omissions in submittals is not relieved by Architect/Engineer's review of submittals.
- 5. Notify Architect in writing prior to submission and specifically on the submittal, of proposed deviations in submittals from contract requirements.
- 6. Contractor's responsibility for notifying Architect of deviations and for correcting deviations not properly identified in submittals is not relieved by Architect's review of improperly documented submittals.
- 7. Do not begin any work which requires submittals without having Architect's stamp and initials or signature indicating review.
- 8. After Architect's review, make response required by Architect's stamp and distribute copies. Indicate by transmittal that copy of approved data has been distributed.
- 9. Subcontractors:
 - a. Subcontractors send their submittals to the Contractor.
 - b. Contractor reviews and initials submittals for compliance with scope, coordination and integration with the work of all other subcontractors.
 - c. Contractor transmits his reviewed copies of subcontractor's submittals to Architect.
 - d. Contractor retains copy of submittals after review by Architect and distributes copies to submitting subcontractor and to other subcontractors for coordination and integration.
 - e. Contractor: Enforce resubmission requirements.
- P. Architect's Duties
 - 1. Review submittals within 10 business days.
 - 2. Review for compliance to design concept of project.
 - 3. Review all requests for proposed deviations. Obtain Owner's concurrence and respond to Contractor's request.
 - 4. Review of separate item does not constitute review of an assembly in which item functions.
 - 5. Affix stamp, date, and initials or signature certifying to review of submittal, and with instructions for contractor response.
 - 6. Return submittals to Contractor for response or distribution.
 - 7. Select product colors upon receipt of all shop drawings and submittals requiring color selections.
- Q. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01315

MECHANICAL AND ELECTRICAL COORDINATOR

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Services of a mechanical and electrical coordinator.
- B. Coordination documents.

1.2 RELATED SECTIONS

- A. Section 01100 - Summary: Responsibilities of separate contractors.
- B. Section 01300 - Administrative Requirements: Additional requirements for coordination.
- C. Section 01600 - Product Requirements: Spare parts and maintenance materials.
- D. Section 01700 - Execution Requirements: Starting of Systems. Systems Demonstration.
- E. Section 01780 - Closeout Submittals: Project record documents.

1.3 REFERENCES

- A. See individual sections in Division 15 and 16.
- B. Equipment, devices, systems, workmanship, shall be entirely suitable and safe for each respective application and shall be in full compliance with all specified standards and laws of state and utility companies.
- C. Where laws so require, written approval shall be obtained for system from proper authorities before ordering equipment.

1.4 MECHANICAL AND ELECTRICAL COORDINATOR

- A. Employ and pay for services of a person, technically qualified and administratively experienced in field coordination for the type of mechanical and electrical work required for this Project, for the duration of the Work.
- B. Contractor shall act as coordinator of General, Plumbing, Heating, Ventilating, Air Conditioning, Fire Protection, and Electrical Sub-contract Work for the duration of construction.

1.5 SUBMITTALS

- A. Submit name, address, and telephone number of Contractor and name of principal officer for review.
- B. Submit coordination drawings and schedules prior to submitting shop drawings, product data, and samples.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 COORDINATION REQUIRED

- A. Coordinate progress schedules, including dates for submittals and for delivery of Products.
- B. Conduct meetings among Subcontractors and others concerned with the Work, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.
- C. Participate in progress meetings. Report on progress of Work to be adjusted under coordination requirements, and any required changes in schedules. Transmit minutes of meetings and reports to concerned parties.
- D. Each subcontractor shall be responsible for all of their work fitting into place in a neat and concise manner in accordance with the specifications and intent of the drawings and to the approval of the Architect.
- E. Confer with other subcontractors regarding the location and size of pipes, equipment, fixtures, conduit, ducts, openings, switches, outlets, and other mechanical and electrical items, so that there shall be no interferences between the installation and the progress of the work of any contractor on the project.
- F. References to contractors in specifications and drawings include respective subcontractors.

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MECHANICAL AND ELECTRICAL COORDINATOR

3.2 COORDINATION DRAWINGS

- A. Prepare coordination drawings to organize installation of Products for efficient use of available space, for proper sequence of installation, and to identify potential conflicts.
- B. Prepare a master schedule to identify responsibilities under each section of Divisions 1 through 17 of the Project Manual for activities which directly relate to this work, including submittals and temporary utilities.
- C. Identify electrical power characteristics and control wiring required for each item of equipment.
- D. Maintain documents for the duration of the Work, recording changes due to site instructions, modifications or adjustments.
- E. The Mechanical and Electrical drawings are diagrammatic and shall be followed as closely as actual construction of the building and the work of other contractors will permit. Make minor changes from drawings to make the work of each contractor conform to general building construction and the work of other contractors.
- F. After Architect review of original and revised documents, reproduce and distribute copies to concerned parties.

3.3 COORDINATION OF SUBMITTALS

- A. Review Shop Drawings, Product Data, and Samples for compliance with Contract Documents and for coordination with work of the Project Manual. Transmit for review, copy reviewed documents to Architect.
- B. A copy of all submittals that include information pertinent to another subcontractor shall be submitted to them for review and information.
- C. Check field dimensions and clearances and relationship to available space and anchors.
- D. Check compatibility with equipment and Work of other sections, electrical characteristics, and operational control requirements.
- E. Check motor voltages and control characteristics.
- F. Coordinate controls, interlocks, wiring of pneumatic switches, and relays.
- G. Coordinate wiring and control diagrams.
- H. Review the effect of any changes on work of other sections.
- I. Verify information and coordinate maintenance of record documents.

3.4 COORDINATION OF SUBSTITUTIONS AND MODIFICATIONS

- A. Review proposals and requests for substitution prior to submission to Architect.
- B. Verify compliance with Contract Documents and for compatibility with Work and Products of other sections.
- C. Submit with recommendation for action.
- D. Space Preference:
 - 1. Carefully verify and coordinate the location and level of conduit, pipes, and ducts. Preliminary levels shall be run and verified with other subcontractors so that conflicts may be avoided. Where conflicts occur the following preference schedule shall be followed:
 - a. Recessed Electrical Fixtures.
 - b. Storm Drainage.
 - c. Sprinkler Piping.
 - d. High Pressure Ductwork
 - e. Sanitary Drainage
 - f. Hot and Chilled Water.
 - g. Low Pressure Ductwork.
 - h. Domestic Water, Storm, and Vent Lines.
 - i. Electrical Conduits.
- E. No other work shall have preference over plumbing lines below plumbing fixtures or electrical work above or below switchgear and electrical panels.
- F. No piping conveying fluids shall be installed directly over electrical equipment or through elevator shafts.
- G. Change in equipment:

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MECHANICAL AND ELECTRICAL COORDINATOR

1. When a change in specified or scheduled equipment including sizes shown, is made or directed for any reason, the contractor making the change shall be responsible for generating coordination drawings showing the new layout of all equipment, indicating required clearances, connection points, and the rerouting of piping, ductwork and conduit.
 2. The contractor making the change shall pay for all costs incurred by the other contractors to make the changes.
- H. Equipment requiring more than one type of connection, service or subcontractor to install it:
1. Whenever a piece of equipment is to be supplied by one contractor, but various connections to the equipment must be made by other contractors, the contractor supplying the equipment shall consult with the other contractors before ordering this equipment.
 2. Opening size and location for access to any mechanical or electrical equipment, or the placement, maintenance or removal of that equipment shall be coordinated between contractors.

3.5 OBSERVATION OF WORK

- A. Observe Work for compliance with Contract Documents.
- B. Maintain a list of observed deficiencies and defects; promptly submit.
- C. Unless explicitly stated to the contrary, each Contractor shall provide each item of equipment or material hereinafter specified, complete with all fittings, supports, trim, piping, and insulation for a complete and properly operating installation.
- D. Equipment and materials shall be installed according to the manufacturer's instructions unless otherwise specifically directed by the Contract Documents.
- E. Wiring of Mechanical Equipment and Motors
 1. Unless otherwise specified the Electrical contractor shall provide conduits, wiring, disconnects, starters, thermal overload heaters, holding coils, remote pushbutton stations and pilot lights for all electrically operated mechanical equipment including final connections to the equipment and as hereinafter specified leaving the equipment ready for operation.
 2. Where starters or control panels come as an integral part of the respective equipment, the Electrical contractor shall furnish and install a disconnect switch and make final connections to the line side of the starter. Wiring beyond this point shall be by the contractor or equipment manufacturer furnishing the equipment unless otherwise shown on the electrical drawings.
 3. Each respective Mechanical contractor shall provide conduit and wiring for all automatic control devices from the holding coils of the starter or the ungrounded load side of manual motor starters, except remote pushbutton stations, and pilot lights. All work shall be in accordance with Division 16.
 4. Each contractor shall consult with the Electrical Contractor before ordering or installing equipment to coordinate the motor type, voltage and size with the starter type, holding coil voltage, thermal overload capacities, interlocks and shall be responsible to insure that the equipment installed is of proper size and type.
 5. After wiring is completed by the Electrical contractor, each equipment contractor shall inspect the wiring before motors are operated. When discrepancies are discovered, notify the Electrical contractor in writing of the discrepancies. After changes are complete the contractor who furnished the motor shall be completely responsible for motor protection during the warranty period including initial startup of each motor. Electrical contractor shall be responsible for the correct rotation, supply voltage and grounding of motors.
- F. Grounding: Electrically operated equipment shall be grounded in accordance with Division 16.

3.6 DOCUMENTATION

- A. Observe and maintain a record of tests. Record:
 1. Specification section number and product name.
 2. Name of Contractor, Subcontractor.
 3. Name of testing agency and name of inspector.
 4. Name of manufacturer's representative present.
 5. Date, time, and duration of tests.

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MECHANICAL AND ELECTRICAL COORDINATOR

- 6. Type of test, and results.
- 7. Retesting required.
- B. Assemble background documentation for dispute and claim settlement.
- C. Submit copies of documentation to Architect upon request.

3.7 EQUIPMENT START-UP

- A. Verify utilities, connections, and controls are complete and equipment is in operable condition as required by Section 01700.
- B. Observe start-up and adjustments, test run, record time and date of start-up, and results.
- C. Observe equipment demonstrations to Owner; record times and additional information required for operation and maintenance manuals.

3.8 INSPECTION AND ACCEPTANCE OF EQUIPMENT

- A. Prior to inspection, verify that equipment is tested, operational, clean, and ready for operation.
- B. Assist Architect with review. Prepare list of items to be completed and corrected.
- C.

END OF SECTION

SECTION 01325

CONSTRUCTION PROGRESS SCHEDULE

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

1.2 RELATED SECTIONS

- A. Section 01100 - Summary: Work sequence.

1.3 REFERENCES

- A. AGC (CPM) - The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry; Associated General Contractors of America; 1976.

1.4 PRECONSTRUCTION MEETING

- A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations for the first 90 days of Work, with a general outline for remainder of Work
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
 - a. Within 10 days after joint review, submit complete schedule.
- D. Submit updated schedule every 30 days or as requested by Architect.
- E. Submit the number of opaque reproductions that Contractor requires, plus one copy which will be retained by Architect and Owner. Furnish additional copies when directed.
- F. Submit under transmittal letter form specified in Section 01300.

1.5 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with five years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.6 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Diagram Sheet Size: Maximum 11x17 inches or width required.
- C. Sheet Size: Minimum of 8-1/2 x 11 inches, Maximum of 24" x 36".
- D. Scale and Spacing: To allow for notations and revisions.

1.7 START OF CONSTRUCTION SERVICES

- A. Construction services as specified herein shall commence upon issuance of the Letter of Intent to Award a Construction Contract.

PART 2 – PRODUCTS - NOT USED

SECTION 01325

CONSTRUCTION PROGRESS SCHEDULE

PART 3 – EXECUTION

3.1 PRELIMINARY SCHEDULE

- A. Prepare (preliminary) schedule in the form of a horizontal bar chart.

3.2 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide sub-schedules for each stage of Work identified in Section 01100.
- E. Provide sub-schedules to define critical portions of the entire schedule.
- F. Include conferences and meetings in schedule.
- G. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- H. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, Products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- I. Indicate delivery dates for owner-furnished products.
- J. Coordinate content with schedule of values specified in Section 01200.
- K. Provide legend for symbols and abbreviations used.

3.3 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.4 NETWORK ANALYSIS

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum 15 day intervals.
 - 4. Earliest start date.
 - 5. Earliest finish date.
 - 6. Actual start date.
 - 7. Actual finish date.
 - 8. Latest start date.
 - 9. Latest finish date.
 - 10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
 - 11. Monetary value of activity, keyed to Schedule of Values.
 - 12. Percentage of activity completed.
 - 13. Responsibility.
- D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and re-computation of all dates and float.
- E. Required Reports: List activities in sorts or groups:
 - 1. By preceding work item or event number from lowest to highest.
 - 2. By amount of float, then in order of early start.
 - 3. By responsibility in order of earliest possible start date.
 - 4. In order of latest allowable start dates.
 - 5. In order of latest allowable finish dates.

SECTION 01325

CONSTRUCTION PROGRESS SCHEDULE

6. Contractor's periodic payment request sorted by Schedule of Values listings.
7. Listing of basic input data which generates the report.
8. Listing of activities on the critical path.

3.5 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 5 days.

3.6 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors.

3.7 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

SECTION 01400

QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. References and standards.
- B. Quality assurance submittals.
- C. Mock-ups.
- D. Control of installation.
- E. Tolerances.
- F. Testing and Inspection Agencies.
- G. Manufacturers' field services.

1.2 RELATED SECTIONS

- A. Section 01210 - Allowances: Allowance for payment of testing services.
- B. Section 01300 - Administrative Requirements: Submittal procedures.
- C. Section 01600 - Product Requirements: Requirements for material and product quality.

1.3 SUBMITTALS

- A. Design Data: Submit for Architect's knowledge as contract administrator or for the Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- B. Test Reports: After each test/inspection, promptly submit five copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Testing laboratory name and address.
 - d. Name and signature of inspector.
 - e. Date and time of sampling or inspection.
 - f. Record of temperature and weather.
 - g. Identification of product and specifications section.
 - h. Location in the Project.
 - i. Type of test/inspection.
 - j. Date of test/inspection.
 - k. Results of test/inspection.
 - l. Conformance with Contract Documents.
 - m. When requested by Architect, provide interpretation of results.
 - 2. Test reports are submitted for Architect's knowledge as contract administrator or for the Owner, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit report in duplicate within 30 days of observation to Architect for information.
 - 2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

SECTION 01400

QUALITY REQUIREMENTS

- F. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
 - 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.4 REFERENCES AND STANDARDS - See Section 01425

1.5 TESTING AND INSPECTION AGENCIES

- A. Contractor will employ and pay for services, from Testing Allowances, of an independent testing agency to perform specified testing and inspection.
- B. Testing Agency of record: The Testing Agency of Record shall be identified by the Owner within 15 days of the Letter of Intent.
- C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- D. Inspection sampling and testing is required for:
 - 1. Section: 02315; Excavation.
 - 2. Section: 02316; Fill and Backfill.
 - 3. Section: 03200; Concrete Reinforcement.
 - 4. Section: 03300; Cast-in-Place Concrete.
 - 5. Section: 04065; Mortar and Masonry Grout.
 - 6. Section: 05120; Structural Steel.
- E. Additional services as requested by Architect
- F. Testing Agency:
 - 1. Testing agency: Comply with requirements of ASTM E 329, ASTM E 548, ASTM E 543, ASTM C 1021, ASTM C 1077, ASTM C 1093, and ASTM C 1021.
 - 2. Inspection agency: Comply with requirements of ASTM D290.
 - 3. Laboratory: Authorized to operate in State in which Project is located.
 - 4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
 - 5. Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 CONTRACTOR CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

SECTION 01400

QUALITY REQUIREMENTS

3.2 MOCK-UPS

- A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, accessories and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining Work.
- D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

3.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturer's tolerances. Should manufacturer's tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Where specified tolerances within individual sections exceed those accepted by the Manufacturer, comply with the more stringent tolerances specified.
- D. Adjust products to appropriate dimensions; position before securing products in place.

3.4 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 3. Acquaint Architect's personnel with testing procedures and with all special conditions encountered at the site.
 - 4. Perform specified inspections, sampling and testing of products in accordance with specified standards.
 - 5. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 6. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
 - 7. Perform additional tests and inspections required by Architect.
 - 8. Attend preconstruction meetings and progress meetings as directed by Architect.
 - 9. Submit reports of all tests/inspections specified.
 - 10. Obtain written acknowledgement of each inspection, sampling and test made from subcontractor whose work is being tested.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
 - 1. Provide to agency at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - a. Monitor or direct superintendent to monitor each inspection, sampling and test.
 - b. Provide laboratory with written acknowledgement of each inspection, sampling or test.
 - c. Within 24 hours notify Architect in writing of reasons for not acknowledging laboratory field procedures.
 - 3. Furnish copies of mill test reports.
 - 4. Furnish verification of compliance with contract requirements for materials and equipment
 - 5. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.

SECTION 01400

QUALITY REQUIREMENTS

- c. To facilitate tests/inspections.
- d. To provide storage and curing of test samples.
- 6. Notify Architect and laboratory 48 hours prior to expected time for operations requiring testing/inspection services.
- 7. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- 8. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- 9. Correct work which is defective or which fails to conform to the Contract Documents in accordance with the General conditions. Corrective work shall not delay the project schedule or the work of other subcontractors.
- 10. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.

3.5 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect 30 days in advance of required observations.
 - 1. Observer subject to approval of Architect.
 - 2. Observer subject to approval of Owner.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

3.6 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01425

REFERENCE STANDARDS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Requirements relating to referenced standards.
- B. Reference standards full title and edition date.

1.2 RELATED SECTIONS

- A. Document 00700 - General Conditions: Reference standards.

1.3 QUALITY ASSURANCE

- A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue specified in this section, except where a specific date is established by applicable code.
- C. Obtain copies of standards when required by the Contract Documents.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- F. Neither the contractual relationships, duties or responsibilities of the parties in Contract nor those of the Architect shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

PART 2 – CONSTRUCTION INDUSTRY ORGANIZATION DOCUMENTS

2.1 AA – ALUMINUM ASSOCIATION, INC.

- A. AA ADM-1 - Aluminum Design Manual; 2000.
- B. AA DAF-45 - Designation System for Aluminum Finishes; 2003.
- C. AA SAAA-46 - Standards for Anodized Architectural Aluminum; 1978.
- D. AA BDAS-516161 - Behavior and Design of Aluminum Structures; 1992.

2.2 AABC -- ASSOCIATED AIR BALANCE COUNCIL

- A. AABC MN-1 - AABC National Standards for Total System Balance; 2002.

2.3 AAMA -- AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION

- A. AAMA/NWWDA 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors; 1997 with revisions contained in "reprinting" of 12/99.
- B. AAMA 303 - Voluntary Specification for Poly (Vinyl Chloride) (PVC) Exterior Profile Extrusions; 2000.
- C. AAMA 501 - Methods of Test for Exterior Walls; 1994.
- D. AAMA 501.1 - Standard Test Method for Exterior Windows, Curtain Walls and Doors for Water Penetration Using Dynamic Pressure; 1994 (part of AAMA 501).
- E. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; 1994 (part of AAMA 501).
- F. AAMA 501.3 - Field Check of Water Penetration Through Installed Exterior Windows, Curtain Walls, and Doors by Uniform Air Pressure Difference (part of AAMA 501); 1994.
- G. AAMA 603.8 - Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum; 1998.
- H. AAMA 605.2 - Voluntary Specification for High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels; 1998.
- I. AAMA 606.1 - Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum; 1976.
- J. AAMA 607.1 - Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes

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REFERENCE STANDARDS

- For Architectural Aluminum; 1977.
- K. AAMA 608.1 - Voluntary Guide Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum; 1977.
 - L. AAMA 609 - Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum; 2002.
 - M. AAMA 610.1 - Voluntary Guide Specification for Cleaning and Maintenance of Painted Aluminum Extrusions and Curtain Wall Panels; 1979.
 - N. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 1998.
 - O. AAMA 701/702 - Combined Voluntary Specifications for Pile Weatherstrip and Replaceable Fenestration Weatherseals; 2000.
 - P. AAMA 800 - Voluntary Specifications and Test Methods for Sealants; 1992, Addendums 1994, 2000.
 - Q. AAMA 802.3 - Compound (Part of AAMA 800); 1992.
 - R. AAMA 803.3 - Voluntary Specifications and Test Methods for Narrow Joint Seam Sealer (Part of AAMA 800); 1992.
 - S. AAMA 804.3 - Sealants: Back Bedding Mastic Type Glazing Tapes (Part of AAMA 800); 1992.
 - T. AAMA 806.3 - Tape (Part of AAMA 800); 1992.
 - U. AAMA 807.3 - Glazing Tape (Part of AAMA 800); 1992.
 - V. AAMA 809.2 - Sealants: Non-Drying Sealant (Part of AAMA 800); 1992.

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telephone and facsimile service.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Waste removal facilities and services.
- F. Winter Protection

1.2 TEMPORARY UTILITIES

- A. Refer to Section 01510 – Temporary Utilities for additional information
- B. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- C. Existing facilities may not be used.
- D. New permanent facilities may be used.

1.3 TELEPHONE SERVICE

- A. Provide, maintain, and pay for telephone service to field office at time of project mobilization.
- B. Provide, maintain and pay for facsimile service and a dedicated telephone line to field office at time of project mobilization.

1.4 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Provide and maintain a temporary toilet for all workers on the project, in an enclosed, roofed structure housing adequate plumbing fixtures.
- C. Portable toilets shall be serviced twice weekly, including emptying tanks, recharging with a germicidal and deodorizing solution and scrubbing entire interior with germicidal solution.
- D. As soon as plumbing is installed in building, temporary fixtures may be provided for all workers and portable toilet facilities may be removed from the site.
- E. Use of existing facilities is not permitted.
- F. New permanent facilities may be used during construction operations.
- G. Maintain daily in clean and sanitary condition.
- H. At end of construction, return facilities to same or better condition as originally found.

1.5 TEMPORARY ENVIROMENTAL CONTROLS

- A. Provide controls over environmental conditions at the construction site and related areas under the Contractor's control.
- B. Equip internal combustion engines on compressors with mufflers to reduce noise to a minimum. Do not operate in enclosed areas without adequate ventilation.
- C. Do not use power actuated tools except where specified in individual specifications
- D. Provide dust control materials to minimize dust from construction operations. Prevent air-borne dust from dispersing into the atmosphere.
- E. Control surface water to prevent damage to the project, the site or adjoining properties. Provide, operate and maintain hydraulic equipment of adequate capacity to control surface water.
- F. Dispose of drainage water in a manner to prevent flooding, erosion, silting, or runoff of silt or sediment or other damage to all portions of the site or to adjoining areas.
- G. Provide rodent control to prevent infestation of construction or storage areas. Employ methods and use materials which will not adversely affect condition at the site or on adjoining properties.
- H. When the use of rodenticides is deemed necessary, submit a copy of proposed program to Architect with a copy to the Owner. Clearly indicate:
 - 1. Areas to be treated.
 - 2. Rodenticides to be used, with copy of manufacturer's current printed instructions.
 - 3. Pollution preventative measures to be employed.

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

- I. Plan and execute construction and earthwork by methods to control surface drainage from cuts and fills, and from borrow waste disposal areas, to prevent erosion and sedimentation.
- J. Construct fills and waste areas by selective placement to eliminate surface silts or clays which will erode. Periodically inspect earthwork to detect evidence of the start of erosion. Apply corrective measures to control erosion.

1.6 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Provide temporary barriers 4 foot high around each, or around each group of trees and plants at drip line.
- E. Carefully supervise excavating, grading, and filling and subsequent construction operations, to prevent damage.
- F. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
- G. Materials may be new or used, suitable for purpose. Materials at Contractor's options, appropriate for purpose. Do not violate code requirements.

1.7 FENCING

- A. Construction: Chain Link Cyclone Fence.
- B. Provide minimum 6 foot high fence around construction site; equip with vehicular and pedestrian gates, with chain link gates and steel posts spaced a 6'-0" on center, maximum. Gates shall be kept locked during all non-working hours. Two sets of keys shall be provided to the Owner.
- C. Contractor shall provide and maintain a temporary construction fence, and where necessary, warning lights in connection therewith in compliance with the requirements of applicable codes and regulations of public agencies having jurisdiction, for the duration of this project.
- D. Maintain and relocate fences and barriers during entire construction period.

1.8 CONSTRUCTION AIDS

- A. Provide and maintain all miscellaneous temporary facilities such as ladders, ramps, scaffolds, hoists, railings, chutes, barricades, enclosures, platforms, walks, etc., as required for the proper execution of the Work.
- B. Materials may be new or used, suitable for purpose. Comply with specified codes and standards.
- C. Consult with Owner's representative, review site conditions and factors which affect construction procedures and construction aids, including adjacent properties and public facilities which may be affected by execution of the work.
- D. Installation:
 - 1. Comply with respective Project Manual Specifications Sections.
 - 2. Relocate construction aids as construction progresses to expedite storage or work requirements and to accommodate legitimate requirements of Owners and other contractors at the site.

1.9 EXTERIOR ENCLOSURES

- A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.
- B. All openings under construction or renovation, for which permanent construction will not serve as a security closure, shall be protected by a weatherproof security closure at the end of each

SECTION 01500

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working day.

- C. Contractor shall be responsible for inspection and repair, of all security closures, on a daily basis, including non-working days.

1.10 INTERIOR ENCLOSURES

- A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:
 - 1. Insulated to R 15.
 - 2. STC rating of 35 in accordance with ASTM E 90.
 - 3. Maximum flame spread rating of 75 in accordance with ASTM E 84.
- C. Paint surfaces exposed to view from Owner-occupied areas.

1.11 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition. Do not burn or bury rubbish on project site.
- B. Provide additional collections and disposal of debris whenever regular schedule is inadequate to prevent accumulation.
- C. Provide containers with lids. Remove trash from site periodically.
- D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
- F. Prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.
- G. Provide equipment and personnel; perform emergency measures to contain all spillages, and to remove contaminated soils or liquids.
- H. Take special measures to prevent harmful substances from entering public waters. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewer.
- I. Provide systems for control of atmospheric pollutants.
- J. Cleaning
 - 1. Maintain areas under Contractor's control free of waste materials, debris and rubbish.
 - 2. Remove debris and rubbish from closed or remote spaces, prior to closing the space.
 - 3. Control cleaning operations so that dust and other particulates will not adhere to wet or newly-coated surfaces.

1.12 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, and materials prior to Substantial Completion.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.
- E. Restore new permanent facilities used during construction to specified condition.
- F. Grade site areas affected by temporary installations to indicated elevations and slopes, and clean the area.
- G. Completely remove fences and barriers, including foundations when construction has progressed to the point that they are no longer needed, and when approved by the Architect.

1.13 WINTER PROTECTION AND WORK

- A. Contractor is to provide and pay for all materials, equipment, labor, utilities, transportation, etc. required to completely enclose and "winter protect" all of the buildings and excavations during construction. The schedule dictates that complete enclosure will be required to complete the

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TEMPORARY FACILITIES AND CONTROLS

project on time. No extensions of time or additional fees will be approved for any delays due to weather or site conditions.

- B. The site and access routes are to be maintained as required to facilitate the winter protection and work.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.
- E. Procedures for Owner-supplied products.
- F. Spare parts and maintenance materials.

1.2 RELATED SECTIONS

- A. Document 00100 - Instructions to Bidders: Product options and substitution procedures prior to bid date.
- B. Section 01400 - Quality Requirements: Product quality monitoring.

1.3 REFERENCES

- A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2002.

1.4 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product; submit 3 copies to Architect.
 - 1. Submit within 20 days after date of Letter of Intent.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
- E. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- F. Provide name and address of similar projects on which product was used and date of installation.
- G. Provide detailed description and drawings illustrating construction methods.
- H. Provide itemized comparison and accurate cost data of proposed substitution in comparison with product or method specified.
- I. Provide data relating to changes in contracts, coordination issues, and construction schedules.
- J. Manufacturer's Instructions: When Contract Documents specify that installation shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to all parties involved in the installation, including three copies to the Architect.

PART 2 – PRODUCTS

2.1 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Motors: Refer to Section 15065, NEMA MG 1 Type. Specific motor type is specified in individual specification sections.
- C. Materials and Equipment Incorporated Into The Work
 - 1. NO MATERIAL OR PRODUCT SHALL BE DELIVERED TO, PROVIDED FOR OR INSTALLED ON PROJECT WHICH CONTAINS ANY ASBESTOS OR ASBESTOS-CONTAINING MATERIAL.
 - 2. Conform to project specifications and standards.
 - 3. Comply with size, make, type and quality specified.

SECTION 01600

PRODUCT REQUIREMENTS

4. Manufactured and fabricated products:
 - a. Design, fabricate and assemble in accord with best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
 - c. Two or more items of the same kind shall be identical from the same manufacturer.
 - d. All parts of systems shall be from the same manufacturer to the greatest extent practicable.
 - e. Adhere to equipment capacities, sizes and dimensions shown or specified unless variations are specifically approved by Change Order.

2.2 PRODUCT OPTIONS

- A. Base all bids on providing all products exactly as specified.
- B. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- C. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- D. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.3 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Provide spare parts, maintenance, and extra products of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 – EXECUTION

3.1 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Architect will consider requests for substitutions only within 20 days after date of Letter of Intent.
- C. Substitutions may be considered at a later date only when a product becomes unavailable through no fault of the Contractor.
- D. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- E. For products specified only by reference or performance standards, select any product which meets or exceeds standards, by any manufacturers, subject to the Architect's approval.
- F. For products specified by naming several products or manufacturers, select any product and manufacturer named which conforms to the intent of the documents.
- G. Substitutions, Bidder/Contractor Options
 1. Prior to Bid Opening: The Architect will consider written requests to amend the bidding documents to add products not specified provided such requests are received at least 10 calendar days prior to bid opening date. Requests received after that time will not be considered. When a request is approved, the Architect will issue an appropriate addendum not less than three calendar days prior to the bid opening.
 2. With Bid: A bidder may propose substitutions with his bid by completing the Substitution Sheet with the Bid Form, subject to the provisions stated thereon. Architect will review Substitution Sheet of low bidder and recommend approval or rejection by Owner prior to award of Contract.
 3. After Award of Contract: No substitutions will be considered after Notice of Award except under one or more of the following conditions:
 - a. Substitutions required for compliance with final interpretations of code requirements or insurance regulations.
 - b. Unavailability of specified products, through no fault of Contractor or subcontractor.
 - c. Subsequent information discloses inability of all specified products to perform properly or

SECTION 01600

PRODUCT REQUIREMENTS

- to fit in designated space.
- d. Manufacturer/fabricator refusal to certify or guarantee performance of specified product as specified.
- e. When a substitution would be substantially beneficial to the Owner.
- H. A request for substitution constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Will provide the same warranty for the substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 - 5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- I. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- J. Substitution Submittal Procedure:
 - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
 - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 - 3. The Architect will notify Contractor in writing of decision to accept or reject request.
 - 4. Complete data substantiating compliance of proposed substitution with Contract Documents.
 - 5. For products:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature:
 - 1) Product description.
 - 2) Performance and test data.
 - 3) Reference standards.
 - c. Samples.
 - d. Name and address of similar projects on which product was used and date of installation.
 - 6. For construction methods:
 - a. Detailed description of proposed method.
 - b. Drawings illustrating methods.
 - 7. Itemized comparison of proposed substitutions with product or method specified.
 - 8. Data relating to changes in construction schedules.
 - 9. Identify:
 - a. Other contract affected.
 - b. Changes or coordination required.
 - 10. Accurate cost data on proposed substitution in comparison with product or method specified.
- K. Provide cost data that is complete and includes all related costs under Bidder/Contractor contract, but excludes:
 - 1. Costs under separate contracts.
 - 2. Architect's redesign.
 - 3. Administrative costs of Architect.

3.2 OWNER-SUPPLIED PRODUCTS

- A. See Section 01100 - Summary for identification of Owner-supplied products.
- B. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. On delivery, inspect products jointly with Contractor.
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.

SECTION 01600

PRODUCT REQUIREMENTS

5. Arrange for manufacturer's warranties, inspections, and service.
- C. Contractor's Responsibilities:
 1. Review Owner reviewed shop drawings, product data, and samples.
 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 3. Handle, store, install and finish products.
 4. Repair or replace items damaged after receipt.

3.3 TRANSPORTATION AND HANDLING

- A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- D. Arrange for transportation and deliveries of materials and equipment in accordance with approved current construction schedules and in ample time to facilitate inspection prior to installation.
- E. Coordinate deliveries to avoid conflict with work and condition at site.
- F. Deliver products in undamaged condition in original containers or packaging, with identifying labels intact and legible. Clearly mark partial deliveries of component parts of assemblies or equipment to permit easy identification of parts and to facilitate assembly.
- G. Lift packages, equipment, or components only at designated lift points.
- H. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- I. Provide equipment and personnel, including those furnished by Owner, to handle products by methods to prevent soiling, disfigurement, or damage.
- J. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturer's instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product. Materials may be new or used at Contractor's option, but shall be non-staining, non-hazardous, and of sufficient strength and durability for proposed use.
- E. Submittals
 1. Request for allocation of storage space.
 2. List of materials and equipment to be stored.
 3. Proposed location for storage.
 4. Special storage requirements.
 5. Schedule of anticipated storage dates.
- F. For exterior storage of fabricated products, place on sloped supports above ground.
- G. Provide bonded off-site storage and protection when site does not permit on-site storage or protection. Off-site storage will be permitted only on Owner's prior written authorization in accordance with General Conditions.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- J. Prevent contact with material that may cause corrosion, discoloration, or staining.
- K. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- L. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
- M. Locate storage areas where authorized by Architect, Contractor will resolve conflicts in storage

SECTION 01600

PRODUCT REQUIREMENTS

requirements of all subcontractors. Do not inhibit use of:

1. Fire exits.
 2. Fire lanes.
 3. Parking.
 4. Work of other contractors.
 5. Owner.
- N. Provide separate storage for combustible and non-combustible products. Store combustible materials in accordance with Fire Protection Agency's regulations.
- O. Remove all temporary storage, contents and utilities at completion of construction activities or when requested by the Architect.

END OF SECTION

SECTION 01700

EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Pre-installation meetings.
- C. Cutting and patching.
- D. Surveying for laying out the work.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. Closeout procedures, except payment procedures.

1.2 RELATED SECTIONS

- A. Section 01300 - Administrative Requirements: Submittals procedures.
- B. Section 01400 - Quality Requirements: Testing and inspection procedures.
- C. Section 01500 - Temporary Facilities and Controls: Temporary exterior enclosures.
- D. Section 01780 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

1.3 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.
 - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents. Include the following data:
 - 3. Architect may at any time require written verifications of grades, lines and levels by a licensed surveyor as work progresses.
 - 4. All areas found to be non-conforming to the Contract Documents shall be corrected by the responsible Contractor.
 - 5. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: 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, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.
 - 6. Include in request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Contractor and crafts to execute the work.
 - e. Description of proposed work and products to be used.
 - f. Extent of refinishing.
 - g. Alternatives to cutting and patching.
 - h. Effect on work of Owner or separate Contractor.
 - i. Written permission of affected separate Contractor.
 - j. Date and time work will be executed.
- D. Designation of party responsible for cost of cutting and patching.
- E. When conditions of work, or schedule, indicate change of materials or methods, submit recommendation to Architect, including:
 - 1. Condition indicating change.
 - 2. Recommendation for alternative materials or methods.
 - 3. Submittals specified for substitutions.

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EXECUTION REQUIREMENTS

- F. Submit written notice to Architect, designating time work will be uncovered, to provide for observation.
- G. Payment for Costs:
 - 1. Costs caused by ill-timed or defective work, or work not conforming to Contract Documents, including costs for additional services of Architect - party responsible for ill timed, rejected or non-conforming work.
 - 2. Work done by change order, other than defective or non-conforming work - Owner.

1.4 GRADES, LINES AND LEVELS

- A. Contractor lay out all of the work under this contract.
 - 1. Establish all working lines, levels, elevations and measurements.
- B. Owner will furnish:
 - 1. A certified topographic survey of existing site, giving all grades and lines of streets, alleys, pavements and adjoining property, rights-of-way, encroachments, boundaries and contours of building site.
 - 2. Locations, dimensions and data pertaining to existing:
 - a. Buildings.
 - b. Underground obstructions.
 - c. Trees and landscaping.
 - d. Other improvements.
 - 3. Information as to available service and utility lines, both public and private.
- C. Location of survey's baseline control points.
 - 1. Benchmark and temporary benchmark location and elevation of each.
- D. Quality Assurance
 - 1. All layout work which establishes site layout dimensions or elevations or exterior building dimensions, angles or grade floor elevations shall be done by a qualified engineer or surveyor.
 - 2. Qualifications of Contractor's Engineer/Surveyor:
 - a. Experienced in layout work of similar complexity.
 - b. Licensed by State of Illinois.
- E. Submittals. Architect may at any time require written verification of grades, lines and levels by a licensed surveyor as work progresses.
- F. Laying Out The Work
 - 1. Prior to the beginning of the actual work, perform the following:
 - a. Each subcontractor shall lay out their portion of the work.
 - b. Establish all required bench marks and reference lines.
 - c. Verify all building dimensions.
 - d. Verify conformance of all actual general dimensions with those indicated on the Architect's plan.
 - e. Notify the Architect immediately if any conflict whatsoever exists.
- G. Survey Upon Completion
 - 1. Upon completion, Owner may provide a survey performed by a licensed surveyor indicating the location of the Work of this Contract and including the following data:
 - a. Building location and dimensions of all walls.
 - b. Elevations of finished floor at all exterior exits.
 - c. Spot elevations, storm, sanitary and watermain manholes, and all invert elevations.
 - d. Spot elevations of corners of all new pavement and on a 50' grid within paved areas.
 - 2. All areas found to be non-conforming to the Contract Documents shall be corrected by the responsible Contractor.

1.5 QUALIFICATIONS

- A. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

SECTION 01700

EXECUTION REQUIREMENTS

- B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located.

1.6 PROJECT CONDITIONS

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.
- E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 1. Minimize amount of bare soil exposed at one time.
 - 2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
 - 3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
 - 4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- G. Pest Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.7 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 – PRODUCTS

2.1 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

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EXECUTION REQUIREMENTS

- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01600.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that demolition is complete in alterations areas and areas are ready for installation of new work.
- C. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- D. Examine and verify specific conditions described in individual specification sections.
- E. Verify in field all measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis-fabrication.
- F. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- G. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a pre-installation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Contractor shall locate and protect survey control and reference points.
- D. Control datum for survey is that established by Owner provided survey.
- E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- H. Utilize recognized engineering survey practices.

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EXECUTION REQUIREMENTS

- I. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
- J. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, and ground floor elevations.
- K. Periodically verify layouts by same means.
- L. Maintain a complete and accurate log of control and survey work as it progresses.
- M. On completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

3.5 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.6 CUTTING AND PATCHING

- A. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.
- B. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- C. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- D. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- E. Restore work with new products in accordance with requirements of Contract Documents.
- F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of the penetrated element.
- H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
- I. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.
- J. In addition to contract requirements, upon written instructions of Architect.
 - 1. Uncover work to provide for observation of covered work.
 - 2. Remove samples of installed materials for testing.
- K. Do not endanger work by cutting or altering work or any part of it.
- L. Do not cut or alter work without written consent of Architect.
- M. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

SECTION 01700

EXECUTION REQUIREMENTS

3.7 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.8 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.9 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems with Architect and Owner's Representative..
- B. Notify Architect and owner two days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer and/or equipment supplier to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.
- E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

SECTION 01700

EXECUTION REQUIREMENTS

- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.
- H. Air and Water Testing, Adjusting and Balancing
 - 1. Testing, adjusting and balancing will be part of the mechanical contract.
 - 2. The mechanical subcontractor will perform services specified in Division 15.
 - 3. Reports will be submitted by the Mechanical subcontractor to the Architect indicating observation and results of test and indicating compliance or non-compliance with the specified requirements and with the requirements of the Contract Documents.

3.11 ADJUSTING

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

3.12 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
 - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- B. Use cleaning materials that are non-hazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Clean debris from roofs, gutters, downspouts, and drainage systems.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
- I. Contractor provide final cleaning at completion of work, or at such other times as directed by the Architect, remove all waste, debris, rubbish, tools, equipment, machinery and surplus materials. Clean all sight exposed surfaces; leave work clean and ready for occupancy.
- J. Safety Requirements
 - 1. Standards: Maintain project in accord with following safety and insurance standards:
 - a. Federal and state regulations.
 - b. National Fire Protection Association (NFPA).
 - 2. Hazards Control:
 - a. Store volatile wastes in covered metal containers and remove from premises daily.
 - b. Prevent accumulation of wastes which create hazardous conditions.
 - c. Provide adequate ventilation during use of volatile or noxious substances.
 - 3. Conduct cleaning and disposal operations to comply with Federal and State anti-pollution laws.
 - a. Do not burn or bury rubbish and waste materials on project site.
 - b. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.
 - c. Do not dispose of wastes into streams or waterways.
- K. Submittals
 - 1. Manufacturer's recommendations for cleaning specified products.
 - 2. Proposed cleaning products for products where manufacturer's recommendations are not specified.
- L. Materials
 - 1. Select and use all cleaning materials and equipment with care to avoid scratching, marring, defacing, staining or discoloring surfaces cleaned.
 - 2. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
 - 3. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

SECTION 01700

EXECUTION REQUIREMENTS

- M. Final Cleaning
 - 1. Employ experienced workers or professional cleaners for final cleaning.
 - 2. Remove grease, dust, dirt, stains, labels, fingerprints, protection and other foreign materials from sight-exposed finished surfaces.
 - a. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed surfaces, and of concealed spaces to insure performance.
 - 3. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.
 - 4. Soft broom clean all exposed concrete surfaces clean; other paved areas with soft or stiff broom as directed. Rake clean other surfaces on grounds.
 - 5. Sweep and mop clean all resilient, quarry and ceramic flooring.
 - 6. Vacuum all carpeting.
 - 7. Remove ice and snow from access to buildings.
 - 8. Replace air handling and conditioning filters if units were operated during construction.
 - 9. Clean all ductwork used for temporary heating.
 - 10. Clean windows and mirrors to be free from labels, dust, fingerprints and other foreign materials.
 - 11. Maintain finally cleaned areas until project, or designated portion thereof, is accepted by Owner.

3.13 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Architect and Owner.
- B. Contractor to determine items to be listed for completion or correction in Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Substantial Completion.
- D. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's review.
- E. Substantial Completion Meeting will be scheduled by Architect. Architect will issue notice of meeting.
 - 1. Agenda will consist of the inspection, discussion of the punch list, determination of final completion dates, and the date and time the Owner will take occupancy. Architect will also review the requirements for contractor closeout in accord with the contract documents.
 - 2. Upon completion of this meeting, the Architect shall prepare the Certificate of Substantial Completion with the completed punch list and forward the package to the Contractor.
- F. Owner will occupy all of the building as specified in Section 01100.
- G. Contractor will correct items of work listed in punch list and comply with requirements for access to Owner-occupied areas.
- H. Notify Architect when work is considered finally complete.
- I. Accompany Architect on final inspection.
- J. Complete items of work determined by Architect's final inspection.

3.14 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections for one year from date of Final Completion.
- B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.2 RELATED SECTIONS

- A. Conditions of the Contract: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01300 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01700 - Execution Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

- A. Substantial Completion
 - 1. When Contractor considers work substantially complete, submit written declaration to Architect that work, or designated portion thereof, is substantially complete. Include list of items to be completed or corrected.
 - 2. Architect will make a preliminary inspection within seven business days after receipt of Contractor's declaration.
 - 3. Upon determining that work is substantially complete, Architect will:
 - a. Prepare a punch list of items to be completed or corrected, as determined by the inspection.
 - b. Prepare and process a certificate of substantial completion, containing:
 - 1) Date of substantial completion.
 - 2) Punch list of items to be completed or corrected.
 - 3) The time within which punch list items shall be completed or corrected.
 - 4) Date and time Owner will take occupancy of project or designated portion thereof.
 - 5) Responsibilities of Owner and Contractor for:
 - a) Insurance
 - b) Utilities.
 - c) Operation and maintenance of mechanical, electrical and other systems.
 - d) Maintenance and cleaning.
 - e) Security
 - 6) Signatures of:
 - a) Architect
 - b) Contractor.
 - c) Owner.
 - 4. Contractor:
 - a. Complete all work listed for completion or correction within designated time.
 - b. Perform final cleaning in accordance with 01700.
 - 5. At time of inspection, should substantial completion not be certified, complete the work and resubmit declaration in accord with Paragraph A.1 above.
- B. Final Completion
 - 1. Contractor:
 - a. Submit written declaration to Architect that:
 - 1) Work complies with all aspects of Contract Documents.
 - 2) All items on substantial completion punch list have been completed or corrected.
 - 3) All tools, construction equipment and surplus materials have been removed from site.
 - 4) Required surveys have been completed and verified.
 - 2. Architect will make final inspection with Contractor to ensure completion of all contract requirements.

SECTION 01780

CLOSEOUT SUBMITTALS

3. When Architect considers that all work is finally complete in accordance with contract document requirements, he will prepare and process closeout documents.
- C. Application for Final Payment
 1. Contractor submit duly executed:
 - a. Final Affidavit and Sworn Statement.
 - b. Contractor's Final Waiver of Lien.
 - c. Separate releases of waivers of liens for all subcontractors, suppliers and others with lien rights against property of Owner, together with complete list of those parties.
 - d. Final accounting statement, reflecting all adjustments to contract sum.
 - 1) Original contract sum.
 - 2) Additions and deductions resulting from:
 - a) All change orders.
 - b) Deductions for uncorrected work.
 - c) Deductions for liquidated damages.
 - e. Total contract sum, as adjusted.
 - f. Previous payments.
 - g. Sum remaining due.
 2. Architect will process final statement in accordance with Conditions of the Contract.
- D. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
 1. Accompany submittal with transmittal letter, in duplicate, containing:
 - a. Date.
 - b. Project title and number.
 - c. Contractor's name and address.
 - d. Title and number of each record document.
 2. Certification that each document submitted is complete and accurate.
 - a. Signature of contractor, or his authorized representative.
 3. Submit 1 copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 4. Submit two hard copy sets and two Compact Disc containing electronic copies (in PDF file format) of revised final documents in final form within 10 days after final inspection.
- E. Operation and Maintenance Data:
 1. The contractor shall cause each mechanical and electrical subcontractor to provide the Contractor with three hard copies and one electronic copy of all operating manuals at the time of delivery of each major piece of equipment.
 2. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 3. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 4. Submit 1 copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 5. Submit two hard copy sets and two Compact Disc containing electronic copies (in PDF file format) of revised final documents in final form within 10 days after final inspection.
- F. Warranties and Bonds:
 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.
 4. Because the warranty period begins with the issuance of the final payment from The District to the general contractor, all warranties should include the verbiage "...for a period of (X)

SECTION 01780

CLOSEOUT SUBMITTALS

year(s) after the date The District issues the final payment to the General Contractor..."

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 PROJECT RECORD DOCUMENTS

- A. Contractor and all subcontractors shall maintain an accurate record of deviations and changes from the Contract Documents which occur in the work.
- B. Indicate all such deviations and changes on a record set of the Contract Documents and turn same over to the Architect and 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.
- C. Create an electronic copy of all approved Project Record Documents in PDF file format and deliver to Architect and Owner on Compact Disc.
- D. Compact Discs: High quality CD-R format Compact Disc formatted for use by Microsoft Windows based computers. Rewriteable Compact Discs will not be accepted. Provide labels on all Compact Discs listing the Owner's name, Project name, Contractor's name, Date of Submittal, and the title "Project Record Documents".
- E. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Project Manual.
 - 3. Interpretations and supplemental instructions.
 - 4. Specifications.
 - 5. Addenda.
 - 6. Change Orders and other modifications to the Contract.
 - 7. Reviewed shop drawings, product data, and samples.
 - 8. Manufacturer's instruction for assembly, installation, and adjusting.
 - 9. Other modifications to contract.
 - 10. Field test records.
 - 11. All schedules.
 - 12. Correspondence file.
- F. Ensure entries are complete and accurate, enabling future reference by Owner.
- G. Store record documents separate from documents used for construction.
- H. Record information concurrent with construction progress.
- I. File documents in format in accord with Project Manual Table of Contents.
- J. Do not use record documents for field construction purposes.
- K. Make documents available at all times for inspection by Architect and Owner.
- L. 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 "as-built" drawings.
- M. Contractor shall develop layout drawings for all concealed work that is schematically indicated on contract drawings.
- N. Provide red colored pencils or felt marking pens for marking devices.
- O. Do not permanently conceal any work until specified information has been recorded.
- P. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Change Order or Field Order.
 - 4. Other matters not originally specified.
- Q. Label each record document "PROJECT RECORD DOCUMENTS" in large print. Keep record documents current.

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CLOSEOUT SUBMITTALS

- R. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Changes made by change order.
 - 6. Details not on original Contract drawings.
- S. Shop Drawings: Maintain as record documents; legibly annotate drawings to record changes made after review.
- T. Completed Work Survey: Requirements specified in Section 01700 - Execution Requirements.

3.2 OPERATION AND MAINTENANCE DATA

- A. Compile product data and related information appropriate for Owner's maintenance and operation of products and equipment provided under the Contract.
- B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Coordinate drawings with information in Product Record Documents to assure correct illustration of completed installation. Do not use Project Record Documents as maintenance drawings.
- E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- F. Warranty, Bond, and Service Contract: Provide information sheet for Owner's personnel with proper procedures in event of failure and instances which might affect validity of warranties of bonds.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. Submit two hard copies and two Compact Discs with electronic copies (in PDF file format) of complete manual in final form.
- B. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
 - 2. Information for re-ordering custom manufactured products.
- C. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- D. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- E. Additional information as specified in individual product specification sections.
- F. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. Submit two hard copies and two Compact Discs with electronic copies (in PDF file format) of complete manual in final form.
- B. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.

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CLOSEOUT SUBMITTALS

- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- O. Include test and balancing reports.
- P. Additional Requirements: As specified in individual product specification sections.

3.5 OPERATION AND MAINTENANCE MANUALS

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. Prepare data in the form of an instructional manual.
- C. Submit one copy of completed instruction manual 15 business days prior to final inspection or acceptance.
 - 1. Copy will be returned after final inspection or acceptance, with comments.
- D. Binders: Commercial quality, 8-1/2 x 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- E. Compact Discs: High quality CD-R format Compact Disc formatted for use by Microsoft Windows based computers. Rewriteable Compact Discs will not be accepted. Provide labels on all Compact Discs listing the Owner's name, Project name, Contractor's name, Date of Submittal, and the title "Operation and Maintenance Manuals".
- F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- G. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- K. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.

SECTION 01780

CLOSEOUT SUBMITTALS

- c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
- 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Photocopies of warranties and bonds.
- L. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- M. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.6 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 x 11 inch three D side ring binders with durable plastic covers and provide electronic copies of all warranties and bonds in PDF file format on two Compact Discs.
- F. Compact Discs: High quality CD-R format Compact Disc formatted for use by Microsoft Windows based computers. Rewriteable Compact Discs will not be accepted. Provide labels on all Compact Discs listing the Owner's name, Project name, Contractor's name, Date of Submittal, and the title "Warranties and Bonds".
- G. Binder Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- H. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- I. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 02315

EXCAVATION

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Excavating for building volume below grade, footings, pile caps, slabs-on-grade, paving, and site structures.
- B. Removal of unsuitable materials under building structure: Remove all unsuitable materials. All soils with a bearing capacity of less than specified on drawings considered unsuitable.
- C. Trenching for utilities outside the building to utility main connections.
- D. Installation and maintenance of erosion control facilities, including silt fence, straw bales, temporary sediment pond and temporary riser pipe.

1.2 RELATED SECTIONS

- A. Section 02316 - Fill and Backfill: Fill materials, filling, and compacting.

1.3 PROJECT CONDITIONS

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

PART 2 – PRODUCTS

2.1 EROSION CONTROL MATERIALS

- A. Silt Fence:
 - 1. Shall be provided and along construction fencing.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.
- C. Notify utility company to remove and relocate utilities.

3.2 EXCAVATING

- A. Underpin adjacent structures which may be damaged by excavating work.
- B. Excavate to accommodate building foundations, slabs on grade, paving, site structures, and construction operations.
- C. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- D. Do not interfere with 45 degree bearing splay of foundations.
- E. Hand trim excavations. Remove loose matter.
- F. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.
- G. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 02316.
- H. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- I. Compact disturbed load-bearing soil in direct contact with foundations to required bearing capacity. Remove and replace unsuitable material or materials not capable of compaction in place and fill in accordance with Section 02316.
- J. Remove excavated material that is unsuitable for re-use from site.
- K. Remove excess excavated material from site.

SECTION 02315

EXCAVATION

3.3 FIELD QUALITY CONTROL

- A. See Section 01400 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

3.4 PROTECTION

- A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION

SECTION 02316

FILL AND BACKFILL

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Filling, backfilling, and compacting for building volume below grade, footings, pile caps, slabs-on-grade, paving, site structures, and utilities within the building.
- B. Backfilling and compacting for utilities outside the building to utility main connections.
- C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.2 RELATED SECTIONS

- A. Section 02310 - Grading: Refer to Civil Drawings.
- B. Section 02315 - Excavation: Removal and handling of soil to be re-used..
- C. Section 03300 - Cast-In-Place Concrete.

1.3 UNIT PRICES

- A. See Section 01270 - Unit Prices, for general requirements applicable to unit prices for earthwork.
- B. Structural Fill: Applies to Unit Price CA-6
 - 1. Measurement Method: By the cubic yard.
 - 2. Includes: Excavating existing soil, stockpiling, scarifying substrate surface, removing existing material from site, preparing subgrade, placing where required, and compacting.
- C. Graded Granular Fill: Applies to Unit Price CA-6.
 - 1. Measurement Method: By the cubic yard.
 - 2. Includes: Excavating existing material, stockpiling, scarifying substrate surface, removing existing material from site, preparing subgrade, placing where required, and compacting.
- D. Open Granular Fill: Applies to Unit Price CA-7.
 - 1. Measurement Method: By the cubic yard.
 - 2. Includes: Excavating existing material, stockpiling, scarifying substrate surface, removing existing material from site, preparing subgrade, placing where required, and compacting

1.4 REFERENCES

- A. Unless otherwise noted the most current issue of the reference shall be used.
- B. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction.
- C. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- D. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
- E. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
- F. ASTM D 2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- G. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- H. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- I. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.5 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: 6 inches below finish grade elevations indicated on drawings, unless otherwise indicated.
- C. SOIL MATERIALS:
 - 1. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.
 - 2. Satisfactory Soil Materials: ASTM D2487 soil classification groups CL, GC GW, GP, GM, SW, SP, SC and SM, free of rock or gravel larger than 2 inches (50 mm) in any dimension,

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debris, waste, frozen materials, vegetation and other deleterious matter and as per AASHTO T180 and IDOT references above.

3. Unsatisfactory Soil Materials: ASTM D2487 soil classification groups ML, MH, CH, OL, OH and PT and as per AASHTO T180 and IDOT references above.
4. Subsoil Structural Fill: Select site excavated subsoil or approved off-site imported inorganic materials meeting the following requirements:
 - a. Graded
 - b. Free of lumps or rocks greater than three inches in size.
 - c. Free of roots and other organic materials.
 - d. Conforming to ASTM D2487 group symbol CL.

1.6 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Samples: 5 lb sample of each type of fill; submit in air-tight containers to testing laboratory.
- C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
 1. Test Reports: In addition to test reports required under field quality control, submit the following:
 - a. Laboratory analysis of each soil material proposed for fill and backfill from on-site and borrowed sources.
 - b. One optimum moisture-maximum density curve for each soil material.
 - c. Report of actual unconfined compressive strength and/or results of bearing tests.
- D. Compaction Density Test Reports.

1.7 PROJECT CONDITIONS

- A. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where designated.
 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 2. Prevent contamination.
 3. Protect stockpiles from erosion and deterioration of materials.
- C. Verify that survey bench marks and intended elevations for the Work are as indicated.

PART 2 – PRODUCTS

2.1 FILL MATERIALS

- A. General Fill: Satisfactory soil materials as noted in definitions above from Subsoil excavated on-site or from off-site source.
 1. Graded.
 2. Free of lumps larger than 3 inches, rocks larger than 2 inches except where permitted by sieve analysis, and debris.
 3. Free from all organic materials, roots, black dirt, shale and chert.
- B. Structural Granular Fill - Fill Type IDOT Designation CA-1: Angular crushed stone, conforming to Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, Latest Edition. Free from Chats, Slag of any designation, Chert, Pit or Bank Run materials and Novaculite Gravel.
 1. CA-1 Composition passing sieve size and percentage under ASTM C 136: 3 inch 95 ± 5 %; 2 inch 60 ± 15 %; 1-1/2 inch, 50 ± 15; 1 inch, 3 ± 3 %.
 2. Free of organic material.
- C. Concrete for Fill: Lean concrete.
- D. Graded Granular Fill - Fill Type IDOT Designation CA-6: Angular crushed stone, conforming to Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, Latest Edition. Free from Chats, Slag of any designation, Chert, Pit or Bank Run materials and Novaculite Gravel.

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1. CA-6 Composition passing sieve size and percentage under ASTM C 136: 1-1/2 inch, 100%; 1 inch, 95 ± 5 %; 1/2 inch, 75 ± 15%; No. 4, 43 ± 13%; No. 16, 25 ± 15; No. 200 8 ± 4%
- E. Open Granular Fill - Fill Type IDOT Designation CA-7: Angular crushed stone; free of shale, clay, friable material and debris. Conforming to Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, Latest Edition. Free from Chats, Slag of any designation, Chert, Pit or Bank Run materials and Novaculite Gravel.
 1. CA-7 Composition passing sieve size and percentage under ASTM C 136: 1-1/2 inch, 100%; 1 inch, 95 ± 5 %; 1/2 inch, 45 ± 15%; No. 4, 5 ± 5%.
- F. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter conforming to IDOT designation FA-1.
- G. Topsoil: Topsoil excavated on-site or from off-site borrow.
 1. Graded and pulverized.
 2. Free of roots, rocks larger than 1/4 inch, subsoil, debris, large weeds and foreign matter.
 3. Conforming to ASTM D2487 Group Symbol OH.

2.2 ACCESSORIES

- A. Geotextile Fabric: Non-biodegradable, woven conforming to IDOT Standard Specification for Road and Bridge Construction for intended use.

2.3 SOURCE QUALITY CONTROL

- A. See Section 01400 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. If tests indicate materials do not meet specified requirements, change material and retest.
- C. Provide materials of each type from same source throughout the Work.
- D. CA-7 shall NOT be substituted for CA-6 without exception. CA-7 is not considered to be a self-compacting material and must be compacted to meet or exceed project requirements.
- E. Pea gravel shall not be substituted for FA-1 or any other aggregate material without express written permission of the Architect of Record--consultant approval is not sufficient.
- F. The use of bank run, spherical aggregates, or other unspecified aggregate materials is strictly prohibited. No substitution shall be permitted.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 02310 for additional requirements.
- C. Verify subdrainage, damp proofing, or waterproofing installation has been inspected.
- D. Verify structural ability of unsupported walls to support imposed loads by the fill.

3.2 PREPARATION

- A. Scarify subgrade surface to a depth of 6 inches to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill and recompact.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. If density or compaction requirements for subgrade cannot be achieved, disc, aerate and recompact subgrade for a minimum depth of 10 inches.
- E. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.3 FILLING

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.

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- E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 8 inches compacted depth.
- F. General Fill: Place and compact material in equal continuous layers not exceeding 12 inches compacted depth.
- G. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- H. Correct areas that are over-excavated.
 - 1. Other areas: Use fill required at specific location, flush to required elevation, compacted to minimum 95 percent Modified Proctor.
- I. Compaction Density Unless Otherwise Specified or Indicated: As listed in Fill at Specific Locations.
- J. Reshape and re-compact fills subjected to vehicular traffic.

3.4 FILL AT SPECIFIC LOCATIONS

- A. Structural Fill at areas designated by Architect/Engineer:
 - 1. Use Fill Type CA-1.
 - 2. Maximum depth per lift: 6 inches, compacted.
 - 3. Compact to minimum 95 percent Modified Proctor.
- B. Under Interior Slabs-On-Grade:
 - 1. Use graded Fill Type CA-6.
 - 2. Depth: minimum 6 inches compacted.
 - 3. Compact to 95 percent Modified Proctor.
- C. At Foundation Walls, Footings, and foundation related items:
 - 1. Use Fill Type CA-6.
 - 2. Fill up to subgrade elevation.
 - 3. Maximum depth per lift: 12 inches, compacted.
 - 4. Compact each lift to 95 percent Modified Proctor.
 - 5. Do not backfill against unsupported foundation walls.
 - 6. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- D. Over Subdrainage Piping at Foundation Perimeter and Under Slabs:
 - 1. Bedding: Use open granular Fill Type CA-7. Fill to cover piping maximum of 18 inches above top edge of pipe or other items unless otherwise noted.
 - a. Cover drainage piping with CA-7 for maximum 18 inches.
 - b. Fill up to subgrade elevation with graded granular CA-6 in lifts not to exceed 8 compacted inches.
 - 2. Compact to 95 percent Modified Proctor.
- E. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches except small diameter (2 inches or less) Polypropylene, Polyvinyl-flouridiene, polyethylene, polybutylene, and Chlorinated Polyvinyl Chloride (CPVC) piping where manufacturer does not permit angular stone:
 - 1. Under all paved areas and within 3 feet of paving:
 - a. Bedding: Use Fill Type CA-7. Fill to cover piping 8 inches above top edge of pipe or other items unless otherwise noted.
 - b. Cover with Fill Type CA-6.
 - c. Fill up to subgrade elevation.
 - d. Compact in maximum 8 inch lifts to 95 percent Modified Proctor.
 - 2. Under all landscaped areas:
 - a. Bedding: Use Fill Type CA-7. Fill to cover piping 8 inches above top edge of pipe or other items unless otherwise noted.
 - b. Cover with general fill.
 - c. Fill up to subgrade elevation.
 - d. Compact in maximum 12 inch lifts to 85 percent Modified Proctor.
- F. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches where small diameter (2 inches or less) Polypropylene, Polyvinyl-flouridiene, polyethylene, polybutylene, and Chlorinated Polyvinyl Chloride (CPVC) piping is present and the manufacturer does not permit angular stone:

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1. Under all paved areas and within 3 feet of paving:
 - a. Bedding: Use Fill Type FA-1. Fill to cover piping 8 inches above top edge of pipe or other items unless otherwise noted. Consolidate sand prior to placing CA-6 without restricting piping below.
 - b. Cover with Fill Type CA-6.
 - c. Fill up to subgrade elevation.
 - d. Compact in maximum 12 inch lifts to 95 percent Modified Proctor at surface.
2. Under all landscaped areas:
 - a. Bedding: Use Fill Type FA-1. Fill to cover piping 8 inches above top edge of pipe or other items unless otherwise noted.
 - b. Cover with general fill.
 - c. Fill up to subgrade elevation.
 - d. Compact in maximum 12 inch lifts to 85 percent Modified Proctor.
- G. Base material under all paved areas:
 1. Use Fill Type CA-6.
 2. Depth: minimum as indicated on Drawings.
 3. Compact in maximum 6 inch lifts to 95 percent Modified Proctor.
- H. At Lawn Areas:
 1. Use general fill.
 2. Fill up to 6 inches below finish grade elevations.
 3. Compact to 85 percent Modified Proctor.
 4. See Section 02310 for topsoil placement.
- I. Around all Underground structures unless otherwise noted:
 1. Bedding: CA-7 Fill to cover piping 8 inches above top edge of pipe or other items unless otherwise noted.
 2. Cover with Fill Type CA-6.
 3. Fill up to subgrade elevation.
 4. Maximum compacted depth of each lift: 8 inches.
 5. Compact to 95 percent Modified Proctor.

3.5 TOLERANCES

- A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.
- B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.6 FIELD QUALITY CONTROL

- A. See Section 01400 - Quality Requirements, for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.
- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor"), ASTM D 1557 ("modified Proctor"), or AASHTO T 180.
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests: 1 for each 2000 SF or fraction thereof per lift.
- F. Proof roll compacted fill at surfaces that will be under paving in the presence of the Testing Agency, Owner, Architect and local municipality. Proof roll with fully loaded 6-wheel dump truck. Areas with 1 inch deflection or greater shall be scarified, aerated, dried, recompacted and retested. Contractor has the option to replace material in lieu of scarification, aeration, drying and recompaction at no cost to the owner.

3.7 CLEAN UP

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water. Restore any vegetation to original condition.

END OF SECTION

SECTION 02485

LAWNS: GENERAL SEEDING/SODDING

1.0 GENERAL

- A. The landscape contractor shall furnish all labor, material and equipment required to complete the work described herein in strict accordance with the drawings and/or terms of the contract. All previously established grades shall be in conformance with the drawings and/or specifications.
- B. The landscape contractor shall be familiar with the project premises and how the existing conditions will affect the work.

1.1 DESCRIPTION

- A. Work included:
 - Scope as defined for this work shall consist of, but not be limited to:
 - 1. Seed and Blanket to restore landscape to original .
 - 2. Fertilizing: To consist of furnishing and placing fertilizer required for the operation.

1.2 QUALITY ASSURANCE

Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the design and application of the work described for this section, and who shall be present at all times during progress of the work of this section and shall direct all work performed under this section.

- A. Protection: Use all means necessary to protect site sod areas before, during, and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage to the site sod areas, immediately make all repairs or replacements necessary to the approval of the Owner and at all no additional cost to the Owner.
- C. Sod: Comply with state and federal laws with respect to inspection for plant diseases and insect infestation.

1.3 SUBMITTALS

- A. Samples and Analysis: Submit, for approval, samples and certified analysis by approved laboratory for sod and fertilizer lime before delivery to the project. Manufacturer's analysis for standard products will be acceptable.
- B. Approval of samples shall not be construed as final acceptance. The Landscape Architect reserves the right to have samples taken of the materials delivered to the site of the Work and analyzed for compliance with the Specifications.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect sod and other required materials against weather conditions and injuries during transit and job storage in such a manner that their effectiveness will not be impaired.
- B. Deliver all items to the site in their original containers with all labels intact and legible at time of Owners representative inspection.
- C. Use all means necessary to protect all items before, during and after installation and to protect the installed work and materials of all trades
- D. Replacements: In the event of damage or rejection, immediately make all repairs and replacements necessary to the approval of the Owners Representative at no additional cost to the owner.

1.5 PROTECTION

- A. Install necessary barricades, temporary fences or signs to protect newly sodded areas until acceptance of the Work.

1.6 Warranty

- A. Warranty this portion of the work through the maintenance period and until final acceptance (See 4.3 this section.)
- B. Within the warranty period, replace all lawn areas and/or groundcover areas, which have failed to flourish and produce a satisfactory stand of grass and/or groundcover due to inferior or defective materials or workmanship, or unfavorable weather conditions. The decision of the Owner for

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LAWNS: GENERAL SEEDING/SODDING

replacement Work shall be conclusive and binding upon the Contractor. The Contractor shall also be responsible for all damage to persons or property caused by defective workmanship or materials or by the re-working of areas not acceptable.

1.7 WORKMANSHIP

- A. During sodding, all areas shall be kept neat and clean and precautions shall be taken to avoid damage to existing plants, turf and structures.
- B. Upon completion, all debris and waste material resulting from sodding operations shall be removed from the project and the area cleaned up.
- C. Any damaged areas caused by the landscape contractor shall be restored to their original condition.

2.0 PRODUCTS

2.1 WATER

- A. Water will be furnished to the Contractor by the Owner from existing facilities such as hose bibs and street washers. The Contractor shall furnish all hose and connections necessary to water the lawn.

2.2 TOPSOIL

- A. Topsoil installed on grade shall attempt to match existing soil texture except for situations where clay subsoil exists. Where clay subsoil exists, use loam or silt loam topsoil.
- B. Topsoil shall be free of stones, lumps, plants, roots and other debris over 1 ½". Topsoil must also be free of plants or plant parts of Bermuda grass, quack grass, Johnson grass, mugwort, nut sedge, poison ivy, Canada thistle or others as specified.
- C. Topsoil shall not contain toxic substances harmful to plant growth (i.e. pesticide residues).

2.3 FERTILIZER

- A. All fertilizers shall be uniform in composition, free flowing and suitable for application with approved equipment.
- B. All fertilizer shall be a commercial balanced 1:2:1 ratio fertilizer. Fertilizers shall be delivered to the site fully labeled according to applicable State Fertilizer laws and shall bear the name, trade name or trademark and warranty of the producer;
- C. Commercial fertilizers shall be complete fertilizers, part of the elements of which are derived from organic sources and shall contain the following percentages by weight:

Prior to Seeding – 6-24-24;*

Nitrogen	6%
Phosphoric Acid	24%
Potash	24%

After seeding – 18-5-9;*

Nitrogen	18%
Phosphoric Acid	5%
Potash	9%

*Or as more adequately determined by soil analysis when so designated in the bid form.

- D. Nitrogen: Shall be in the form of available nitrates, ammonium sulfate or phosphate and urea. A minimum of 30% of the available nitrogen shall be water-insoluble.
- E. Phosphoric Acid: Shall be derived from super phosphates or ammonium phosphates.
- F. Potash: Shall be in the form of potassium nitrate or potassium sulfate.
- G. Special Protection: If stored at the site, protect fertilizer from the elements at all times.

2.4 LIME

- A. Lime material shall be ground or pulverized limestone which contains at least 50% total oxides, i.e. calcium oxide plus magnesium oxide. Limestone shall be ground to such fines that at least 50% will pass through a 100 mesh sieve and 98%-100% will pass through a 20-mesh sieve.

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Granular or palletized lime may be used but it must follow the same specifications as above prior to being granulated or palletized.

2.5 STRAW-HAY MULCH

- A. Straw-Hay Mulch: This mulch shall be non-toxic to the germination of seed and shall be approved by the Landscape Architect.
 - 1. Straw: Shall be stalks of wheat, rye, oats, or other approved source and shall be air dried.
 - 2. Hay: Shall be obtained from fields of Timothy, Red Top or other approved mature grasses and shall be air dried.

3.0 SOIL PREPARATION

3.1 SUBGRADE SOIL PREPARATION

- A. General Conditions: Work shall proceed only after rough grading has been completed and the subgrade is within 2/10 of 1', i.e. 2.4", from final subgrade. If the graded area develops volunteer weed growth, the growth must be eliminated at the expense of the general contractor or the owner.
- B. Grades: Grades which have been previously established in conformance with the drawings and/or other applicable specifications shall be maintained in a true and even grade.
- C. Liming: Limestone shall be spread based on soil test recommendations. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with an expanded tillage operation as described below.
- D. Tilling (Scarifying): After the areas have been brought to grade, the subgrade shall be loosened by disking or by scarifying to a depth of 2" – 4" inches. This is especially critical when topsoil is to be added.

3.2 FINAL GRADE SOIL PREPARATION WITH COMPOST

This specification applies only when compost is used to amend existing subsoil in order to make it suitable for sod or for sowing seed. The use of compost shall be noted in the contract agreement.

- A. General Conditions: The areas to which these specifications apply shall be clearly indicated on the drawings or as otherwise specified. Equipment, labor and materials necessary for preparation of the specified areas shall be furnished by the landscape contractor. Work shall proceed only after the subgrade is within 1" of final grade.
- B. Grades: Grades in the specified area shall conform to the drawings and/or other applicable specifications and shall be maintained true and even.
- C. Applying Compost: The compost shall be uniformly applied at a level not to exceed 4 cubic yards per 1000 square feet, 1" thick layer. This level of application will provide adequate nutrients to supply the needs of the plants through the first growing seasons.
- D. Tilling: As soon as the compost has been applied, it shall be incorporated into the top 4" – 6" of soil by either rototilling or cross disking.

3.3 FINAL GRADE SOIL PREPARATION WITH TOPSOIL

- A. General Conditions: The areas to which these specifications apply shall be clearly indicated on the drawings or as otherwise specified. Equipment, labor and materials necessary for preparation of the specified areas shall be furnished by the landscape contractor. Work shall proceed upon acceptance of the subgrade by the landscape architect or the owner.
- B. Grades: Grades in the specified area shall conform to the drawings and/or other applicable specifications and shall be maintained true and even.
- C. Materials: Topsoil shall be as stated in 2.2 topsoil above. Topsoil on the existing site may be used but must meet standards.
- D. Topsoil Installation: Topsoil shall be uniformly distributed on the designated areas to meet final grades. Spreading shall be performed in such a manner that sodding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from

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topsoiling or other operations shall be corrected in order to prevent the formation of depressions or water pockets. Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed sodding.

- E. Fertilizer: Fertilizer application rates shall be determined by topsoil test recommendations.
- F. Liming: Liming shall be based upon topsoil test recommendations.
- G. Tilling: If 3" or less of topsoil is added to the site, it must be incorporated into the subgrade by tilling. All amendments must be incorporated to at least a 3" depth.

3.4 FINISH GRADE

- A. General Conditions: The landscape contractor shall proceed only after the topsoil or subsoil has been prepared uniformly to the designated areas to within $\frac{1}{4}$ of 1". Any undulations or irregularities in the surface resulting from fertilizing, liming, tilling or other causes shall be leveled prior to sodding.
- B. Prior to sodding, the surface shall be cleared of all trash, debris and stones larger than 1-1/2" in diameter or length, and of all roots, brush wire, grade stakes and other objects that would interfere with sodding.
- C. All areas within the limits of this project to be seeded or sodded shall be conditioned by loosening and finely pulverizing the soil to a depth of three (3) inches. The conditioning process shall consist of rototilling, discing, or harrowing with approved equipment, and bringing the finished grade to an acceptable surface in conformance with the plans and as approved by the Landscape Architect. All rocks and other debris over 1½ inches in any dimension shall be removed from the fine graded surface prior to seeding or sodding.
- D. In the event that prior conditioned soil has become compacted by rain, equipment or other means, the entire area affected shall be reconditioned to a depth of not less than two (2) inches just prior to seeding or sodding time.
- E. Generally, the fine grading and soil conditioning will be done just prior to seeding or sodding; however, if in the opinion of the Landscape Architect, soil or weather conditions are not suitable for sodding at that time, the Contractor shall recondition the soil and seed or sod when directed.

4.0 EXECUTION

4.1 INSPECTION

- A. Prior to beginning this Work, the Contractor shall be responsible for inspecting all final grades as completed under SITE GRADING and gaining approval of the Landscape Architect to commence the Landscape Architect's operations. Any discrepancies in the final topsoil grades must be brought to the Landscape Architect's attention and corrected prior to beginning this Work.

4.2 INSTALLATION AND APPLICATION

- A. Planting Seasons:
 - 1. Sodded Areas: Lawns shall be sodded from March 15th to June 15th and from August 15th to November 1st.
 - 2. The actual planting of areas to be designated, however, shall be done during periods within these seasons as determined by weather conditions, by acceptable practices in the locality of the project, or as approved by the Landscape Architect.
- B. Fertilizing:
 - 1. Commercial fertilizer shall be mechanically spread and mixed into the top three (3) inches of the topsoil at the rate of 20 lbs. Per 1000 square feet (870 lbs./acre).
- C. Sodding:
 - 1. Site Approval: The landscape contractor shall inspect the site to approve final grading and preparation prior to the installation of the sod.
 - 2. Moistening the Soil: During periods of high temperature, lightly irrigate the soil immediately prior to laying the sod.

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3. Starter Strip: The first row of sod shall be laid in a straight line with subsequent rows placed parallel to and tightly against each other. Lateral joints shall be staggered to promote more uniform growth and strength. Care shall be exercised to ensure that the sod is not stretched or overlapped and that all joints are butted tightly in order to prevent voids which would cause air drying of the roots. All openings in the sod shall be plugged with sod and all joints shall be filled with topsoil.
4. Sloping Terrain: On sloping terrain where erosion may be a problem, sod should be installed perpendicular to slope when possible with staggered joints and secured by sod staples driven to ground level. If staples remain above ground level during sod establishment, either remove or drive to ground level once sod is rooted.
5. Watering and Rolling: The landscape contractor shall lightly water sod during installation to prevent excessive drying. As sodding is completed in any one section, the entire area shall be rolled sufficiently to incorporate the sod with the sod beds and insure tight hand joints between the sod strips. It shall then be thoroughly irrigated so that the underside of the new sod pad and soil immediately below the sod are thoroughly wet. The general contractor shall be responsible to have adequate water available at the site prior to and during installation of sod, unless otherwise stated.

4.3 MAINTENANCE (CLEAN UP AND ACCEPTANCE)

- A. Maintenance: Provide continuous maintenance until the date of final acceptance, including but not limited to: reseeding, watering, mowing, weeding, and re-working as follows:
 1. Sodded Areas:
 - a. Watering
 - i. First Week: Sod shall be kept moist at all times. In the absence of adequate rainfall, watering shall be performed daily or as often as necessary and in sufficient quantities to maintain moist soil to a depth of at least 2".
 - ii. Second and Subsequent Weeks: Water the sod as required to maintain adequate moisture in the upper 4" of soil to promote deep root growth. Once sod is well-rooted, less frequent, deep watering should be maintained to encourage deep root growth. The total should equal the equivalent of at least 1" of water per week. This can be accomplished with a combination of rainfall and irrigation.
 - b. Mowing:
 - i. The first mowing shall be as soon as top growth warrants it. No more than 1/3 of the grass leaf shall be removed by the initial cutting or subsequent cuttings.
 - ii. Mowing to a height of 1½ to 2 inches when grass attains height of three (3) inches.
 - iii. Re-fertilizing with 18-5-9 commercial fertilizer at the rate of 15 lbs. Per 1000 square feet after the second mowing or prior to final acceptance.
 - iv. Re-work areas which fail to show a uniform stand of grass or are otherwise unacceptable. Work shall be done with the same sod and repeated until satisfactory results are achieved.
 - v. Maintain sodded area for a period of 30 days after installation or until satisfactory results are achieved.
- B. Clean Up:
 1. Excess and waste material shall be removed daily.
 2. All pavements shall be left broom cleaned and all damaged areas in existing turf shall be restored to their original condition.
- C. Final Inspection and Acceptance:
 1. Upon completion of the specified maintenance period, the Contractor shall request in writing that a final inspection be conducted by the Landscape Architect to determine final acceptance of the Work. The Contractor will be required to make said request five (5) days in advance. If acceptance is not granted, the Contractor is required to maintain those unacceptable areas until final approval has been given.

END OF SECTION

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.2 RELATED DECTIONS

- A. Section 03200 - Concrete Reinforcement.
- B. Section 03300 - Cast-In-Place Concrete.
- C. Section 04816 - Masonry Veneer: Spacing for veneer anchor reglets recessed in concrete.
- D. Section 05310 - Steel Deck.
- E. Section 05500 - Metal Fabrications: Supply of metal fabrications for placement by this section.

1.3 REFERENCES

- A. Unless otherwise noted the most current issue of the reference shall be used.
- B. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
- C. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.
- D. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary; American Concrete Institute International.
- E. ACI 347R - Guide to Formwork for Concrete; American Concrete Institute International.
- F. ASME A17.1 - Safety Code for Elevators and Escalators; The American Society of Mechanical Engineers.
- G. PS 1 - Construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce).

1.4 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.5 SUBMITTALS

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on void form materials and installation requirements.
- C. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.
- D. Provide data on form liner installation and provide min. 6" x 6" sample.

1.6 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 347R, ACI 301, and ACI 318. Maintain one copy of standards on project site.
- B. Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in the State in which the Project is located.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable code for design, fabrication, erection and removal of formwork.

1.8 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01600 - Product Requirements: Transport, handle, store and protect products.
- B. Deliver void forms and installation instructions in manufacturer's packaging.
- C. Store void forms off ground in ventilated and protected manner to prevent deterioration from moisture.

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 2 – PRODUCTS

2.1 SECTION INCLUDES

- A. Standard Structural Concrete Formwork is at the Contractor's discretion, but must meet minimum requirements specified below.

2.2 WOOD FORM MATERIALS

- A. Typical Forms: Plyform, Class I, exterior minimum thickness 3/4" inch; in accordance with American Plywood Association Standards.
- B. Keyways: 2 inch lumber.

2.3 PREFABRICATED FORMS

- A. Manufacturers:
 - 1. American Polysteel Forms, Albuquerque, NM 87107
 - 2. Amico Stay-Form, Birmingham, IL 35208
 - 3. Molded Fiber Glass Concrete Forms Co., Union City, PA 16438.
 - 4. Sonoco Products Co., Hartsville, SC
 - 5. Symons Corp., Des Plaines, IL 60017
 - 6. Substitutions: See Section 01600 - Product requirements.
- B. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- C. Preformed Plastic Forms: Thermoplastic polystyrene form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- D. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

2.4 FORMWORK ACCESSORIES

- A. Form Ties: Removable or Snap-off type, galvanized metal, adjustable length, 1 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface; form ties designed to resist lateral pressure of fresh concrete on forms.
- B. Form Release Agent: Colorless mineral oil that will not stain concrete, absorb moisture, impair natural bonding of concrete finish coatings, or affect color characteristics of concrete finish coatings.
- C. Form Liners: Units of face designs, texture arrangement, and configuration indicated. Furnish with manufacturer's recommended liquid release agent that will not bond, stain or adversely affect concrete surfaces and will not impair subsequent surface treatments of concrete.
- D. Rustication Strips: Metal, rigid plastic, or dressed wood with sides beveled and back kerfed; nonstaining.
- E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- F. Waterstops: Polyvinyl chloride, minimum 1,750 psi tensile strength, minimum 50 degrees F to plus 175 degrees F working temperature range, 4 inch wide, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

- A. Earth forms are not permitted.

3.3 ERECTION – FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301, ACI 347 and ACI 318.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. Obtain approval before framing openings in structural members that are not indicated on drawings.
- F. Provide chamfer strips on external corners of beams, joists, and columns.
- G. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.
- H. Coordinate this section with other sections of work that require attachment of components to formwork.
- I. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.4 APPLICATION – FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in or passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Position recessed anchor slots for brick veneer masonry anchors to spacing and intervals specified in Section 04816.
- E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- F. Install PVC waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement. Heat seal joints so they are watertight.
- G. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- H. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

3.6 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
 - 1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
 - 2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117-90 and ACI 301. Where conflicts occur, the more stringent requirement shall apply.
- B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.
- C. Camber slabs and beams in accordance with ACI 301.

3.8 FIELD QUALITY CONTROL

- A. An independent Testing Agency will perform field quality control tests, as specified in Section 01400.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.
- C. Do not reuse wood formwork more than 4 times for concrete surfaces to be exposed to view. Do not patch formwork.
- D. When forms are reused, clean surfaces, remove laitance, and tighten to close joints. Align and secure joints to avoid offsets.

3.9 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.
- D. Wall Forms:
 - 1. If curing compound is not used, leave the forms in place for 7 days and keep continuously wet.
 - 2. If curing compound is used, remove forms 24 hours after concrete has been placed providing concrete has developed sufficient strength to sustain its own weight. Do not use curing compound on vertical concrete surfaces that will be painted or otherwise finished.
 - 3. During cold weather concreting, leave forms in place for 7 days in addition to placement of other cold weather protection.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.2 RELATED SECTIONS

- A. Section 03100 - Concrete Forms and Accessories.
- B. Section 03300 - Cast-In-Place Concrete.
- C. Section 04810 - Unit Masonry Assemblies: Reinforcement for masonry.

1.3 REFERENCES

- A. Unless otherwise noted the most current issue of the reference shall be used.
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.
- C. ACI 318 - Building Code Requirements For Reinforced Concrete and Commentary; American Concrete Institute International.
- D. ACI SP-66 - ACI Detailing Manual; American Concrete Institute International.
- E. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- F. ASTM A 184/A 184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement.
- G. ASTM A 185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- H. ASTM A 497 - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
- I. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- J. ASTM A 704/A 704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
- K. ASTM A 767/A 767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
- L. AWS D1.4 - Structural Welding Code - Reinforcing Steel; American Welding Society.
- M. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute.
- N. CRSI (P1) - Placing Reinforcing Bars; Concrete Reinforcing Steel Institute.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
 - 1. Prepare shop drawings under seal of a Professional Structural Engineer experienced in design of work of this type and licensed in the State in which the Project is located.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with CRSI (DA4), CRSI (P1), ACI 301, and ACI 318.
 - 1. Maintain one copy of each document on project site.
- B. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.
- C. Prepare shop drawings under seal of a Professional Structural Engineer experienced in design of work of this type and licensed in the state where the project is located.

SECTION 03200

CONCRETE REINFORCEMENT

PART 2 – PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420).
 - 1. Deformed billet-steel bars.
 - 2. Galvanized in accordance with ASTM A 767/A 767M, Class I.
- B. Reinforcing Steel Mat: ASTM A 704/A 704M, using ASTM A 615/A 615M, Grade 60 (420) steel bars or rods, unfinished.
- C. Stirrup Steel: ASTM A 82 steel wire, unfinished.
- D. Welded Steel Wire Reinforcing (W.W.R.): ASTM A 185, plain type. Provide in sizes as shown on Drawings and in flat sheets. Roll stock is not permitted.
- E. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gage.
 - 2. Bar Supports: Bolsters for spacing, supporting, and fastening reinforcing bars in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire precast concrete or fiber-reinforced concrete of greater compressive strength than concrete unless exceeded herein. Provide continuous length wire type bolsters with continuous sand plates for all slabs on grade. All support items in contact with vapor barrier system must have continuous plates so as to avoid puncture of the system during installation and over total life of structure.
 - 3. W.W.R. Supports: Chairs, for spacing, supporting, and fastening welded wire reinforcing in place. Provide continuous length wire type chairs with continuous sand plates for all welded wire reinforcing, placed in continuous rows maximum 4 feet on center or spaced sufficiently to support W.W.R. to intended position within concrete--plastic supports are not permitted for W.W.R. All support items in contact with vapor barrier system must have continuous plates so as to avoid puncture of the system during installation and over total life of structure.
 - 4. Bar and reinforcing Support Manufacturers:
 - a. Dayton Richmond Concrete Accessories, Miami, OH.
 - b. Meadow Burke Products, Chicago, IL.
 - c. Universal Form Clamp Co., Bellwood, IL.
 - d. Substitutions: See Section 01600 - Product Requirements.
 - 5. Provide stainless steel, galvanized, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.
 - 6. Joint Dowel Bars: Plain-steel bars, ASTM A615/A615M, Grade 60 (420). Cut bars true to length with ends square and free of burrs.
- F. Reinforcing for concrete topping of precast concrete hollow core plank
 - 1. Woven wire fabric: 2 inch x 2 inch X 14 gauge, plain type, in flat sheets.

2.2 DELIVERY, STORAGE, AND PROTECTION

- A. Properly label all bars with weatherproof tags to facilitate identification.
- B. Store reinforcing steel on supports above ground level. Keep covered with tarpaulins.
- C. Protect coated bars from damage to coating.

2.3 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is not permitted unless indicated on drawings. If and when explicitly indicated, perform welding in accordance with AWS D1.4.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
 - 1. Review locations of splices with Engineer.
 - 2. Minimize reinforcement splices.

SECTION 03200

CONCRETE REINFORCEMENT

PART 3 – EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement in accordance with CRSI. Do not deviate from required position.
- B. Do not displace or damage vapor barrier for slabs on grade.
- C. Accommodate placement of formed openings.
- D. Lap welded wire fabric one full mesh at side and end laps and wire together.
- E. Tie bars at all points where bars cross or as required by CRSI (P1).
- F. Provide welded wire fabric in all interior concrete slabs on grade unless noted otherwise on plans.
- G. Provide keys and dowels where the walls and other items are shown to be built integrally but are placed as separate pours. Use dowels of the same size and spacing as reinforcing but not less than 48 bar diameters embedment.
- H. Splice reinforcing bars as required. Lap continuous reinforcing 48 diameters but not less than 18 inches.
- I. Minimum Wall Reinforcing: Two No. 5 bars, continuous top and bottom, unless other sizes or quantities are indicated. Reinforcing bars shall be continuous around corners or corner bars shall be provided of the same size and spacing of reinforcing bars.
- J. Prior to pouring concrete, check all reinforcing for contamination and clean as required.
- K. Conform to applicable code and requirements of contract documents for concrete cover over reinforcement.
- L. Tie bars at all points where crossed or as required by CRSI.
- M. Provide welded wire fabric in all interior concrete slabs on grade unless noted otherwise on plans.

3.2 FIELD QUALITY CONTROL

- A. An independent testing agency, as specified in Section 01400, will inspect installed reinforcement for conformance to contract documents before concrete placement.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Slabs on grade.
- B. Joint devices associated with concrete work..
- C. Concrete curing.

1.2 RELATED SECTIONS

- A. Section 01400 - Quality Requirements: Testing and inspection services.
- B. Section 02316 - Fill and Backfill.
- C. Section 03100 - Concrete Forms and Accessories: Forms and accessories for formwork.
- D. Section 03200 - Concrete Reinforcement.
- E. Section 04810 - Unit Masonry Assemblies: Coordinate placement of vertical reinforcing.
- F. Section 05120 - Structural Steel: Placement of anchor bolts.
- G. Section 07212 - Board and Batt Insulation.
- H. Section 07900 - Joint Sealers.
- I. Mechanical items for casting into concrete: refer to drawings.
- J. Electrical items for casting into concrete: refer to drawings.
- K. Plumbing items for casting into concrete: refer to drawings.

1.3 REFERENCES

- A. Unless otherwise noted, the most current issue of references shall be used.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International.
- C. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; American Concrete Institute International.
- D. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.
- E. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International.
- F. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International.
- G. ACI 305R - Hot Weather Concreting; American Concrete Institute International.
- H. ACI 306R - Cold Weather Concreting; American Concrete Institute International.
- I. ACI 309R - Guide for Consolidation of concrete.
- J. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary; American Concrete Institute International.
- K. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- L. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete.
- M. ASTM C 143/C 143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- N. ASTM C 173/C 173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- O. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete.
- P. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- Q. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete.
- R. ASTM C 1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- S. ASTM D 994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- T. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- U. ASTM E 1643-98 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

SECTION 03300

CAST-IN-PLACE CONCRETE

- V. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop; Corps of Engineers.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products.
- C. Samples: Submit two, 12 inch x12 inch samples of vapor barrier materials and all accessories.
- D. Samples: Submit two, 12 inch long samples of waterstops and construction joint devices.
- E. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction for concrete accessories.
- F. Project Record Documents: Contractor shall coordinate with all trades to accurately record the actual locations of all embedded utility lines, conduits, piping and other items that will be concealed from view upon completion of concrete work.
- G. Mix Design: Submit concrete mix design for each type and strength of concrete determined by either laboratory trial mix or field test data in accordance with ACI 211.1 and ACI 301. Submit mix design at least 15 days prior to first pour.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
 - 1. Maintain one copy of each document on site.
- B. Acquire cement from same source and aggregate from same source for entire project.
- C. Follow recommendations of ACI 305R when concreting during hot weather.
- D. Follow recommendations of ACI 306R when concreting during cold weather.
- E. Concrete design mix shall test 15% higher than specified requirements.
- F. Test concrete in accordance with Section 01400 - Quality Requirements.
- G. All items in contact with vapor barrier system must have continuous plates so as to avoid puncture of the system during installation and over total life of structure.

PART 2 – PRODUCTS

2.1 FORMWORK

- A. Comply with requirements of Section 03100.

2.2 REINFORCEMENT

- A. Comply with requirements of Section 03200.
- B. Bolsters and Chairs for reinforcing support: Comply with requirements of Section 03200 specifically for slab on grade applications.
 - 1. All support items in contact with vapor barrier system must have continuous plates so as to avoid puncture of the system during installation and over the total life of structure.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C 150, Type I - Normal Portland type.
- B. Fine and Coarse Aggregates: ASTM C 33.
- C. Lightweight Aggregate: ASTM C 330.
- D. Fly Ash: ASTM C 618, Class C or F.
- E. Water: Clean and not detrimental to concrete.

2.4 ADMIXTURES

- A. Air Entrainment Admixture: ASTM C 260.
- B. Chemical Admixtures:
 - 1. ASTM C 494, Type A - Water Reducing.
 - 2. Other chemical admixtures may be used only when approved in writing by the Architect prior to use. Under certain conditions the Architect may consider the use of the following admixtures: ASTM C 494/C 494M, Type E - Water Reducing and Accelerating, Type F -

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Water Reducing, High Range, and Type G - Water Reducing, High Range and Retarding.

3. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

2.5 VAPOR BARRIER

- A. Acceptable products:
 1. Stego Wrap (15 mil) Vapor Barrier by Stego Industries (877) 464-7834 www.stegoindustries.com.
 2. Soco-Shield 15 mil. Vapor Barrier by Socopac (888) 276-2672 www.socoshield.com
 3. Moistop Ultra "A" 15 mil. Vapor Barrier by Fortifiber Building Products (800) 773-4777 www.fortifiber.com
 4. Premolded membrane with Plasmatic Core by W.R. Meadows 1-800-342-5976 www.wrmeadows.com
 5. Vaporguard by Reef Industries 1-800-231-6074 www.reefindustries.com
 6. Substitutions: NOT PERMITTED
- B. Vapor Barrier Accessories: As recommended by the manufacturer for complete installation of vapor barrier placed over Granular Fill Material under Concrete Slabs as defined in Section 02316 - Fill and Backfill - and conforming to ASTM E 1643-98. Accessories include, but are not limited to:
 1. Seam Tape
 2. Pipe Boots
 3. Sealant or Mastic adhesive

2.6 CONCRETE ACCESSORIES

- A. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
- B. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- C. Bonding Agent: ASTM C 1059, Type II acrylic non-redispersable type.
- D. Epoxy Bonding System: ASTM C 881, type as required by project conditions.
- E. Non-Shrink Grout: ASTM C 1107; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 1. Minimum Compressive Strength at 48 Hours: 2,400 psi.
 2. Minimum Compressive Strength at 28 Days: 7,000 psi.
- F. Moisture-Retaining Cover for slabs on grade: ASTM C 171; white burlap-polyethylene sheet.
- G. Liquid Curing Compound: ASTM C 309, Type 1, clear or translucent.
- H. Anchors to be cast into concrete: As outlined in Section 05120 - Structural Steel.

2.7 JOINT DEVICES AND MATERIALS

- A. Waterstops: As defined in Section 03100 - Concrete formwork: FORMWORK ACCESSORIES
- B. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, 1/2 inch thick and full depth of slab less 1/2 inch.
- C. Construction Joint Devices: Integral extruded plastic; 0.0239 inch thick, formed to tongue and groove profile, knockout holes spaced at 6 inches, ribbed steel spikes with tongue to fit top screed edge.
- D. Sealant and Primer: As specified in Section 07900.

2.8 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Proportioning Structural Lightweight Concrete: Comply with ACI 211.2 recommendations.
- C. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience, as specified in ACI 301.
- D. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

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CAST-IN-PLACE CONCRETE

- E. Concrete for Footings, Foundations and Walls:
 - 1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 3000 psi.
 - 2. Concrete weight: Normal (144 lbs. per cubic foot)
 - 3. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 4. Cement Content: Minimum 470 lb per cubic yard, maximum 517 per cubic yard.
 - 5. Water-Cement Ratio: Maximum 55 percent by weight.
 - 6. Total Air Content: 3 percent naturally occurring, per ASTM C 173.
 - 7. Maximum Slump: 3 inches, plus or minus 1 inch.
 - 8. Maximum Aggregate Size: 1 inch.
 - 9. Water reducing agent required.
- F. Concrete for elevated slabs greater than 2 inches in thickness:
 - 1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 3000 psi.
 - 2. Concrete weight: Normal (144 lbs. per cubic foot)
 - 3. Water-Cement Ratio: Maximum 44 percent by weight.
 - 4. Cement Content: Minimum 470 lb per cubic yard, maximum 517 lb. per cubic yard.
 - 5. Total Air Content: Maximum 3 percent naturally occurring, per ASTM C 173.
 - 6. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 7. Maximum Slump: 3 inches plus or minus 1 inch.
 - 8. Maximum Aggregate Size: 1 inch.
 - 9. Water reducing agent required.
- G. Slabs on Grade:
 - 1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 3000 psi.
 - 2. Concrete weight: Normal (144 lbs. per cubic foot)
 - 3. Cement Content: Minimum 470 lb. per cubic yard, maximum 517 lb per cubic yard.
 - 4. Water-Cement Ratio: Maximum 44 percent by weight.
 - 5. Total Air Content: Maximum 3 percent naturally occurring, per ASTM C 173.
 - a. If air entrainment is added for workability, Water-Cement ratio shall be reduced to 40 percent by weight.
 - 6. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 7. Maximum Slump: 3 inches plus or minus 1 inch.
 - 8. Maximum Aggregate Size: 1-1/2 inch gradations shall include sizes up to 1 inch.
 - 9. Water reducing agent required.

2.9 MIXING

- A. Transit Mixers: Comply with ASTM C 94/C 94M.
- B. Admixtures:
 - 1. Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer. All admixtures must be approved prior to placing concrete.
 - 2. Use accelerating admixtures in cold weather only when approved by Architect. Use of admixtures will not relax cold weather placement requirements.
 - 3. Use of calcium chloride is not permitted.
 - 4. Use set of retarding admixtures during hot weather only when approved by Architect.
 - 5. Add air entraining agent to normal weight concrete mix for work exposed to exterior.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.
- B. Verify placement and compaction of granular fill for slab on grade applications prior to placement of vapor barrier. Compaction shall meet requirements of Section 02316 - Fill and Backfill as verified by the Testing Agency of Record.

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CAST-IN-PLACE CONCRETE

- C. Contractor shall coordinate with Division 15 and 16 trades and verify that all Mechanical, Electrical, Plumbing lines or other items placed are wholly within or below the CA-6 granular fill layer for slab on grade applications. Vapor Barrier may not be placed directly over any pipes, conduits or other items, but shall rest firmly on compacted granular fill.

3.2 PREPARATION

- A. Formwork: Comply with requirements of Section 03200. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Where sheet waterproofing will be applied, chamfer corners of concrete on a 45 degree angle measuring minimum 1/2 inch along the full face of the corner.
- C. Verify that forms are clean and free of rust before applying release agent.
- D. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.
- E. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- F. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.3 INSTALLATION OF VAPOR BARRIER

- A. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643-98 unless exceed herein.
 - 1. Unroll Vapor Barrier with the longest dimension parallel with the direction of the pour.
 - 2. Lap Vapor Barrier over footings and seal to foundation walls.
 - 3. Overlap joints 6 inches and seal with sealant and seam tape.
 - 4. Seal all barrier penetrations including pipes, electrical conduit, reinforcing penetrations or other items with pipe boot made from Vapor Barrier and seam tape.
 - 5. Repair vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight. The use of brick type reinforcing supports for W.W.F. is prohibited.
 - 6. Install compressible filler at slab perimeter and at all locations where slab meets vertical surface.
- B. Remove all standing water from vapor barrier prior to placing concrete.
- C. Notify Architect for review of vapor barrier installation a minimum of 48 hours prior to placing concrete. Contractor shall complete any remedial work required to comply with installations requirements as determined by the Architect.

3.4 INSTALLATION OF REINFORCING

- A. Following placement of vapor barrier, install reinforcement in compliance with Section 03200 and ACI 301. All support items in contact with vapor barrier system must have continuous plates so as to avoid puncture of the system during installation and over total life of structure.

3.5 PLACING CONCRETE

- A. Begin placing concrete within 60 minutes from the time truck leaves the concrete plant.
- B. Place concrete in accordance with ACI 304R.
- C. Do not add water to concrete during transport, delivery, at project site, or during placement unless approved by Architect.
- D. Place concrete in a continuous operation and without segregation.
- E. Placement of concrete requiring drops less than 10 feet may be by means of bottom discharge bucket, flexible drop chute, elephant-trunk, hopper or tremie, or free fall concrete may be used provided it is directed such that fall is vertical down the center of forms and reinforcing without hitting the sides, or reinforcement. Where a drop of more than 15 feet is required concrete must be pumped into place.
- F. Consolidate concrete prior to the point in which the mechanical vibrator will not sink into the concrete by its own weight.
- G. Consolidate concrete using a mechanical vibrator by inserting and withdrawing vertically at

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close uniform intervals, using a systematic pattern of vibration to ensure that all concrete has been adequately consolidated. When pouring multiple lifts, insert mechanical vibrator to a depth of penetrating the previous lift by minimum 6 inches. Use equipment and procedures as recommended by ACI 309R--Do not over consolidate. Do not allow vibrator to contact forms or reinforcing.

- H. On surfaces where air void holes are objectionable, use additional vibration. Do not over vibrate.
- I. Place concrete for floor slabs in accordance with ACI 302.1R unless exceeded herein.
- J. Cold Weather Placement: Comply with ACI 306.1
- K. Hot Weather Placement: Comply with ACI 305R.
- L. Notify Architect not less than 48 hours prior to commencement of placement operations.
- M. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- N. Separate slabs on grade from vertical surfaces with joint filler.
- O. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- P. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Conform to Section 07900 for finish joint sealer requirements.
- Q. Install joint devices in accordance with manufacturer's instructions.
- R. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- S. Slabs on grade shall be placed in continuous strips as per ACI recommendations. The maximum pour area shall not exceed 3600 square feet. Allow 24 hours to elapse between the placement of adjacent strips. Pour in alternating strip pattern so that no two adjoining slabs are poured the same day.
- T. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- U. Place concrete continuously between predetermined expansion, control, and construction joints.
- V. Do not interrupt successive placement; do not permit cold joints to occur. Provide construction joints at the termination of all pours.
- W. Saw cut joints within 24 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness. If no spacing of joints is indicated on drawings, place joints at a maximum spacing of 15 feet in each direction.
- X. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- Y. Screed floors and slabs on grade level, maintaining surface flatness within maximum 1/8 inch from a level plane.

3.6 PLACING GROUT

- A. Mix non-shrink grout in accordance with manufacturer's instructions
 - 1. Do not mix more grout than can be placed in 20 minutes.
 - 2. Do not retemper grout.
- B. Soak concrete surfaces to receive grout and remove free water just before placing grout. Pack grout to form a full grout bed without air pockets or cavities. Trowel smooth and splay neatly to 45 degrees.

3.7 CONCRETE TOPPINGS FOR PRECAST HOLLOW CORE PLANKS

- A. Grout all panel seams and other items as put forth in Section 03415.
- B. Prior to placing floor topping, remove deleterious material. Broom and vacuum clean.
- C. Place required dividers, edge strips, reinforcing, and other items to be cast in.
- D. Place reinforcing in accordance with Section 03200.
- E. Place concrete floor toppings to required lines and levels.
 - 1. Place topping in checkerboard panels not to exceed 30 ft in either direction.
- F. Screed toppings level, as outlined in Placing Concrete above.

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3.8 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
 - 2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
- C. Where sheet waterproofing will be applied, contractor shall fill all voids in excess of 1/4 inch in diameter, remove all oil and form bond breaking material that may hinder adhesion of sheet waterproofing prior to installing waterproofing.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Wood float surfaces that will receive quarry tile and terrazzo with full bed setting system.
 - 2. Steel trowel all other surfaces.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:50 nominal.
- F. Do not sprinkle dry cement on surfaces to absorb water.

3.9 CURING AND PROTECTION

- A. Comply with requirements of ACI 308 unless exceeded herein. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Apply evaporation retarder after floating to prevent premature surface setting under dry or windy conditions.
- C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: Not less than 7 days.
 - 2. High early strength concrete: Not less than 4 days.
- D. Formed Surfaces: Cure by moist curing with forms in place for full curing period of 7 days minimum. Where forms are removed prior to 7 day curing period, apply curing compound in two coats at right angles using application rate recommended by manufacturer.
- E. Surfaces Not in Contact with Forms:
 - 1. Start initial curing as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by saturated burlap.
 - 2. Begin final curing after initial curing but before surface is dry.
 - a. Moisture-retaining cover: Seal in place with waterproof tape or adhesive.
- F. Concrete slab curing:
 - 1. Wet cure all concrete slabs for a minimum of 7 days. Completely cover pour area with moisture retaining cover and protect against movement. Keep moisture retaining cover continuously moist for full 7 day period. Do not permit loading or partial loading caused by vehicle traffic or material placement during this curing period.
 - 2. In no case shall liquid curing compound be used where compound may be incompatible with floor finish materials. If the application of curing compound is questionable, the Contractor shall provide a review report by the finish materials manufacturer prior to the application of those materials to ensure that the proper moisture and other conditions exist and if any remedial work is required.

3.10 FIELD QUALITY CONTROL

- A. An independent Testing Agency will perform field quality control tests, as specified in Section 01400.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm. Contractor must provide minimum 48 hours notice to testing agency and Architect prior to all concrete pours.

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CAST-IN-PLACE CONCRETE

- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- E. Compressive Strength Tests: ASTM C 39/C 39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 50 cu yd or less of each class of concrete placed.
- F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents. Record ambient temperature at time of concrete sampling.
- G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C 143/C 143M.
- H. The testing agency will perform the following:
 - 1. Obtain representative samples of fresh concrete in accordance with ASTM C 172.
 - 2. Three concrete test cylinders will be taken for every 50 cu. yds. of each class of concrete placed, but not less than one set of test cylinders for any day's placement.
 - 3. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.
 - 4. Perform compression strength tests. Break one cylinder at 7 days and two cylinders at 28 days.
 - 5. Perform one slump test for each 25 cubic yards of concrete or fraction thereof, but in no case less than two per each day of concrete pour, in accordance with ASTM C 143.
 - 6. Test for air entrainment, one test for each 50 cubic yards of concrete or fraction thereof, in accordance with ASTM C 231.
 - 7. If tests indicate concrete strengths below those required or visual defects indicate concrete of poor quality has been placed, additional tests shall be made and reported at the expense of the Contractor. Tests may be compression test on cored cylinders, ASTM C 42 and/or load tests as outlined in ACI 318.

3.11 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 72 hours of test.
- B. Defective Concrete:
 - 1. Test samples not conforming to requirements or in-place concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
 - 2. Improper use or application of reinforcing accessories or other items that may compromise the integrity of the vapor barrier system.
 - 3. Improper placement of W.W.R. or other reinforcing.
- C. Requirements for repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Provide sample area of patch, fill, touch-up, repair, or exposed concrete for approval of the Architect for each type of area requiring repair.
- E. Excessive honeycombing or embedded debris in concrete is not acceptable. Notify Architect upon discovery.
- F. Allow Architect to inspect concrete surfaces upon removal of forms and prior to backfilling or otherwise covering concrete.

END OF SECTION

SECTION 03356

CONCRETE FLOOR FINISHING

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Finishing slabs on grade and monolithic floor slabs.
- B. Surface treatment with concrete hardener, sealer, and slip resistant coatings.

1.2 RELATED SECTIONS

- A. Section 03300 - Cast-In-Place Concrete: Prepared concrete floors ready to receive finish.

1.3 REFERENCES

- A. Unless otherwise noted the most current issue of the reference shall be used.
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.
- C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on concrete hardener, sealer, and slip resistant treatment, including information on compatibility of different products and limitations.
- C. Maintenance Data: Provide data on maintenance renewal of applied coatings.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.

1.6 DELIVERY, STORAGE, AND HAULING

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.7 PROJECT CONDITIONS

- A. Coordinate the work with concrete floor placement and concrete floor curing.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Temporary Lighting: Minimum 200 W light source, placed 8 feet above the floor surface, for each 425 sq ft of floor being finished.
- B. Do not finish floors until interior heating system is operational.
- C. Temporary Heat: Ambient temperature of 50 degrees F minimum at concrete surface.
- D. Ventilation: Sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

PART 2 – PRODUCTS – NOT USED

SECTION 03356

CONCRETE FLOOR FINISHING

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that floor surfaces are acceptable to receive the work of this section.

3.2 FLOOR FINISHING

- A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1R.
- B. Wood float surfaces that will receive quarry tile, ceramic tile, or cementitious terrazzo with full bed setting system.
- C. Steel trowel surfaces that will receive carpeting or resilient flooring.
- D. Steel trowel surfaces that are scheduled to be exposed.
- E. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains at 1/8 inch per foot nominal.

END OF SECTION

SECTION 03395

CURING, SEALING, AND HARDENING CONCRETE FLOORS

PART 1 – PRODUCTS

1.1 MANUFACTURERS

- A. Acceptable Manufacturer: Curecrete Distribution, Inc; 1203 West Spring Creek Place, Springville, UT 84663. ASD. Tel: (800) 998-5664. Fax: (801) 489-3307. Email: techsupport@ashfordformula.com. www.ashfordformula.com
- B. Substitutions: See Section 01600 - Product Requirements.

1.2 MATERIALS

- A. Cure-Seal-Hardener: Ashford Formula; water-based chemically-reactive penetrating sealer and hardener, that seals by densifying concrete so that water molecules cannot pass through but air and water vapor can, while allowing concrete to achieve full compressive strength, minimizing surface crazing, and eliminating dusting.
 - 1. Colorless, transparent, odorless, non-toxic, non-flammable.
 - 2. Containing no solvents or volatile organic compounds.
 - 3. USDA approved for food handling facilities.
 - 4. Allowing traffic on floors within 2 to 3 hours, with chemical process complete within 3 months.
 - 5. No change to surface appearance except a sheen developed due to traffic and cleaning.
- B. Water: Clean, potable.

END OF SECTION

SECTION 03505

SELF-LEVELING UNDERLAYMENT

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Liquid applied cementitious self-leveling floor underlayment.

1.2 REFERENCES

- A. Unless otherwise noted the most current issue of the reference shall be used.
- B. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

- A. See Section 01300 – Administrative Requirements, for submittal procedures.
- B. Product Data: Provide physical characteristics, product limitations
- C. Manufacturer's Instructions: Indicate mix instructions.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section and approved by the manufacturer.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable code for combustibility or flame spread requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install underlayment until floor penetrations and peripheral work are complete.
- B. Maintain ambient temperatures of 50 degrees for 24 hours before, during and 72 hours after installation of underlayment.
- C. During the curing process, ventilate spaces to remove excess moisture.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Cementitious Underlayment:
 - 1. Ardex Engineered Cements. Inc.: www.ardex.com.
 - 2. Dayton Superior Corporation: www.daytonsuperior.com
 - 3. Dependable Chemical Co., Inc.: www.floorprep.com.
 - 4. Substitutions: See Section 01600 - Product Requirements.

2.2 ACCESSORIES

- A. Provide all primers, cleaners, bonding agents or any other accessory materials recommended by the manufacturer for the intended installation.

2.3 MIXING

- A. Site mix materials in accordance with manufacturer's instructions.
- B. Mix to achieve following characteristics:
 - 1. Density: 100 lb/cu ft minimum dry density.
 - 2. Compressive strength: 1,000 psi minimum.
 - 3. Surface burning characteristics: Flame spread/smoke developed index of 0/0 in accordance with ASTM E 84.
- C. Mix to self-leveling consistency.

SECTION 03505

SELF-LEVELING UNDERLAYMENT

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum bi-products or other compounds detrimental to underlayment material bond to substrate.

3.2 PREPARATION

- A. Remove substrate surface irregularities. Fill voids and deck joints with latex based filler. Finish smooth.
- B. Vacuum clean surfaces.
- C. Prime substrate in accordance with manufacturer's instructions. Allow to dry.

3.3 APPLICATION

- A. Install underlayment in accordance with manufacturer's instructions.
- B. Install underlayment as required, or as directed by the Architect, to correct any imperfections or irregularities which have caused the floor to be out of level.

3.4 CURING

- A. Air cure in accordance with manufacturer's instructions.

3.5 APPLICATION TOLERANCE

- A. Top Surface: Level to 1/8 inch in 5 feet.

3.6 PROTECTION OF FINISHED WORK

- A. Do not permit traffic over unprotected floor underlayment surfaces.

3.7 SCHEDULES

- A. Level all floor surfaces which will receive new flooring materials.

END OF SECTION

SECTION 04065

MORTAR AND MASONRY GROUT

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Mortar for masonry.
- B. Grout for masonry.

1.2 RELATED SECTIONS

- A. Section 01400 - Quality Requirements: Testing laboratory services.
- B. Section 04810 - Unit Masonry Assemblies: Installation of mortar and grout.

1.3 REFERENCES

- A. Unless otherwise noted the most current issue of the reference shall be used.
- B. ACI 530/ASCE 5/TMS 402 - Building Code Requirements For Masonry Structures; American Concrete Institute International;
- C. ACI 530.1/ASCE 6/TMS 602 - Specification for Masonry Structures; American Concrete Institute International.
- D. ASTM C 5 - Standard Specification for Quicklime for Structural Purposes.
- E. ASTM C 199 - Test Method for Pier Test for Refractory Masonry.
- F. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.
- G. ASTM C 387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
- H. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout.
- I. ASTM E514 -90 - Standard Test Method for Water Penetration and Leakage Through Masonry
- J. ASTM C 1384 - Standard Specification for Modifiers for Masonry Mortars.
- K. ASTM C 1388 - Standard Test Method for Compressive Strength of Laboratory Constructed Masonry Prisms.
- L. Contractor to verify that specified cleaning is done during progress of work and at the completion of each subcontractor's work.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C 270 is to be used. Also include required environmental conditions and admixture limitations.
- C. Samples: Submit two samples of mortar, illustrating mortar color and color range.
- D. Contractor shall retain the services of an independent testing laboratory to test, evaluate and report on the following:
 - 1. Submit reports on mortar indicating compliance with component mortar materials to requirements of ASTM C 270 and test and evaluation reports per ASTM C 780.
 - 2. Reports: Submit reports on grout indicating compliance with component grout materials to requirements of ASTM C 476 and test and evaluation reports to requirements of ASTM C
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Manufacturer's Instructions: Submit packaged dry mortar manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.
 - 1. Maintain one copy of each document on project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during,

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MORTAR AND MASONRY GROUT

- and 48 hours after completion of masonry work.
- B. Cold Weather Requirements: Comply with recommendations of ACI 530.1
- C. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.
- D. Hot Weather Requirements: Comply with recommendations of ACI 530.1

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Masonry Cement: ASTM C 91, Type S.
 - 1. Colored Mortar: Premixed cement as required to match Architect's sample.
- B. Portland Cement: ASTM C 150, Type I – Normal, or Type II - Moderate; standard gray color.
- C. Blended Cement: ASTM C 595, Type IP or i(PM) for type I or II cement..
- D. Packaged Dry Mortar: ASTM C 387, using gray color cement.
- E. Hydrated Lime: ASTM C 207, Type S or M.
- F. Mortar Aggregate: ASTM C 144, standard masonry type.
- G. Grout Aggregate: ASTM C 404.
- H. Pigments for Colored Mortar: Iron or chromium oxides with demonstrated stability and colorfastness. Do not use carbon black.
 - 1. ASTM C 979: Pigment shall not exceed 10% of the weight of portland cement.
 - 2. Colors: As required to match Architect's color samples.
 - 3. Acceptable products:
 - a. Soloman Colors: www.solomoncolors.com
 - b. Davis Colors: www.concretestains.com
 - c. Color Solutions, Inc.: www.dynamiccolorsolutions.com
 - d. Prism Pigments: www.prismpigments.com
 - e. Western Lime and Cement Co.
 - 4. Substitutions: See Section 01600 - Product Requirements.
- I. Water: Clean and potable.
- J. Accelerating Admixture: Not Permitted.
- K. Moisture-Resistant Admixture: Water repellent compound designed to reduce capillarity; Integral liquid polymeric admixture for mortar added during mixing, capable of achieving a Class E Rating when evaluated using ASTM E 514 with the test extended to 72 hours, using the rating criteria specified in ASTM E 514.
- L. Bonding Agent: Latex type.

2.2 MORTAR MIXES

- A. Mortar for Unit Masonry: ASTM C 270, Property Specification.
 - 1. Engineered Masonry: Type S.
 - 2. Masonry below grade and in contact with earth: Type S.
 - 3. Exterior, loadbearing masonry: Type M or S.
 - 4. Exterior, non-loadbearing masonry: Type M or S.
 - 5. Interior, loadbearing masonry: Type M or S.
 - 6. Interior, non-loadbearing masonry: Type N.
 - 7. Glass unit masonry: Type N or S.
 - 8. Pointing mortar: Prehydrated Type N with maximum 2 percent ammonium stearate or calcium stearate per cement weight.
- B. Stain Resistant Pointing Mortar: One part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate, or ammonium stearate equal to 2 percent of Portland cement by weight.
- C. Pointing Mortar For Glass Unit Masonry: ASTM C 270, Prehydrated Type M, using the Property Specification.
 - 1. Maximum 2 percent ammonium stearate or calcium stearate per cement weight.
 - 2. Beach sand aggregate.

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- D. Mortar for Stone: ASTM C 270, Property Specification.
 - 1. Setting mortar:
 - a. Granite: Type S mortar.
 - b. Limestone: Type N mortar.
 - c. Marble: Type S mortar.
 - d. Travertine: Type S mortar.
 - e. Quartz-based stone: Type N mortar.
 - f. Slate: Type S mortar.
 - 2. Pointing mortar:
 - a. Granite: Type S mortar.
 - b. Limestone: Type N mortar.
 - c. Marble: Type N mortar.
 - d. Travertine: Type N mortar.
 - e. Quartz-based stone: Type N mortar.
 - f. Slate: Type N mortar.
- E. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

2.3 MORTAR MIXING

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C 270 and in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Add mortar color in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.
- D. Do not use anti-freeze compounds to lower the freezing point of mortar. Do not use set accelerators unless approved in writing by The Brick Institute of America (BIA), National Concrete Masonry Association (NCMA), ASTM C 270, the Architect of Record and the Engineer of Record. The use of admixtures does not relax cold weather protection requirements.
- E. If water is lost by evaporation, re-temper only within two hours of mixing.
- F. Use mortar within two hours after mixing at temperatures of 90 degrees F, or two-and-one-half hours at temperatures under 40 degrees F.

2.4 GROUT MIXES

- A. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches slump; provide grout in accordance with ASTM C 476. Use or fine grout in accordance with ACI 530 and 530.1.
- B. Engineered Masonry: Unless otherwise noted provide grout with 3,000 psi strength at 28 days; 7-8 inches slump; mix in accordance with ASTM C 476.
 - 1. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

2.5 GROUT MIXING

- A. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C 476
- B. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- C. Do not use anti-freeze compounds to lower the freezing point of grout. Do not use set accelerators unless approved in writing by The Brick Institute of America (BIA), National Concrete Masonry Association (NCMA), ASTM C 270, the Architect of Record and the Engineer of Record. The use of admixtures does not relax cold weather protection requirements.

2.6 PRECONSTRUCTION TESTING

- A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01400.
- B. Mortar Mixes: Test mortars pre-batched by weight in accordance with ASTM C 270 or ASTM C 780 recommendations for preconstruction testing for compressive strength, consistency, mortar aggregate ratio, water content, air content and splitting tensile strength.
 - 1. Test results will be used to establish optimum mortar proportions and establish quality control

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- values for construction testing.
- C. Grout Mixes: Test grout batches in accordance with ASTM C 1019 procedures for compressive strength and slump.
1. Test results will be used to establish optimum grout proportions and establish quality control values for construction testing.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Apply bonding agent to existing smooth finish concrete surfaces.
1. Plug clean-out holes for masonry with brick or masonry units to match adjacent surfaces.
Brace masonry for wet grout pressure.
- B. Request inspection of spaces to be grouted.

3.2 INSTALLATION

- A. Install mortar and grout to requirements of Section 04810; and in accordance with ACI 530.1/ASCE 6.
- B. Work grout into masonry cores and cavities to eliminate voids.
- C. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.
- D. Do not displace reinforcement while placing grout.
- E. Remove excess mortar from grout spaces.

3.3 GROUTING

- A. Use either high-lift or low-lift grouting techniques, at Contractor's option, in accordance with ACI 530.1.
- B. Consolidate grout with a mechanical vibrator on any grout pours greater than 12 inches in height; and in accordance with ACI 530.1. Grout pours 12 inches or less in height shall be mechanically vibrated or puddled. Do not over consolidate.
- C. When grouting is stopped for 1 hour or longer, stop the grout pour 1 1/2 inches below the top of the masonry to create a shear key.
- D. Pour grout only after reinforcing is in place. Prevent displacement of bars as grout is poured.
- E. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.
- F. Place grout for spanning elements in single, continuous pour.

3.4 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field tests, in accordance with provisions of Section 01400.
1. Tests and evaluation listed in this Article will be performed during construction for each 5000 square feet of wall area or fraction thereof.
- B. Test and evaluate mortar in accordance with ASTM C 780 procedures.
1. Test with same frequency as specified for masonry units.
- C. Test and evaluate grout in accordance with ASTM C 1019 procedures.
1. Test with same frequency as specified for masonry units.
- D. Prism Tests: Test masonry and mortar panels for compressive strength in accordance with ASTM C 1388, and for flexural bond strength in accordance with ASTM C 1072 or ASTM E 518; perform tests and evaluate results as specified in individual masonry sections
1. Prepare set of prisms for testing at 7 days and 1 set for testing at 28 day

END OF SECTION

SECTION 04810

UNIT MASONRY ASSEMBLIES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Concrete Masonry Units.
- B. Facing Brick.
- C. Reinforcement and Anchorage.
- D. Flashings.
- E. Accessories.

1.2 RELATED SECTIONS

- A. Section 03200 - Concrete Reinforcement: Reinforcing steel for grouted masonry.
- B. Section 04065 - Mortar and Masonry Grout.
- C. Section 05120 - Structural Steel: accessories for masonry construction.
- D. Section 06100 - Rough Carpentry: Nailing strips built into masonry.
- E. Section 07212 - Board and Batt Insulation: Insulation for cavity spaces.
- F. Section 07620 - Sheet Metal Flashing and Trim: Rigid Through-wall masonry flashings.
- G. Section 07900 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.3 REFERENCES

- A. Unless otherwise noted the most current issue of the reference shall be used.
- B. ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures; American Concrete Institute International.
- C. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International.
- D. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- E. ASTM D 1667 - Standard Specification for Flexible Cellular Materials—Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam)
- F. ASTM - D2240 - Standard Test Method for Rubber Property-Durometer Hardness
- G. ASTM D 2287 - Standard Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
- H. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- I. ASTM A 641/A 641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- J. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- K. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- L. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction.
- M. ASTM C 27 - Standard Classification of Fireclay and High-Alumina Refractory Brick.
- N. ASTM C 34 - Standard Specification for Structural Clay Load Bearing-Wall Tile.
- O. ASTM C 55 - Standard Specification for Concrete Brick; 2001a.
- P. ASTM C 56 - Standard Specification for Structural Clay Non-Load-Bearing Tile.
- Q. ASTM C 62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale).
- R. ASTM C 67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
- S. ASTM C 91 - Standard Specification for Masonry Cement.
- T. ASTM C 126 - Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.
- U. ASTM C 129 - Standard Specification for Nonloadbearing Concrete Masonry Units.
- V. ASTM C 140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units.
- W. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
- X. ASTM C 150 - Standard Specification for Portland Cement.
- Y. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.

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- Z. ASTM C 212 - Standard Specification for Structural Clay Facing Tile.
- AA. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
- BB. ASTM C 315 - Standard Specification for Clay Flue Linings.
- CC. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout.
- DD. ASTM C 476 - Standard Specification for Grout for Masonry.
- EE. ASTM C 530 - Standard Specification for Structural Clay Nonloadbearing Screen Tile.
- FF. ASTM C 652 - Standard Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale).
- GG. ASTM C 744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.
- HH. ASTM C 780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
- II. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- JJ. ASTM E 514-90 - Standard Test Method for Water Penetration and Leakage Through Masonry

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and all flashings including accessories and primer.
- C. Samples; submit three of each for review:
 - 1. Inside, outside corners self-adhering rubberized flashing end dams and outside corners.
 - 2. 2 inch x 6 inches wide x .015 inch thick stainless steel drip with hemmed edge.
 - 3. 2 inch x 1-5/8 inch wide x .015 inch thick stainless steel drip with hemmed edge.
 - 4. Sealant.
 - 5. 12 inch long section of Termination bar.
 - 6. Joint filler: full width x 6 inches long.
 - 7. Preformed Control Joints: 6 inches long.
 - 8. Weep/Cavity Vents: Manufacturer's full color range.
 - 9. Anchors: submit each type of anchor required.
 - 10. Facing Brick: submit bound units to illustrate color, texture, and extremes of color range and sizes.
 - 11. Decorative Concrete Masonry units: submit bound units to illustrate color, texture, and extremes of color range.
 - 12. Glazed Facing Brick: submit bound units to illustrate color, texture, and extremes of color range and sizes.
 - 13. Structural Clay Facing Tile: submit bound units to illustrate color, texture, and extremes of color range and sizes.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.
 - 1. Maintain one copy of each document on project site.

1.6 MOCK-UP

- A. Construct a masonry wall as a mock-up panel sized 6 feet long by 4 feet high, which includes an exterior wall corner, flashing end dams and lap joints, window sill condition, cavity insulation with adhesive, mortar and accessories, all typical accessories, control joints with sealant, and structural backup.
- B. Locate where directed.
- C. Rebuild mock-up or non-conforming work within mock-up to meet intent of all specified components at the direction of the Architect.
- D. Mock-up will be used as the standard of quality for all masonry installation on the project.

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- E. All work shall conform to the specifications and quality established in the mock-up panel.
- F. Mock-up may not remain as part of the finished work.

1.7 PRE-INSTALLATION MEETING

- A. Convene minimum one week before starting work of this section.
- B. Construct Mock-up wall prior to pre-installation meeting.
- C. Attendance:
 - 1. Contractor
 - 2. Mason contractor.
 - 3. Mason foreman.
 - 4. Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. Handle and store ceramic glazed masonry units and pre-faced concrete block units in protective cartons or trays. Do not remove from protective packaging until ready for installation.
- C. Stack masonry units, anchors, ties and miscellaneous accessories on wood pallets or blocking above ground and protect from exposure to weather at all times.
- D. Cover brick, all masonry units and all reinforcing and accessories with covers that permit air circulation and prevent moisture infiltration.
- E. Any materials not protected at all times will be marked rejected and shall be removed from the site by the contractor within 24 hours. All transportation and replacement costs and delays in the schedule will be the sole responsibility of the contractor and at no additional cost to the owner.
- F. Clean all materials of dirt, mud, ice, rust, or other foreign substances immediately prior to using.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Requirements: Comply with ACI 530.1.
- B. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- C. Do not build on frozen work.
- D. Remove and replace all masonry work damaged by freezing.
- E. Hot Weather Requirements: Comply with ACI 530.1.
- F. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

1.10 EXTRA MATERIALS

- A. See Section 01600 - Product Requirements, for additional provisions.
- B. Provide 50 of each size, color, and type of glazed units for Owner's use in maintenance of project.

PART 2 – PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Acceptable Manufacturers:
 - 1. Best Block Co.; www.bestblock.net.
 - 2. Chicago Block and Brick; www.chicagoblock.com
 - 3. Northfield Block; www.northfieldblock.com
 - 4. Trenwyth Industries; www.trenwyth.com
 - 5. Valley Block & Supply Co., Inc., Elgin, IL 60123.

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- B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide bullnose units for outside corners unless otherwise indicated.
- C. Load Bearing Concrete Masonry units: Comply with referenced standards and as follows:
 - 1. Size: Unless otherwise noted provide standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
 - 2. Load-Bearing Units: ASTM C 90, medium weight.
 - a. Hollow block with nominal 1 3/8 inches shell thickness unless indicated otherwise on contract drawings.
 - b. Exposed faces: Manufacturer's standard color and texture where indicated.
- D. Non-Load Bearing Units: Comply with referenced standards and as follows:
 - 1. Hollow block, as indicated unless otherwise noted.
 - 2. Size: Unless otherwise noted provide standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
 - 3. Load-Bearing Units: ASTM C 129, medium weight.
 - a. Hollow block with nominal 1 3/8 inches shell thickness unless indicated otherwise on contract drawings.
 - b. Exposed faces: Manufacturer's standard color and texture where indicated.
- E. Concrete Brick Units: ASTM C 55, With integral water repellent admixture mixed with concrete during production resisting water penetration for a minimum of 72 hours when tested in accordance with ASTM E 514:
 - 1. Grade N, solid, normal weight.
 - 2. Size: Unless otherwise noted provide standard units with nominal face dimensions of 16 x 4 inches and nominal depths as indicated on the drawings for specific locations.
 - 3. Colors: As selected by Architect from manufacturer's full range.

2.2 BRICK UNITS

- A. Manufacturers:
 - 1. Belden Brick; www.beldenbrick.com.
 - 2. Contact: Sam Source, Illinois Brick Company, (708) 912-8578, SSorce@illinoisbrick.com
 - 3. Substitutions: See section 01600 - Product requirements.
- B. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
 - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished
 - 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 - 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 - 4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- C. Facing Brick: ASTM C 216, Type FBS, Grade SW.
 - 1. All face brick will provided under an allowance: Refer to Section 01210 Allowances.
 - 2. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 - 3. Color and texture: Sienna Blend Velour A
 - 4. Modular Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
 - 5. Compressive strength: As indicated on drawings, measured in accordance with ASTM C 67.

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2.3 MORTAR AND GROUT MATERIALS

- A. Mortar and grout: As specified in Section 04065.

2.4 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers of Joint Reinforcement and Anchors:
1. Dur-O-Wal: www.dur-o-wal.com.
 2. Heckmann Building Products, Inc: www.heckmannbuildingprods.com.
 3. Hohmann & Barnard, Inc: www.h-b.com.
 4. Masonry Reinforcing Corporation of America: www.wirebond.com.
 5. Substitutions: See Section 01600 - Product Requirements.
- B. Reinforcing Steel: ASTM A 615/A 615M Grade 60 deformed billet bars.
- C. Vertical Structural Reinforcing Steel: type as specified in Section 03200; size as indicated on drawings; uncoated finish.
- D. Interior Single Wythe Joint Reinforcement: Contractor option of Truss or ladder type; ASTM A 82 steel wire, mill galvanized to ASTM A 641/A 641M, Class 3; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
- E. Exterior Single Wythe Joint Reinforcement: Ladder type; ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/A 153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
- F. Interior Multiple Wythe Joint Reinforcement: 3 Wire Ladder or truss type; spaced 16 inches on center vertically ASTM A 82 steel wire, mill galvanized to ASTM A 641/A 641M, Class 3; 0.1483 inch side rods minimum with 0.1483 inch cross rods and pintles; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
- G. Exterior Multiple Wythe Joint Reinforcement: 3 Wire Ladder type; spaced 16 inches on center vertically ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1483 inch side rods minimum with 0.1483 inch cross rods and pintles; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
- H. Exterior Adjustable Multiple Wythe Joint Reinforcement: Ladder type with adjustable ties or tabs spaced at 16 in on center ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire in compliance with ACI 530; width of components as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from each masonry face.
1. Vertical adjustment: Not more than 2 inches.
 2. Insulation Clips: Provide clips at tabs or ties designed to secure insulation against outer face of inner wythe of masonry.
- I. Exterior Cavity Wall Multiple Wythe reinforcement: Contractor choice of Exterior Multiple Wythe joint reinforcing or Exterior Adjustable Multiple Wythe Joint Reinforcing placed at 16 inches on center and in compliance with ACI 530.1. Where a two piece (eye and pintle) adjustable system is used in the backup wythe, an additional ladder reinforcement is to be added to the face wythe one course above or below the 2 piece system and at 16 inches on center vertically and conforming to the characteristics of single wythe reinforcing.
- J. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.
1. Concrete frame: Dovetail anchors of bent steel strap, nominal 1 inch width x 0.06 in thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
 2. Steel frame: Crimped wire anchors for welding to frame, minimum 0.25 inch thick, with triangular wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.

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- K. Wall Ties: Corrugated formed sheet metal, minimum 7/8 inches x 7 inches x 0.065 inches thick, adjustable hot dip galvanized to ASTM A 153/A 153M, Class B.
- L. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
 - 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
 - 2. Wire ties: Triangular shape, 0.1875 inch thick.
 - 3. Vertical adjustment: Not less than 3-1/2 inches.
- M. Additional Anchors for Masonry to Structural Steel.
 - 1. Vertical wide flange column - Flanges parallel to wall:
 - a. STRAP-TYPE COLUMN & WALL ANCHOR with CORRUGATED COLUMN ANCHOR WALL TIE: 1/8 inch x 7 inches long x 2 inches wide x 1-1/2 inch fold back with a 5/8 inch wide x 1 inch deep slot starting 1 inch from end. Wall tie 22 gage x 1 inch (25.4 mm) wide x 24 inches (610 mm) long. All components hot dip galvanized to ASTM A 153/A 153M, Class B-2.
 - 2. Vertical wide flange column - Flanges perpendicular to wall:
 - a. TWISTED L-TYPE COLUMN & WALL ANCHOR (left and right) and 190-WT CORRUGATED COLUMN ANCHOR WALL TIE 1/8 inch x 1-1/4 inch wide x length with a 1-1/2 inch fold back with a twist to start length from inside of hook. Wall tie 22 gage x 1 inch wide x 24 inches long. All components shall be hot dip galvanized to ASTM A 153/A 153M, Class B-2.

2.5 FLASHINGS

- A. Metal Flashing and receivers: As specified in Section 07620.
- B. Flexible Flashing and accessories:
 - 1. Acceptable Products and Manufacturers (Obtain all flashing materials and accessories from a single manufacturer):
 - a. Illinois Products Corp: IPCO Flashing; www.illinoisproducts.com.
 - b. Dur-O-Wal, Inc.: Dur-O-Barrier-44 Wall Flashing; www.dur-o-wal.com.
 - c. Grace Construction Products: Perm-A-Barrier Wall Flashing; www.na.graceconstruction.com
 - d. Hyload Inc.; www.hyload.com
 - e. Substitutions not permitted.
 - 2. Wall Flashing: Consisting of minimum 26 mils of self-adhering rubberized asphalt waterproofing laminated to a 4 mil high density, cross-laminated polyethylene film. Provide a release paper to protect rubberized asphalt surface prior to installation.
 - 3. Flashing End Dams: Preformed unit consisting of minimum 36 mils of self-adhering rubberized asphalt waterproofing laminated to a 4-mil high density, cross-laminated polyethylene film with 8-inch high legs (16 inch high legs if mortar net is used). Provide a release paper to protect rubberized asphalt surface prior to installation.
 - 4. Inside and Outside Flashing Corners: Preformed unit consisting of minimum 36 mils of self-adhering rubberized asphalt waterproofing laminated to a 4-mil high density, cross laminated polyethylene film with 8-inch high legs (16 inch high legs if mortar net is used). Provide a release paper to protect rubberized asphalt prior to installation.
 - 5. Level Change: Preformed unit consisting of minimum 36 mils of self-adhering rubberized asphalt waterproofing laminated to a 4-mil high density, cross laminated polyethylene film with 8-inch high legs (16 inch high legs if mortar net is used). Provide a release paper to protect rubberized asphalt prior to installation.
 - 6. Flashing Primer / Substrate cleaner: Liquid; brush or roller applied; by same manufacturer as flashing.
 - 7. Metal Drip Edge: 2-inch wide x 0.015-inch thick stainless steel strip with preformed drip and hemmed edge (1/4-inch drip at 45 degree angle) for all supported conditions.
 - 8. Metal Drip edge preformed corners for 2-inch wide drip: same material as drip edge and as provided by drip edge manufacturer.

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9. Metal Drip Edge: 6-inch wide x 0.015-inch thick stainless steel strip with preformed drip and hemmed edge (1/4-inch drip at 45 degree angle) for wherever flashing is unsupported across air space.
10. Metal Drip edge preformed corners for 6-inch wide drip: same material as drip edge and as provided by drip edge manufacturer.
11. Sealant for bedding drip edge: One component gun grade polyurethane sealant as specified in 07900.
12. Sealant for flashing edges corners and seams: mastic sealant as recommended by flashing Manufacturer and Compatible with flashing material.
13. Termination Bar 1/8 inches x 1 inch stainless steel with sealant ledge and predrilled pilot holes at 12 inches o.c.
 - a. Expansion anchors for termination bar: Material compatible with termination bar that will not cause galvanic action.

2.6 BOARD INSULATION

- A. Rigid Insulation for Cavity Walls: As specified in Section 07212.

2.7 ACCESSORIES

- A. Rigid insulation adhesive: as specified in section 07212.
- B. Preformed Control Joints: Polyvinyl chloride material meeting ASTM D 2287 with a durometer hardness minimum of 80 when tested in conformance with ASTM D-2240. Provide with corner and tee accessories, fused joints.
 1. Manufacturers:
 - a. Illinois Products Corp.; www.illinoisproducts.com.
 - b. Dur-O-Wal Inc.; www.dur-o-wal.com.
 - c. Heckmann Building Products, Inc; www.heckmannbuildingprods.com.
 - d. Hohmann & Barnard, Inc; www.h-b.com.
 - e. Substitutions: See Section 01600 - Product Requirements.
- C. Frame installation contractor to provide bitumastic coating for all exterior door frames for the entire length of the frame prior to frame installation.
- D. Joint Filler: Closed cell polyvinyl chloride; meeting ASTM D 1667 Type VE-41; oversized 50 percent to joint width; self-expanding; 3 and 6 inch wide x maximum lengths available.
 1. Manufacturers:
 - a. Illinois Products Corp.; www.illinoisproducts.com.
 - b. Dur-O-Wal Inc.; www.dur-o-wal.com.
 - c. Heckmann Building Products, Inc; www.heckmannbuildingprods.com.
 - d. Hohmann & Barnard, Inc; www.h-b.com.
 - e. Substitutions: See Section 01600 - Product Requirements.
- E. Weep/Cavity/Cell Vents: Molded PVC grilles, insect resistant.
 1. Manufacturers:
 - a. Illinois Products Corp.; www.illinoisproducts.com.
 - b. Dur-O-Wal Inc.; www.dur-o-wal.com.
 - c. Heckmann Building Products, Inc; www.heckmannbuildingprods.com.
 - d. Hohmann & Barnard, Inc; www.h-b.com.
 - e. Substitutions: See Section 01600 - Product Requirements.
- F. Cavity Drip/Insulation Retaining Ring: Molded PVC grilles, insect resistant. PVC clip-type retainer for rigid board insulation; attaches to loop wires on horizontal joint reinforcement
 1. Manufacturers:
 - a. Illinois Products Corp.; www.illinoisproducts.com.
 - b. Dur-O-Wal Inc.; www.dur-o-wal.com.
 - c. Heckmann Building Products, Inc; www.heckmannbuildingprods.com.
 - d. Hohmann & Barnard, Inc; www.h-b.com.
 - e. Substitutions: See Section 01600 - Product Requirements.
- G. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

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- H. Beam and Column Isolation Wrap: Contractor choice of closed cell Expanded Polyethylene, closed cell Neoprene or closed cell PVC. Minimum of ½ inch thick, continuous wrap provided in largest sheets available.
1. Expanded Polyethylene:
 - a. Structure: Closed cell
 - b. Density: 1.5
 - c. Compression Deflection (Force to compress 75% of original) (PSI at 25%): 6
 - d. Water Absorption (% by Volume): 0.5
 - e. Applicable Standard: ASTM D 1056 / D 624 / C 272
 2. Neoprene:
 - a. Structure: Closed cell
 - b. Density: 8 to 12
 - c. Compression Deflection (Force to compress 75% of original)(PSI at 25%):2-5
 - d. Applicable Standard: ASTM D 1056
 3. PVC:
 - a. Structure: Closed cell
 - b. Density: 3 to 5
 - c. Compression Deflection (Force to compress 75% of original)(PSI at 25%): 12.5
 - d. Applicable Standard: ASTM D 1667

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Wetting of Brick: Wet brick prior to laying if the initial rate of absorption exceeds 30 g/30 sq. in. (g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb the water so they are damp but not wet at the time of laying.
- B. Determine any adjustments in mortar mix to accommodate brick absorption and weather conditions necessary to produce appropriate bond to brick and to insure water-resistive wall construction.
- C. Install and coordinate placement of metal anchors supplied for securing materials of other sections type, size, finish and spacing as indicated in the drawings and as required by ACI 530.
- D. Determine requirements for temporary bracing of walls which require bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
- E. Consult and coordinate masonry work with other crafts to avoid future cutting and patching.
- F. Provide column isolation wrap at all intersections of steel and masonry unless otherwise noted.

3.3 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 1. Bond: Running.
 2. Coursing: One unit and one mortar joint to equal 8 inches.
 3. Mortar Joints: Concave at all locations unless otherwise noted.
- D. Brick Units:
 1. Bond: Running.

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2. Coursing: Three units and three mortar joints to equal 8 inches for standard and modular size brick.
3. Mortar Joints: Concave.

3.4 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Provide cleanouts minimum 8 inches long and 1 brick high, 24 inches on center in the course immediately above any flashing.
- C. Lay hollow masonry units with full face shell bedding on head and bed joints.
- D. Lay first course of all masonry above steel and concrete surfaces in full bed of mortar.
- E. Lay all concrete masonry units dry.
- F. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- G. Remove excess mortar as work progresses.
- H. Interlock intersections and external corners, except for units laid in stack bond.
- I. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- J. Do not use broken, chipped or cracked units where exposed to view.
- K. Where necessary to stop off a horizontal run of masonry, rack back one-half block length or one half brick length in each course. Toothing is not permitted.
- L. Where fresh masonry joints partially or totally set masonry, clean exposed surface of set material and remove loose mortar and foreign material prior to laying fresh masonry.
- M. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- N. Fill mortar joints flush where wall tile or resilient base is scheduled. All other joints shall be tooled as scheduled above in coursing.
- O. Isolate interior masonry partitions from vertical structural framing members and exterior walls with open one-half inch joint with joint filler. Maintain continuous joint reinforcement through installation.
- P. Isolate masonry partitions from vertical structural framing members with a control joint.
- Q. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible filler.
- R. Extend and anchor all masonry walls to underside of floors, beams or roof structure, unless otherwise indicated.
- S. Brick up solid wherever beams bear on masonry, except where otherwise indicated.
- T. Provide soft joints at all dissimilar materials. Rake back mortar at dissimilar materials to provide sufficient width to depth ratio for soft joint. Provide backer rod or bond breaker tape and sealant as specified in Section 07900 - Joint Sealers

3.5 CLEANOUTS

- A. Provide cleanouts in exterior masonry wythes in every course immediately above through wall flashings.
 1. Cleanouts are to occur every third brick horizontally for exterior brick wythes.
 2. Cleanouts are to occur every second block horizontally for exterior CMU wythes.

3.6 WEEPS (CELL VENTS)

- A. Install weeps in cavity walls at 24 inches on center horizontally immediately above through-wall flashings for brick.
- B. Install weeps in cavity walls at 32 inches on center horizontally immediately above through-wall flashings for CMU.
- C. Install cell vents at head joints per manufacturer recommendations.

3.7 CAVITY WALL

- A. Do not permit mortar to accumulate in cavity, at lintel locations, or at the bottom of cavity air space.

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1. Maintain cavity free from mortar droppings and other obstructions by utilizing one of the following:
 - a. Provide daily monitoring of cleanouts and remove excess material to eliminate mortar dropping buildup.
 - b. Provide pull up board in cavity to prevent mortar droppings in cavity when workmanship alone does not prevent mortar droppings.
 - c. Provide cavity drainage board complying with no interior water intrusion when tested in accordance with ASTM E514.
- B. Build inner wythe ahead of outer wythe to receive cavity insulation and air/vapor barrier materials.
- C. Install rigid insulation in accordance with Section 07212.
 1. Assure continuous positive bonding with backup wall. Do not allow insulation to reduce cavity space.
- D. Fill in cleanouts and install weeps at brick and/or CMU units at cleanout locations when approved by Architect. Mortar color shall match surrounding units to the satisfaction of the Architect. Repoint as required to obtain proper color.

3.8 REINFORCEMENT AND ANCHORAGE – GENERAL

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.
- F. For exterior multiple wythe systems, reinforce stack bonded brick and concrete masonry units of any configuration with an additional layer of horizontal reinforcing within the outer wythe. Install at 16 inches on center vertically and alternate with cross wythe reinforcing.
- G. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

3.9 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHER MASONRY

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Do not continue horizontal joint reinforcement through control and expansion joints.
- F. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.
- G. Secure wall to decking above as shown on drawings to guard against lateral movement.

3.10 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above openings and the second horizontal joint below openings unless otherwise indicated on drawings. Extend minimum 16 inches each side of openings.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. All masonry wythes are to have continuous horizontal joint reinforcing at 16 inches on center vertically. Where a two piece (eye and pintle) system is used in the backup wythe an additional ladder reinforcement is to be added to the face wythe one course above or below the 2 piece system 16 inches on center vertically.
- E. For exterior multiple wythe systems, reinforce stack bonded brick and concrete masonry units

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of any configuration with an additional layer of horizontal reinforcing within the outer wythe. Install at 16 inches on center vertically and alternate with cross wythe reinforcing.

- F. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by the manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other similar special conditions where continuity of reinforcement is interrupted.
- G. Lap joint reinforcement ends minimum 6 inches.
- H. Do not continue horizontal joint reinforcement through control and expansion joints.
- I. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 24 inches vertically.
- J. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.
- K. Provide adjustable wall ties for exterior masonry over steel stud framing, corrugated wall ties are not permitted.
- L. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 24 inches horizontally and 24 inches vertically.
- M. Masonry Back-Up: Embed anchors in masonry back-up to bond veneer at maximum 1.77 sq ft of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 16 on center.
- N. Stud back-Up: Secure adjustable veneer anchors to stud framed back-up and embed into masonry veneer at maximum 1.77 sq ft of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 16 on center.
- O. Reinforce concrete masonry units of walls and partitions with deformed steel bars as indicated on the drawings.
- P. Support and secure reinforcing bars from displacement. Maintain position within tolerances specified by ACI 530.1.
- Q. Lap reinforcing bars splices minimum 48 bar diameters.

3.11 REINFORCEMENT AND ANCHORAGES – MULTIPLE WYTHE UNIT MASONRY

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 24 inches vertically.
- F. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

3.12 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry and turn up at least 8 inches to form watertight pan at non-masonry construction. Turn flashing up 16 inches where mortar net is used.
 - 2. Provide prefabricated end dams at the extremities of all flashings at, above and below all openings except at changes in foundation or brick ledge level.
 - 3. Provide prefabricated flashing corners and elevation changes at all corners and changes in elevation where flashing is shown or required by this Specification.
 - 4. Provide stainless steel drip edge for all flashing and extend 1/4-inch beyond the vertical face of the masonry and lap 2 inches at flashing joints. Crimp or hem all exposed edges of drip edge to eliminate sharp edge prior to installation.
 - 5. Install all rigid flashing receivers as specified in Section 07620.

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6. Remove or cover protrusions or sharp edges that could puncture flashings.
- B. Installation of Flexible Flashing:
 1. Extend flashing a minimum of 8 inches vertically and return into mortar joint for full width of face shell.
 2. Clean surface of the wall which is to receive the adhesive side of the flexible flashing material. Maintain surface free of dust, dirt, protrusions, and all foreign materials that would impair the bonding of the flexible flashing to the masonry. Allow surface of the wall to dry. Apply the specified flashing primer to all contact surfaces to receive wall flashing. Ensure that flashing material adheres directly to the surface of the wall and the drip edge and is free of void pockets.
 3. Install metal drip edge with a gun-grade sealant on the edges of the masonry foundation wall or structural steel. Extend the bent portion of the drip 1/4-inch beyond the face of the masonry. Maintain straight even length projections.
 4. Install flashing boots and end dams by removing the release paper and setting the items in place. Field trim ends as required to work with face wythe materials.
 5. Install the flashing over the metal drip edge and recess 1/4-inch from the vertical face of the masonry wall. Overlap the flashing segments and any flashing boots and end dams a minimum of 4 inches and install in a manner to direct the flow of water to the exterior and weepholes. Place a bead of sealant along the edge of all overlaps.
 6. Do not apply flexible flashing materials when the ambient temperature is below 25 degrees F. Do not allow flexible flashing materials to be exposed to direct sunlight for more than 30 days.
 7. Provide wide drip edge flashing wherever membrane flashing is unsupported across air space.
 8. Where counter-flashing receiver is required per drawings, install material provided by others.
 9. Provide termination bar with continuous sealant cap wherever top of flashing is not anchored in mortar joint. Provide a bead of sealant along the underside top edge of the flashing to ensure it does not start to peel away from the backup wall.
 10. Protect flashing from UV exposure: Provide Manufacturer approved protection for all flashing that may be exposed to UV radiation for a period of 30 days or more. For materials that have been exposed to UV radiation for more than 30 days, provide Manufacturer's written inspection report and approval that the materials in place will perform as intended. All materials not passing this inspection shall be removed and replaced at no additional cost to the Owner.
 11. Seal lapped ends and penetrations of flashing a minimum of 6 inches and seal watertight with mastic before covering with mortar.
 12. Extend flexible flashings to within 1/4 inch of exterior face of masonry

3.13 LINTELS

- A. Install loose steel lintels over openings.
 1. Connect lintel to bearing plate where indicated.
 2. Build masonry tight to all encased surfaces of lintels.
- B. Install reinforced unit masonry lintels over openings where steel or pre-cast concrete lintels are not scheduled.
 1. Openings to 42 inches: Place two, No. 5 reinforcing bars 1 inch from bottom web.
 2. Do not splice reinforcing bars.
 3. Allow masonry lintels to attain specified strength before removing temporary supports.
- C. Maintain minimum 8 inch bearing on each side of opening.

3.14 GROUTED COMPONENTS

- A. Reinforce bond beams with 2, No. 5 bars, 1 inch from bottom web, unless indicated otherwise.
- B. Lap splices minimum 48 bar diameters. No lap splices are permitted in bond beams over masonry openings.

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- C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- D. Place and consolidate grout fill without displacing reinforcing.
- E. At bearing locations, fill masonry cores with grout for a minimum 2 courses below and 24 inches horizontally for lintels and 3 courses below and 24 inches horizontally for beams unless noted otherwise on drawings.

3.15 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control and expansion joints.
- B. Form all Control Joints with Jamb blocks.
- C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- D. Control joints shall align with wall discontinuities such as window and door jambs.
- E. Size control joint in accordance with Section 07900 for sealant performance.
- F. Control and Expansion joints are to be spaced no more than 20 feet apart; and must be within 2 feet of one side of exterior building corners; AS INDICATED ON DRAWINGS. In the absence of indications on drawings, the Contractor shall contact the Architect in writing for direction as to where to place the joints prior to proceeding with the work of this section. Any masonry engaged by the contractor without such notification shall be repaired by the Contractor at no cost to the Owner and as directed by the Architect.

3.16 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames, glazed frames, window frames, and anchor bolts and other items to be built into the work and furnished under other sections. Frame installing contractor shall coat inside of frames to be installed in masonry or to be grouted, with bituminous coating prior to installation as noted. Apply wet to 18.0 mils (450 microns) in one or two coats. Total dry film thickness of not less than 12 mils (300 microns) or in excess of 30 mils.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame jamb voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Grout all spaces around built-in items solid
- E. Do not build into masonry construction organic materials that are subject to deterioration.

3.17 TOLERANCES

- A. Construct unit masonry assemblies in strict accordance with ACI 530.1, but not less than tolerances below.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.18 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.19 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01400.

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UNIT MASONRY ASSEMBLIES

3.20 CLEANING

- A. Remove excess mortar and mortar smears as work progresses.
- B. Replace defective or discolored mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Replace chipped or broken units where exposed to view.
- E. Use non-metallic tools in cleaning operations.

3.21 PROTECTION OF FINISHED WORK

- A. Without damaging completed work, provide protective boards at exposed external corners, which are subject to damage by construction activities and maintain until substantial completion of masonry.

END OF SECTION

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STRUCTURAL STEEL

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Structural steel framing members, and accessories.

1.2 RELATED SECTIONS

- A. Section 03300 - Cast in Place Concrete: Supply of anchors for casting into concrete.
- B. Section 04810 - Steel Unit Masonry Assemblies: Supply of anchors for embedding into masonry

1.3 REFERENCES

- A. Unless noted otherwise, the most current issue of reference shall be used.
- B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.
- C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts.
- D. AISC S329 - RCSC's Allowable Stress Design Specification for Structural Joints Using ASTM A325 or A490 Bolts; American Institute of Steel Construction, Inc.
- E. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.
- F. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- G. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- H. ASTM A 490 - Standard Specification for Structural Bolts, Alloy Steel, Heat-Treated, 150 ksi Minimum Tensile Strength.
- I. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- J. ASTM A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- K. ASTM A 563 - Standard Specification for Carbon and Alloy Steel Nuts.
- L. ASTM A 992/A 992M - Standard Specification for Structural Steel Shapes.
- M. ASTM A992/A992M Standard Specification for Steel for Structural Shapes for Use in Building Framing.
- N. ASTM E 94 - Standard Guide for Radiographic Examination.
- O. ASTM E 142 - Standard Method for Controlling Quality of Radiographic Testing.
- P. ASTM E 164 - Standard Practice for Ultrasonic Contact Examination of Weldments.
- Q. ASTM E 709 - Standard Guide for Magnetic Particle Examination.
- R. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.
- S. AWS D1.1 - Structural Welding Code - Steel; American Welding Society.
- T. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings for review:
 - 1. Indicate profiles, sizes, spacing, and locations of structural members, openings, attachments, and fasteners.
 - 2. Connections.
 - 3. Indicate cambers and loads.
 - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Erection Procedure: Submit descriptive data to illustrate the structural steel erection procedure, including the sequence of erection and temporary staging and bracing for information.
- D. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements for information.
- E. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis for information.

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STRUCTURAL STEEL

- F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months for information.
- G. Fabricate structural steel in accordance with Section 6 of AISC S303 and Chapter M of AISC M016.

1.5 QUALITY ASSURANCE

- A. Fabricate structural steel in accordance with Section 6 of AISC S303 and Chapter M of AISC M016.
- B. Comply with Section 10 of AISC "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.
- C. Fabricator: Company specializing in performing the work of this section with minimum 5 years of documented experience.
- D. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience.
- E. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located. Provide signed and sealed connection design calculations if requested by Architect/Structural Engineer of Record (SER).

1.6 REGULATORY REQUIREMENTS

- A. Comply with Illinois Steel Procurement Act, As Amended (Illinois Revised Statutes, Ch. 48, Par. 1801 ET SEQ.).

1.7 DELIVERY, STORAGE AND PROTECTION

- A. Store structural steel members at project site above ground on platforms, skids or other supports.
- B. Store other materials in a watertight and dry place, until ready for use in the work.
- C. Store packaged materials in their original unbroken package or container.
- D. Do not allow dirt, mud or other foreign materials to collect on structural steel. Steel materials shall be clean from all debris and ready to receive finishes prior to erection.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Steel Bars Angles, Plates, Channels, and Rod: ASTM A 36/A 36M.
- B. Rolled Steel Structural Shapes: ASTM A 992/A 992M.
- C. Cold-Formed Structural Tubing: ASTM A 500, Grade B.
- D. Hot-Formed Structural Tubing: ASTM A 501, seamless.
- E. Pipe: ASTM A 53/A 53M, Grade B, Finish black unless otherwise noted.
- F. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, medium carbon, plain.
- G. High-Strength Structural Bolts: ASTM A 490 (ASTM A 490M), with matching ASTM A 563 (ASTM A 563M) nuts and ASTM F 436 washers; Type 1 alloy steel.
- H. Anchor Bolts: ASTM A 307, Grade C.
- I. Shop and Touch-Up Primer: complying with VOC limitations of authorities having jurisdiction. Lead and Chromate-free, non-asphaltic, rust inhibiting primer.
- J. Welding Materials: AWS D1.1; type required for materials being welded.
- K. Sliding Bearing Plates: Lower Element - PTFE Sliding Surface Bonded to Carbon Steel Plate. Upper Element - 316 Stainless Steel Plate with ZB Finish on Sliding Surface Face.
- L. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C 1107 and capable of developing a minimum compressive strength of 7,000 psi at 28 days.
- M. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
- N. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

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2.2 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Dimensional tolerances shall be as permitted in the AISC S303.
- C. Perform thermal cutting by machine to greatest extent possible. Plane thermally cut edges to be welded.
- D. Fabricate connections for bolt, nut, and washer connectors.
- E. Develop required camber for members. . Fabricator shall maintain record of beams cambered and actual measured camber provided in fabricated members.
- F. Bearing Plates: Provide bearing plates under lintels, beams and joists resting on walls. Provide bearing plates loose. Where size is not indicated on plans provide plate 1/2 x 8" x width of wall minus 1".
- G. Opening Framing: Provide frames at all floor and roof openings equal to or larger than 12".
- H. All steel embedded in or adjacent to masonry construction shall have adjustable masonry anchors spaced not greater than 16" vertically and 24" horizontally, unless otherwise noted, whether or not such ties are explicitly indicated on the drawings.
- I. Typical beam connections shall be standard AISC framed beam connections, unless otherwise shown. All field connections, except where shown welded, shall be bolted with 3/4" diameter, high strength bolts, unless otherwise noted. Where reactions are not indicated, connections shall be designed for 60% of the total allowable uniform load (in kips) derived from AISC Manual table of "Allowable Loads on Beams" for non-composite beams.
- J. All coped beams to be designed in accordance with Section J4 of AISC's "Specification For Structural Steel Buildings"-ASD. Provide reinforcing as required. All re-entrant corners to be shaped, notch-free, to a radius of at least 1/2 inch.
- K. All beam splices, not indicated on the contract documents, shall be full penetration welded to restore full capacities of the original beam; bolted connections shall be used for erection purposes only, unless approved in writing by Structural Engineer of Record. If splices are required for construction purposes, contractor shall coordinate all splice locations with General Contractor or Construction Manager to avoid any interference/conflicts with other trades.
- L. Unless otherwise noted, the structural steel supplier shall furnish L5 x 3 1/2 x 5/16 shop welded angle frames at all roof and floor openings. Contractor shall verify in field all sizes and locations.

2.3 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP-2, Hand Tool Cleaning or better.
- B. Shop prime structural steel members unless otherwise noted. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
- C. Galvanize any structural steel members indicated to be galvanized to comply with ASTM A123/A 123M. Provide minimum 1.3 oz/sq. ft. galvanized coating.

2.4 SOURCE QUALITY CONTROL AND TESTS

- A. High-Strength Bolts: Provide testing and verification of shop-bolted connections in accordance with AISC S329 testing at least 20 percent of bolts at each slip critical or Direct Tension connection. Bolts in Non-Slip Critical Connections Need Not Be Tested.
- B. Radiographic testing performed in accordance with ASTM E 94 and ASTM E142.
 - 1. Radiographic testing performed in accordance with ASTM E 94 and ASTM E 142.
 - 2. Ultrasonic testing performed in accordance with ASTM E 164.
 - 3. Liquid penetrant inspection performed in accordance with ASTM E 165.
 - 4. Magnetic particle inspection performed in accordance with ASTM E 709.
- C. In Addition to Visual Inspection, Shop Welded Shear Connectors Shall Be Inspected and Tested In Accordance With AWS D1.1 For Stud Welding and the Following:
 - 1. Bend Test will be performed when visual inspections reveal either less than a continuous 360-degree flash or welding repairs.
 - 2. Tests will be conducted on additional shear connectors when weld fracture occurs on shear connectors already tested, according to requirements of AWS D1.1.

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PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that conditions are appropriate for erection of structural steel including elevations of bearing surfaces and locations of anchorages and that the work may properly proceed.
- B. Verify that materials are clean, free of all debris and prepared for erection. Clean all dirt, mud or other foreign materials from structural steel and related items. Steel materials shall be clean from all debris and ready to receive finishes prior to erection.

3.2 ERECTION

- A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".
- B. Tighten anchor bolts after supported members have been positioned and plumbed.
- C. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- D. Field weld components and shear studs indicated on shop drawings.
- E. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".
- F. Do not field cut or alter structural members without approval of Architect.
- G. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- H. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for non-shrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.
- I. Install shop welded angle frames at all roof and floor openings in preparation for decking.

3.3 ERECTION TOLERANCES

- A. Erect structural steel within tolerances of AISC S303, Section 7, except as noted.
- B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- C. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01400.
- B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC S329 testing at least 20 percent of bolts at each slip critical and direct tension connection. Bolts in non-slip critical or direct tension connections need not be tested, but visually checked for number of bolts and snugness.
- C. Shear Connectors: In addition to visual inspection, field welded shear connectors shall be inspected and tested in accordance with AWS D1.1 for stud welding and the following:
- D. Bend Test will be performed when visual inspections reveal either less than a continuous 360-degree flash or welding repairs.
- E. Tests will be conducted on additional shear connectors when weld fracture occurs on shear connectors already tested, according to requirements of AWS D1.1.
- F. The structural steel framing members shown on the contract drawings rely on other non-structural steel building components for final lateral strength and stability (previously referred to as a non-self-supporting frame by the AISC). The following portions of the AISC S303 "Code of Standard Practice for Steel Buildings and Bridges", Section 7.10.1, shall be modified as follows:
 - 1. add the words "endeavor to" after the word shall.
 - 2. in paragraph (b), substitute the word "extraordinary" for the word "special".
 - 3. add paragraph (c) "However, the Owner's Designated Representative for Design shall not be responsible for lateral strength and stability support or bracing which is dependent upon the

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Contractors means and methods of construction".

- G. The Contractor shall employ the services of a licensed structural Engineer if the Contractor is unable to assume complete responsibility for any and all temporary support and bracing as required by the Contractor's sequence, schedule and procedures of construction.

Commencement of erection shall indicate that the contractor understands all temporary support and bracing requirements and assumes responsibility for maintaining the overall stability of the entire structure and of each individual component throughout construction and until such time that all structural work is complete in accordance with the contract documents. Furthermore, the steel fabricator shall indicate upon each shop drawing erection plan "This structure relies upon non-structural steel building components for final lateral strength and stability."

- H. Welded Connections: Visually inspect all field-welded connections and test at least 20 percent of welds using one of the following:
1. Radiographic testing performed in accordance with ASTM E 94.
 2. Ultrasonic testing performed in accordance with ASTM E 164.
 3. Liquid penetrant inspection performed in accordance with ASTM E 165.
 4. Magnetic particle inspection performed in accordance with ASTM E 709.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Structural floor, wall, and roof framing.
- B. Miscellaneous framing and sheathing.
- C. Telephone and electrical panel boards.
- D. Miscellaneous wood nailers and furring strips.

1.2 RELATED SECTIONS

- A. Section 06114 - Wood Blocking and Curbing
- B. Section 07620 - Sheet Metal Flashing and Trim

1.3 REFERENCES

- A. Unless otherwise noted the most current issue of the reference shall be used.
- B. AFPA T10 - Wood Frame Construction Manual; American Forest and Paper Association.
- C. AWWA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association.
- D. AWWA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Preservers' Association.
- E. PS 1 - Construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce).
- F. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce).
- G. PRI - 400 - Performance for APA EWS I-Joists; The Engineered Wood Association.
- H. PRL-501 - Performance Standard for APA EWS Laminated Veneer Lumber; The Engineered Wood Association.
- I. F405 - APA Performance Rated Panels; The Engineered Wood Association.
- J. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. Samples: For rough carpentry members that will be exposed to view, submit two samples 12 inches in size illustrating wood grain, color, and general appearance.
- D. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
- B. Do not use split, warped, twisted or otherwise damaged or unacceptable members. All such members shall be removed from the site at the discretion of the Architect.
- C. Do not use moisture damaged materials. All such materials shall be removed from the site at the discretion of the Architect.

1.6 QUALIFICATIONS

- A. Design structural site fabricated trusses under direct supervision of a Professional Structural Engineer experienced in design of such trusses and licensed in the State in which the Project is located.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Protect site fabricated trusses from warping or other distortion by stacking in vertical position, braced to resist movement.

SECTION 06100

ROUGH CARPENTRY

PART 2 – PRODUCTS

2.1 SECTION INCLUDES

- A. Grading Agency: Western Wood Products Association (WWPA).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Stud Framing (2 x 2 through 2 x 6):
 - 1. Species: Douglas Fir-Larch.
 - 2. Grade: Select Structural.
- E. Joist, Rafter, and Small Beam Framing (2 x 6 through 4 x 16):
 - 1. Machine stress-rated (MSR) as follows:
 - a. Fb-single (minimum extreme fiber stress in bending): 1350 psi.
 - b. E (minimum modulus of elasticity): 1,300,000 psi.
 - 2. Species: Douglas Fir-Larch.
- F. Miscellaneous Blocking, Furring, and Nailers:
 - 1. Lumber: S4S, No. 2 or Standard Grade.

2.2 EXPOSED BOARDS

- A. Moisture Content: Kiln-dry (15 percent maximum).
- B. Surfacing: S4S.
- C. Species: Douglas Fir.
- D. Grade: No. 2, 2 Common, or Construction.

2.3 CONSTRUCTION PANELS

- A. Miscellaneous Panels:
 - 1. Concealed Plywood: PS 1, C-C Plugged, exterior grade.
 - 2. Exposed Plywood: PS 1, A-D, interior grade.
 - 3. Electrical Component Mounting: APA rated sheathing, fire retardant treated.

2.4 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Fasteners: Hot-dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
 - 2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
 - 3. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete.
- B. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
- C. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.
- D. Sill Flashing: As specified in Section 07620.
- E. Subfloor Glue: Waterproof, water base, air cure type, cartridge dispensed.
- F. Building Paper: No. 30 asphalt felt.
- G. Termite Shield: copper.

2.5 FACTORY WOOD TREATMENT

- A. Fire Retardant Treatment: AWWPA Treatment C20, Interior Type A Low Temperature (low hygroscopic), chemical treatment pressure impregnated; capable of providing a maximum flame spread/smoke development rating of 25 / 450.
- B. Pressure Treatment of Lumber Above Grade: AWWPA Treatment C2 using waterborne preservative to 0.25 lb/cu ft retention.
 - 1. Kiln dry after treatment to maximum moisture content of 19 percent.
 - 2. Treat wood in contact with roofing, flashing, or waterproofing.
 - 3. Treat wood in contact with masonry or concrete.

SECTION 06100

ROUGH CARPENTRY

4. Treat wood less than 18 inches above grade.
- C. Pressure Treatment of Lumber in Contact with Soil: AWPAC Treatment C2 using waterborne preservative designated in AWPAC C2 as suitable for ground contact use to 0.4 lb/cu ft retention.

PART 3 – EXECUTION

3.1 FRAMING INSTALLATION

- A. All framing shall be Platform type as put forth in AFPA T10- Balloon Framing is not permissible.
- B. Unless otherwise noted, all framing members shall be spaced at 16 inch on center intervals and secured with a minimum of five 10d toenails or screws at the end of each member.
- C. Install all framing members in compliance with detailing presented in AFPA T10 - Wood Frame Construction Manual- unless exceeded herein.
- D. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- E. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- F. Install structural members full length without splices unless otherwise specifically detailed.
- G. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.
- H. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed and comply with fasteners listed above.
- I. Provide solid blocking at all joists and other framing in excess of 8 feet span. Provide solid blocking at 8 feet on center across all floor joists. Fit solid blocking at ends of joists over all supporting members.
- J. Provide continuous double 2 inch by 4 inch stiffeners over all ceiling joists at 8 foot centers or at mid span for members less than 16 feet. Stiffeners shall be constructed of one flat 2 inch by 4 inch member, with one 2 inch by 4 inch member on edge and nailed to flat member and joists on 16 inch centers.
- K. Provide solid blocking at framing in excess of 8 feet span and as detailed. Fit solid blocking at ends of members.
- L. Fire blocking: install solid fire blocking of identical sized material to studs or joists between floors where balloon framing is encountered and over all supporting girders or beams.
- M. Frame openings with two studs at each jamb for openings not exceeding 4 foot; Frame openings with three studs at each jamb for openings from 4 foot to 8 foot; Frame openings with 5 studs at each jamb for openings exceeding 8 foot; support headers on cripple studs at each end and at center to center spacing.
- N. Provide miscellaneous members as indicated or as required to support finishes, fixtures, specialty items, and trim.

3.2 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD

- A. Place full width continuous sill flashings or termite shield under framed walls over sill gasket. Lap flashing joints 4 inches and seal.
- B. Place sill gasket directly on cementitious foundation. Puncture gasket cleanly and fit tightly to protruding foundation anchor bolts.
- C. Coordinate installation of LVL beams, wood decking, wood chord metal joists, glue laminated structural units, prefabricated wood trusses, and plywood web joists.
- D. Install I-joists in compliance with manufacturer's recommended procedures unless exceeded herein. Provide continuous rim joists at outer edges of all joists both parallel and perpendicular to joists.
- E. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

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ROUGH CARPENTRY

- F. Coordinate curb installation with installation of decking and support of deck openings.
- G. See Section 06114 for installation of wood blocking and curbing for roof applications.

3.3 INSTALLATION OF CONSTRUCTION PANELS

- A. Install telephone and electrical panel back boards made of plywood or other acceptable structural panels at locations indicated. Size back boards to be minimum 6 inches beyond size of telephone and electrical panels.
- B. Sub-flooring/Underlayment Combination: Glue and nail to framing using minimum 2 1/2 inch long nails; staples are not permitted.
- C. Sub-flooring: Glue and nail to framing using minimum 2 1/2 inch long nails; staples are not permitted.
- D. Underlayment: Secure to sub-flooring with nails and glue.
 - 1. At locations where resilient flooring will be installed, fill and sand splits, gaps, and rough areas.
 - 2. Place building paper between floor underlayment and sub-flooring.
- E. Roof Sheathing: Secure panels perpendicular to framing members, with ends staggered and sheet ends over firm bearing.
 - 1. Use sheathing clips between roof framing members.
 - 2. Provide solid edge blocking between sheets.
 - 3. Screw panels to framing with galvanized screws; staples are not permitted.
- F. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails or screws of minimum 2 inch length.
 - 1. Use plywood at building corners, for not less than 96 inches, measured horizontally.
 - 2. Place building paper horizontally over wall sheathing, weather lapping edges and ends.

3.4 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

3.5 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
- C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

END OF SECTION

SECTION 06114

WOOD BLOCKING AND CURBING

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Roof nailers and curbs.
- B. Blocking in wall and roof openings.
- C. Preservative treatment of wood.
- D. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, wood trim, and all wall mounted items.

1.2 RELATED SECTIONS

- A. Section 06100: Rough Carpentry.
- B. Section 07531: Single Ply Roofing - Fully Adhered EPDM.
- C. Section 07620: Sheet metal flashing and trim.

1.3 REFERENCES

- A. Unless otherwise noted the most current issue of the reference shall be used.
- B. AWPAC2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association.
- C. AWPAC20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Preservers' Association.
- D. PS 1 - Construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce).
- E. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce).
- F. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber; Redwood Inspection Service.
- G. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc..
- H. WCLB (GR) - Standard Grading Rules for West Coast Lumber No. 17; West Coast Lumber Inspection Bureau.
- I. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials.

1.5 QUALITY ASSURANCE

- A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
 - 1. Acceptable Lumber Inspection Agencies: RIS, SPIB, WCLB, and WWPA.
 - 2. Lumber of other species or grades, or graded by other agencies, is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.
- B. Plywood: Comply with PS 1.

PART 2 – PRODUCTS

2.1 DIMENSION LUMBER

- A. Grading Agency: Western Wood Products Association (WWPA).
- B. Sizes: Nominal sizes as indicated on drawings, S4S. Wood blocking for all wall mounted items shall be 2 x 6 inch nominal unless otherwise noted.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Blocking, Furring, and Nailers:
 - 1. Structural grade 1200fb Douglas Fir as defined in Section 06100.

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WOOD BLOCKING AND CURBING

2.2 CONSTRUCTION PANELS

- A. Plywood Sheathing: PS 1, Grade C-D, Exposure I. Panels shall be treated as listed in the Factory Wood Treatment article of this section and as listed in the schedule.
- B. All other panels as listed in Section 06100.

2.3 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Fasteners: Hot-dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
 - 2. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Anchor bolt for anchorage into cavity walls.

2.4 FACTORY WOOD TREATMENT

- A. Wood preservative pressure treatment: ACQ Type D preservative; retention level .25
 - 1. Kiln dry after treatment to maximum moisture content of 19 percent.
 - 2. Treat wood in contact with roofing, flashing, or waterproofing.
 - 3. Treat wood in contact with masonry or concrete.
 - 4. Treat wood less than 18 inches above grade.
- B. Fire Retardant Treatment: AWWPA Treatment C20, Interior Type, Class A, Low Hygroscopic, Chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating of 25 / 450.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Examine all surfaces to receive parts of the work specified herein. Application or installation of materials constitutes acceptance of the substrate.
- B. Verify all dimensions of in-place and subsequent construction and that it accurately fit this part of the work to other construction.
- C. Protect lumber and keep under cover both in transit and at job site. Protect from dampness.

3.2 FRAMING

- A. Set members level and plumb, in correct position.
- B. Place horizontal members with crown side up.
- C. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- D. Coordinate curb installation with installation of decking and support of deck openings.
- E. All wood blocking that is installed is to be temporarily protected from moisture utilizing 15 lb. roofing felt.
- F. All wood blocking joints to be mitered @ 45 degrees, staggered, and screw fastened together.
- G. Provide miscellaneous members as indicated or as required to support finishes, fixtures, specialty items, and trim.

3.3 INSTALLATION OF CONSTRUCTION PANELS

- A. Sheathing: Secure with long dimension perpendicular to framing members, with ends over firm bearing and staggered, using screws.

3.4 SCHEDULES

- A. Roof Blocking: S/P/F species, 19 percent maximum moisture content, pressure preservative treatment. Roof edge and roof related wood blocking.
- B. Treated plywood: Roof edge and roof related conditions.
- C. Miscellaneous wood blocking exterior: S/P/F species, 19 percent maximum moisture content, pressure preservative treatment.
- D. Miscellaneous wood blocking interior: Provide wood blocking for support of toilet and bath

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WOOD BLOCKING AND CURBING

accessories, wall cabinets, wood trim, and all other wall mounted items. Utilize material as listed in this section and in section 06100. Wood blocking for wall mounted items shall be minimum of 2 x 6 inch nominal dimensional lumber. Fasten wood blocking with minimum 2 screws each side into framing. Where conflicts occur, the more stringent requirement shall prevail.

END OF SECTION

SECTION 07212

BOARD AND BATT INSULATION

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Board insulation and integral vapor retarder at cavity wall construction and perimeter foundation wall.
- B. Protection Board insulation for sheet water proofing applications.
- C. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.
- D. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.2 RELATED SECTIONS

- A. Section 03300 - Cast in Place Concrete: perimeter insulation.
- B. Section 04810 - Unit Masonry Assemblies: Insulation for Cavity spaces.

1.3 REFERENCES

- A. ASTM C578 - Preformed, Cellular Polystyrene Thermal Insulation.
- B. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2001.
- C. ASTM D 2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2001.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2001.
- E. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials; 2000.

1.4 SYSTEM DESCRIPTION

- A. Materials of This Section: Provide continuity of thermal barrier at building enclosure.
- B. Materials of This Section: Provide thermal protection to vapor retarder in conjunction with vapor retarder materials in Section 07260.

1.5 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations, ASTM Test Compliance and data.
 - 1. Provide product data on all materials and accessories comprising a complete installation including but not limited to all adhesives, clips and other accessories.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.7 SEQUENCING

- A. Sequence work to ensure fireproofing, firestop, vapor retarder, air barrier, and other related materials are in place before beginning work of this section.
- B. Protection Board for Waterproofing: Provide complete installation of all waterproofing membrane, drainage and all related accessories. Allow Architect access to waterproofing for review prior to installing protection board or backfilling. Complete any remedial work as directed by Architect.

1.8 COORDINATION

- A. Coordinate work under provisions of Section 01300
- B. Coordinate the work with Section 07260 for installation of vapor retarder.

SECTION 07212

BOARD AND BATT INSULATION

PART 2 – PRODUCTS

2.1 BOARD INSULATION MATERIALS

- A. Extruded Polystyrene Board Insulation: Extruded polystyrene board with natural skin surfaces; with the following characteristics relative to application:
 - 1. Cavity wall applications; ASTM C 578 type IV.
 - a. Board Size: 48 x 96 inch with 16 inch perforations for horizontal reinforcing applications.
 - b. Board Thickness: 1-1/2 inches.
 - c. Board Edges: Square.
 - d. Thermal Resistance of 1 inch thickness at 25 degrees F: 5.6 minimum.
 - e. Compressive Resistance: Min. 50 psi.
 - f. Board Density: 1.6 lb/cu ft.
 - g. Water Absorption, maximum: 0.3 percent, volume.
 - 2. Foundation or below grade applications; ASTM C 578 type VI.
 - a. Board Size: 24 x 96 inch.
 - b. Board Thickness: 2 inches.
 - c. Board Edges: Square.
 - d. Thermal Resistance of 1 inch thickness at 25 degrees F: 5.6 minimum.
 - e. Compressive Resistance: 60 psi.
 - f. Board Density: 1.8 lb/cu ft.
 - g. Water Absorption, maximum: 0.3 percent, volume.
 - 3. Protection Board for Sheet Waterproofing below grade applications; ASTM C 578 type VI.
 - a. Board Size: 48 x 96 inch or 24 x 96 inch.
 - b. Board Thickness: 1/2 inches minimum.
 - c. Board Edges: Square.
 - d. Thermal Resistance of 1 inch thickness at 25 degrees F: 5.6 minimum.
 - e. Compressive Resistance: 40 psi minimum for thickness stated.
 - f. Board Density: 1.8 lb/cu ft.
 - g. Water Absorption, maximum: 0.3 percent, volume.
 - 4. Manufacturers:
 - a. Dow Chemical Co: www.dow.com.
 - b. Owens Corning Corp: www.owenscorning.com.
 - c. Pactiv Building Products formerly Tenneco Building Product 2907 Log Cabin Drive Smyrna, Georgia 30080-7013 800-241-4402 .
 - d. Substitutions: See Section 01600 - Product Requirements.

2.2 MANUFACTURERS - ADHESIVES

- A. As manufactured and recommended by insulation manufacturer.
- B. Chem Rex, Inc., "Contact Brand PL300 Foam Board Adhesive."
- C. Dacar Products, In., "Foamgrab PS."
- D. Substitutions: Not permitted.

2.3 BATT INSULATION MATERIALS

- A. Batt Insulation: ASTM C 665; preformed glass fiber batt; friction fit, conforming to the following:
 - 1. Manufacturers:
 - a. CertainTeed Corporation: www.certainteed.com.
 - b. Johns Manville Corporation: www.jm.com.
 - c. Owens Corning Corp: www.owenscorning.com.
 - 2. Substitutions: See Section 01600 - Product Requirements.

2.4 ACCESSORIES

- A. Sheet Vapor Retarder Type 1: Black polyethylene film for above grade application, 10 mil mil thick.
- B. Tape: Bright aluminum self-adhering type, mesh reinforced and 2 inch wide.
- C. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be

SECTION 07212

BOARD AND BATT INSULATION

adhered to surface to receive board insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01300.
- B. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.
- C. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Adhere a 6-inch wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
- B. Apply adhesive to back of boards:
 - 1. Three continuous beads per board length.
 - 2. Full bed 1/8 inch thick.
- C. Install boards horizontally on foundation perimeter.
- D. Place boards to maximize adhesive contact.
- E. Install in running bond pattern.
- F. Stagger side joints.
- G. Butt edges and ends tightly to adjacent boards and to protrusions.
- H. Extend boards over control and expansion joints, un-bonded to foundation 8 inches on one side of joint.
- I. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- J. All Boards to extend a minimum of 24" below outside grade.

3.3 BOARD INSTALLATION AT CAVITY WALLS

- A. Adhere a 6-inch wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
 - 1. Extend sheet full height of joint.
- B. Install using adhesive recommended by insulation manufacturer for application. Apply adhesive to back of boards:
 - 1. Three continuous beads per board length.
 - 2. Full bed 1/8 inch thick.
- C. Install boards to fit snugly between wall ties.
 - 1. Place membrane surface facing out, and tape seal board joints.
- D. Install boards horizontally on walls.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and to protrusions.
 - 4. Place impale fastener locking discs.
- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.4 PROTECTION OF UNFINISHED WORK

- A. Do not permit work to be damaged prior to covering insulation.

3.5 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

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BOARD AND BATT INSULATION

- E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Staple facing flanges in place at maximum 6 inches on center.
- G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- H. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.
- I. Tape seal tears or cuts in vapor retarder.
- J. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

3.6 PROTECTION OF FINISHED WORK

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07531

SINGLE PLY ROOFING-FULLY ADHERED EPDM

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Substrate covering over metal deck and vapor retarder.
- B. Vapor retarder and sheathing over metal deck surfaces.
- C. Insulation.
- D. EPDM Membrane roofing, base flashings, roof expansion joints, and all accessories and appurtenances for a complete system.

1.2 RELATED SECTIONS

- A. Section 06114 - Wood Blocking and Curbing
- B. Section 07620 - Sheet Metal Flashing and Trim

1.3 REFERENCES

- A. ASTM C79 - Gypsum Sheathing Board
- B. ASTM C 1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- C. ASTM C1289-01 - Class I Grade II - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- D. E108 - Standard Test Methods for Fire Tests of Roof Coverings
- E. E119 - Standard Test Methods for Fire Tests of Building Construction and Materials
- F. FM 4470 (Factory Mutual Engineering Corporation) - Roof Assembly Classifications.

1.4 SYSTEM DESCRIPTION

- A. Elastomeric Sheet Membrane EPDM Roofing System: Fully adhered single ply membrane roofing and flashing with vapor retarder, insulation, and all accessories and appurtenances for a complete system.

1.5 SUBMITTALS

- A. Section 01300 - Administrative Requirements: Procedures for submittals.
- B. Submit written certification that the roofing contractor/subcontractor has been an approved applicator of selected roof system for 5 years or more.
- C. Submit written certification of license under the Illinois Roofing Industry Licensing Act.
- D. Submit written certification from the proposed SPM manufacturer that all appropriate warranty paper work has been submitted prior to starting the work.
- E. Submit written certification from insulation manufacturer that their insulation is compatible with the proposed SPM.
- F. Submit written certification and/or documentation that the foreman and/or crew members have attended the proposed SPM manufacturer's training seminar.
- G. Submit written certification from roofing system manufacturer that proposed insulation faces are compatible with proposed single ply membranes.
- H. Submit written certification from roofing system manufacturer that all details indicated in the drawings are acceptable to the roofing system manufacturer.
- I. Submit nail pull-out test results, roof test location plan and SPM manufacturer's letter of acceptance of pull-out results.
- J. Product Data: Provide characteristics on membrane materials, flashing materials, insulation, vapor retarders, and all products to be installed as part of roofing system.
 - 1. Material safety and technical information data sheets for all roofing system components.
 - 2. Insulation
 - a. Polyisocyanurate
 - 3. EPDM
 - a. membrane
 - b. Self adhering flashing
 - c. Adhesives
 - d. Seam Tape
 - e. SPM sealant

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SINGLE PLY ROOFING-FULLY ADHERED EPDM

- f. Water cut off mastic
- 4. Mechanical Fasteners:
 - a. Nails
 - b. Screw Fasteners
- 5. SPM manufacturer's specification and instruction manual for all components of roofing system.
- 6. Sample copy of manufacturer's 15 year full roof system and 20 year material warranty.
- 7. Rubber walkway pads.
- 8. Vapor Retarder Materials
 - a. Asphalt primer
 - b. Asphalt
 - c. Base sheet
 - d. Top sheet
 - e. Roofing Cement
- 9. Concrete Pavers.
- 10. Coverboard.
- K. Shop Drawings:
 - 1. Submit shop drawings to the roofing system manufacturer for approval.
 - 2. Submit Manufacturer approved shop drawings to the Architect. Shop drawings shall represent standards and detailing as specified herein or as indicated in the drawings.
 - 3. Minimum scale: 3" = 1'-0", except where otherwise specified. Manufacturer's standard details are unacceptable.
 - 4. Submit:
 - a. Base flashing:
 - 1) Utilizing field ply EPDM as base flashing
 - 2) Utilizing reinforced EPDM strip
 - b. Parapet Roof edge with coping.
 - c. Mechanical/electrical equipment curbs.
 - d. Roof plumbing vents.
 - e. Roof drains showing appropriate extensions rings.
 - f. Pipe penetration curb.
 - g. Gutter roof edge.
 - h. Door sill.
 - i. Window sill.
 - j. Skylight curb.
 - k. Expansion joints.
 - l. Pipe Penetrations.
 - m. Clerestory curb.
 - n. Louver sill.
 - o. Eave roof edge.
 - p. Overflow scupper detail
 - q. Base conditions at mechanical penthouse
 - r. Roof plan/insulation layout:
 - 1) Tapered insulation layout minimum scale 1/8" = 1'-0".
 - 2) Indicate all roof curbs, penetrations, required saddles, and crickets.
 - 3) NO FLAT SUMPS AT DRAINS PERMITTED.
 - s. Roof plan with proposed lap seam layout.
- L. Samples: Submit 2 Manufacturer's samples.
 - 1. Insulation:
 - a. Polyisocyanurate 3 pieces
 - 2. EPDM.
 - 3. Semi cured self adhering EPDM cover strip.
 - 4. Fasteners, as indicated on the drawings:
 - a. Nails
 - b. Screw fasteners w/stress plates

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SINGLE PLY ROOFING-FULLY ADHERED EPDM

5. 1/8 x 1 inch aluminum Termination bar
6. Foam insulation adhesive
7. Rubber walkway pad
8. Concrete pavers
9. Coverboard

1.6 SUBMITTALS FOR INFORMATION

- A. Section 01300 - Administrative Requirements: Procedures for submittals.
- B. Manufacturer's Installation Instructions: Indicate special precautions required for seaming the membrane.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Field Reports: Submit under provisions of Section 01400.
 1. Submit 3 copies of in-progress inspection reports.
- E. Reports: Indicate procedures followed; ambient temperatures, humidity, wind velocity during application, work in progress and observations.

1.7 QUALITY ASSURANCE

- A. Qualifications/Requirements of Roofing Contractor.
 1. Contractor shall have a minimum of 5 years experience in successfully applying the specified products and shall be certified by the specified products manufacturer to apply their roofing systems.
 2. On warranted roof systems, be an approved applicator of the system in question for 5 years minimum.
- B. Application Qualifications: The application method shall be approved by the manufacturer of the roofing materials which are selected.
- C. Perform work in accordance with current published manufacturer's instructions and recommendations.

1.8 REGULATORY REQUIREMENTS

- A. Conform to applicable code for roof assembly fire hazard requirements.
- B. UL 790: Class A Fire Hazard Classification.
- C. FM 4470: Roof Assembly Classification, of Class 1 Construction, wind uplift requirement of I-90, in accordance with FM Construction Bulletin 1-28.

1.9 PRE-INSTALLATION MEETING

- A. Section 01300 - Administrative Requirements: Pre-Installation meeting.
- B. Convene one week before starting work of this section.
- C. Roof Foreman for project - MUST BE IN ATTENDANCE.

1.10 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01600 - Product Requirements: Transport, handle, store, and protect products.
- B. Store products on clean raised pallets in weather protected environment, clear of ground and moisture per manufacturer's recommendations.
- C. Deliver all materials in manufacturer's original, unopened containers and rolls with all labels intact and legible.
- D. Deliver materials requiring fire resistance classification packaged with labels attached as required by the labeling service.
- E. Deliver materials in sufficient time and quality to allow continuity of work and compliance with approved construction schedule.
- F. Store rolled goods on end and handle rolled goods in manner to prevent damage to edges or ends.
- G. Provide continuous protection of materials against damage or deterioration.
- H. Remove damaged or defective materials from site.
- I. Roof Insulation:
 1. Store insulation on clean, raised platforms, remove manufacturer's wrappings and cover

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- with breathable, waterproof weather protective coverings.
- 2. Provide continuous protection of insulation materials against wetting and moisture absorption.
- 3. Remove wet insulation materials from the project site.
- 4. Once insulation becomes wet, it will be removed from the site and not used. Wet insulation which then dries shall be removed from the site, the same as wet insulation.
- J. Comply with fire and safety regulations.
- K. SPM splice cleaner to be contained in UL approved safety cans at all times.
- L. All materials shall be new.
- M. Do not store material or park vehicles/dumpsters in front of doors.
- N. No materials shall be stored on any new or existing roofing system.

1.11 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not apply EPDM roofing membrane during inclement weather and/or ambient temperatures below 20 degrees F or above 95 degrees F.
- C. Do not apply roofing membrane to damp or frozen deck surface.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- E. All SPM sealants and adhesives must be kept at 60 degrees F prior to installation when the ambient temperature falls below 40 degrees.

1.12 COORDINATION

- A. Coordinate work under provisions of Section 01300.
- B. Coordinate the work with the installation of trades whose impinges on the roofing and of associated metal flashings, as the work of this section proceeds.

1.13 PROTECTION

- A. Avoid heavy traffic on heavy work.
- B. Restore to original condition or replace all the work or materials damaged by roofing operations.
- C. Protect the paving, grass and building walls adjacent to hoists and kettles prior to starting work.
 - 1. Lap all suitable protective materials at least 6 inches.
 - 2. Secure protective coverings against wind.
 - 3. Leave protective covering in place for duration of roofing work.
 - 4. Repair any damage to existing conditions caused by work of this section.
- D. Remove protection upon completion of the roofing work.

1.14 WARRANTY

- A. Refer to Section 01780 - Closeout Submittals for additional information.
- B. Correct defective work within a two year period after Substantial Completion for damage to building resulting from failure to prevent penetration of water.
- C. General Contractor: To provide manufacturer's 15 year total roofing system warranty for roofing system, guaranteeing the materials manufacturer will pay for repairs to stop the leaks resulting from the natural deterioration of the membrane or from any errors in application of the membrane.
 - 1. Carlisle Golden Seal Roofing System Warranty.
 - 2. Firestone Red Shield Roofing System Limited Warranty.
 - 3. Gencorp Inc.; EPDM Roofing System Warranty.
 - 4. Manville Roofing Systems Gold Shield Roofing System Guarantee.
 - 5. Versico Roofing Systems Total System Warranty.
 - 6. Warranty shall include the asphalt used to fully adhere the high density, closed cell, polyisocyanurate cover board.
- D. General Contractor: To provide manufacturer's standard 20 year guarantee/warranty for roofing membrane guaranteeing that the membrane material used in the roofing system will not

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- deteriorate to the point of failure due to weathering.
1. Carlisle Syntec Incorporated 20-Year Membrane and Material Warranty.
 2. Firestone Building Products, Roofing Membrane Limited Warranty.
 3. Gencorp Inc.; Limited Membrane Only Warranty.
 4. Manville Roofing Systems 20-Year Membrane and Material Warranty.
 5. Versico Roofing Systems 20 Year Extended Membrane Material Warranty.
- E. The guarantee shall start from the day of inspection by the manufacturer's representative. The date shall be established as the date the Architect and the manufacturer's representative inspect the work and find that all work is complete and forms a watertight installation.
- F. The roofing contractor shall notify the Architect in writing when the roof is complete for final inspection.
- G. Following raising and reinstallation of the mechanical unit curbs, verify in writing that all units are in working order.
- H. Following the complete installation of the roofing system and sheet metal, all roof drain downspouts are to be rodded clean and written verification submitted verifying all roof drain downspouts are in working order.
- I. Completed Operations Inspection:
1. Upon completion of installation of EPDM roof system, an inspection of the entire roof system shall be made by Contractor to determine compliance with manufacturer's requirements. Submit written notice of same in accord with Section 01700.
 2. Upon completion of installation of EPDM roof system, Manufacturer shall certify in writing to the Architect that materials, workmanship, and installation were in accordance with the manufacturer's printed instructions and current recommendations.
- J. See Section 01780 - Closeout Submittals, for additional warranty requirements.

PART 2 – PRODUCTS

2.1 MANUFACTURERS- MEMBRANE MATERIAL

- A. Firestone Building Products Company, 525 Congressional Blvd., Carmel, IN 46032 Phone: (317) 575-7000.
- B. Manville Roofing Systems, P.O. Box 5108, Denver, CO 80217-5108
- C. Carlisle Syntec Incorporated, P.O. Box 7000, Carlisle, PA 1701 Phone: 800-4-SYNTEC.
- D. Genflex Roofing Systems, 1722 Indian Wood Circle, Suite A, Maumee, OH 43537
- E. Jersico Roofing Systems Total System Warranty, 3485 Fortuna Drive, Akron, OH. 44312. Phone: 800-992-7663.
- F. Section 01600 - Materials and Equipment: Product options. Substitutions: Not permitted.

2.2 MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane: EPDM reinforced 60 mil thick.
- | | | |
|------------------------------------|-----------------|-----------------------|
| 1. Properties | Test | Pass Test |
| 2. Tensile Strength | ASTM D412 | 1305 psi |
| 3. Elongation | ASTM D412 | 350% |
| 4. Tear Strength | ASTM D624 Die C | 175#/in. |
| 5. Water Absorption | ASTM E96 | 0.1 perms |
| 6. Moisture Vapor Perms | ASTM E96 | 0.1 perms |
| 7. Resistant to Outdoor Weathering | ASTM D22 | No cracks- No crazing |
| 8. Low Temperature Brittleness | ASTM D746 | -75 degrees F. |
| 9. Ozone Resistance | ASTM D1149 | No cracks |
- B. Seaming Materials: As recommended by membrane manufacturer.

2.3 ADHESIVE MATERIALS

- A. Surface Conditioner: Compatible with membrane, as recommended by membrane manufacturer.
- B. Membrane Adhesives: As recommended by membrane manufacturer.

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- C. Insulation Adhesive: As recommended by insulation manufacturer.
- D. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.

2.4 SUBSTRATE COVERING MATERIALS

- A. Fiberglass faced Gypsum Roof Board: 1/2 inch thickness, Type X, water resistant, zero flame spread, zero smoke development; ASTM E-136, Dens-Deck Prime, Georgia Pacific, Atlanta GA.
- B. Coverboard: Facing Compatible with roofing membrane, 1/2 inch thickness high density, closed cell, polyisocyanurate equal to Firestone Isogard HD or Dens-Deck Prime as recommended by EPDM manufacturer. Install as per recommendations of cover board manufacturer.
- C. 3 ply vapor retarder
- D. Sheet vapor Retarder: 10 mil polyethylene with duct tape.

2.5 INSULATION

- A. Manufacturers:
 - 1. Carlisle Syntec Incorporated.
 - 2. Firestone Building Products.
 - 3. Genflex Roofing Systems.
 - 4. Manville Roofing Products.
 - 5. Versigard Roofing Systems.
 - 6. Section 01600 - Product Requirements: Product options. Substitutions: Not permitted.
- B. Polyisocyanurate foam panels shall be HCFC free and formulated with hydrocarbon blowing agents chemically bonded during the foaming process to facers on top and bottom surfaces.
- C. Flat Insulation: Flat rigid board conforming to ASTM C1289 -01 Type II, Class I, Grade II, UL 1256 No. 120 and 123, UL 790 (ASTM E108) Class A, UI 263 (ASTM E119) FM 4450 / 4470 Class I fire rating, polyisocyanurate rigid board, both faces surfaced with fiber reinforced faces, with the following characteristics:
 - 1. Board Density: 2.0 lb/cu ft
 - 2. Board Size: 48 inches x 48 inches or 48 inches x 96 inches.
 - 3. Board Thickness: 1 1/2 inches
 - 4. Thermal Conductivity: LTTR value of 6/inch per ASTM C1303.
 - 5. Board Compressive Resistance: 20 psi min. PER ASTM D 1621
 - 6. Board Edges: Square
- D. Tapered Insulation: Conforming to ASTM C1289 -01 Type II, Class I, Grade II, UL 1256 No. 120 and 123, UL 790 (ASTM E108) Class A, UI 263 (ASTM E119) FM 4450 / 4470 Class I fire rating, polyisocyanurate rigid board, both faces surfaced with fiber reinforced faces, with the following characteristics:
 - 1. Board Density: 2.0 lb/cu ft
 - 2. Board Size: 48 inches x 48 inches
 - 3. Board Taper: Beginning thickness 1/2 inch minimum 1/8 inch/ft. slope.
 - 4. Thermal Conductivity: Aged R value of 5.56/inch as per ASTM C1303.
 - 5. Board Edges: Square
 - 6. Board Compressive Resistance: 20 psi min.
- E. Cover board: Facing Compatible with roofing membrane, 1/2 inch thickness high density, closed cell, polyisocyanurate equal to Firestone Isogard HD or Dens-Deck Prime as recommended by EPDM manufacturer. Install as per recommendations of cover board manufacturer.

2.6 FLASHINGS

- A. Flexible Flashings same material as membrane.
- B. Copings, Fascias, Counterflashings and Misc. Sheet Metal: As specified in Section 07620.
- C. Control or Expansion Joint Flashing: As specified in Section 07620.

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2.7 ACCESSORIES

- A. Prefabricated Roof Specialties: As specified in Section 07710.
- B. Tapered Edge Strips: Polyisocyanurate, compatible with EPDM. Tapered edge strip manufactured configuration as detailed. Provided by EPDM membrane manufacturer.
- C. Sheathing Adhesive: Non-combustible type, for adhering gypsum sheathing to metal deck.
- D. Sheathing Joint Tape: Paper type.
- E. Insulation Joint Tape: Asphalt treated glass fiber reinforced; 6 inches wide; self adhering.
- F. Cover Strips: 6 inch minimum widths semi-cured self adhering EPDM as supplied by roof system manufacturer and provided by contractor.
- G. Roofing Nails: Ring shank aluminum, size as required to suit application with 1 inch plastic washer heads.
- H. Insulation Fasteners: Appropriate for purpose intended and approved by Factory Mutual and system manufacturer; length required for thickness of material with metal washers; manufactured by EPDM manufacturer.
- I. Sealants: As recommended by membrane manufacturer.
- J. Walkway Pads: 24 inches x 24 inches x 2-1/4 inches thick Sure Seal Rubber Pavers; Carlisle Syntec or equal.
- K. Preformed Boots: Flexible boot with self adhering flange for pipe penetrations through membrane by membrane manufacturer.
- L. SPM Manufacturers Water Cut-Off Mastic: Provide as needed to sheet metal manufacturer.
- M. Foam Adhesive: PL200 Panel and Foam Adhesive by Rexnord Chemical Products, Minneapolis, MN.
- N. Steep Asphalt: Type III, ASTM 312.
- O. Rosin Paper.
- P. Finishing Felts/Fiberglass Felts: Type IV, ASTM 2178.
- Q. Fiberglass Base Sheet: Type II, ASTM 4601.
- R. 10 mil Polyethylene Vapor Retarder.
 - 1. 10 mil Polyethylene Duct Tape.
- S. Self Adhering Vapor Retarder.
- T. Miro Pipe Curbs.
- U. Termination Bars: 1/8 inch by 1 inch minimum as supplied by roofing manufacturer and provided by contractor.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains.
- D. Verify deck surfaces are dry and free of snow or ice. Confirm dry deck by moisture meter with 12 percent moisture maximum.
 - 1. Cast-in-place concrete must cure a minimum of 28 days prior to the installation of vapor barrier.
- E. Verify adjacent precast concrete roof members do not vary more than 1/4 in height. Verify grout keys are filled flush.
- F. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set and wood blocking is in place.
- G. Verify that all work of subcontractors which penetrates roof deck or requires men and equipment to traverse roof deck has been completed.
- H. Do not issue a proceed order to the subcontractor or proceed with work until all defects are corrected to satisfaction of and with written approval of the roofing system manufacturer.
- I. Repair any minor sections of the roof deck which may have been damaged to provide smooth level surface.

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- J. Do not install any roof insulation until all perimeter roof edge wood blocking is installed. All wood blocking shall be ACQ Type D treated lumber, installed with staggered and scarfed joints, without buckles or warps and be screw fastened.
- K. Verify that all roof edge perimeter conditions are constructed prior to roof system installation.

3.2 PREPARATION - WOOD DECK

- A. Verify flatness and tight joints of wood decking.
- B. Seal joints of decking with tape.
- C. Fill knot holes with latex filler.

3.3 PREPARATION - CONCRETE DECK

- A. Fill surface honeycomb and variations with latex filler.

3.4 PREPARATION - METAL DECK

- A. Install preformed sound absorbing fiber insulation strips supplied by Section 05310, in acoustic deck flutes; in accordance with manufacturer's instructions.
- B. Install coverboard on metal deck with FM approved screw fasteners and stress plates at one per every two square feet, into top flute of metal roof deck only.
- C. Lay sheathing with long side at right angle to flutes; stagger end joints; provide support at ends.
- D. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface. Tape joints.
- E. Mechanically fasten sheathing at full roof area using FM approved screw fasteners and stress plates at one per every two square feet.
- F. Adhere sheathing to roof deck in accordance with the adhesive manufacturer's printed recommendations.
- G. Mechanically fasten sheathing to roof deck, in accordance with Factory Mutual requirements.

3.5 INSTALLATION

- A. Install roofing with flashing systems and accessory items in strict accordance with system manufacturer's printed instructions current at the date of bidding documents. When items of conflict arise between the manufacturer's recommendations and the contract documents, the more stringent will govern unless it violates manufacturer's warranty requirements.

3.6 VAPOR RETARDER APPLICATION

- A. Vapor Retarder Polyethylene:
 - 1. Apply vapor retarder over roof deck, lap 6 inches and tape all joints.
 - 2. Extend vapor retarder deck edge, tape in place,
 - 3. Cut vapor retarder at roof curbs and penetration and tape in place. Tape all cuts to prevent water vapor transmission.
 - 4. Lap over vapor and air barrier of wall construction to provide continuity of vapor and air barrier seal.
- B. Vapor Retarder: 3 Ply Asphalt Adhesive
 - 1. Kettle Temperatures:
 - a. Each kettle shall be provided with a thermometer in good working order.
 - b. Heating of Asphalt: 525 degrees F per manufacturer's recommendation.
 - c. Application: Steep Asphalt Manufacturer's published EVT with a range of 25 degrees
 - 2. At contractors option, a self-adhering asphalt vapor barrier may be used.
 - 3. Asphalt Application:
 - a. Roofing materials shall not be applied when moisture, in any form such as dew, can be seen or felt on the surface to which the materials are to be applied. Properly apply waterproofing.
 - b. Materials shall not be applied when any foaming, blistering or bubbling of the hot asphalt occurs.
 - c. All hot asphalt applications shall be maintained within 25 degrees F or asphalt's EVT temperature, as supplied by the material manufacturer. Asphalt temperature shall

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never fall below 400 degrees F. at the point of membrane application. The kettle temperatures shall never exceed the manufacturer recommended maximum temperature.

4. Metal Roof Decks:
 - a. Install ½ inch layer of Dens Deck prime and mechanically fasten with FM approved screw fasteners and stress plates at a rate of 1 per 2 square feet into top flute of metal roof deck only.
 - 1) Errantly installed fasteners into the bottom flute are to be removed.
 - b. Starting at the low point, embed base sheet mopped to the entire surface of the insulation with steep asphalt at a rate of 20 lbs. per square feet. Lap sides 2 inches. Lap ends 6 inches.
 - c. Starting at the low point, mop in finishing felts solid over base sheet with approximately 20 lbs. per square of steep asphalt, and while hot, embed finishing felt lapping sides a minimum of 4 inches and lapping the ends of the roll a minimum of 6 inches. Offset base sheet felt 12 inches.
 - d. Set third ply offset 12 inches from 2nd finishing felt.
 - e. Cover exposed vapor barrier felts with a glaze coat of asphalt, utilizing a squeegee application of 10 lbs. per square on the day of felt installation.

3.7 INSULATION APPLICATION Adhesive Application: Asphalt or Spray Foam

- A. Ensure vapor retarder is clean and dry.
- B. Apply adhesive to deck in accordance with adhesive and insulation manufacturer's instructions. Embed insulation into adhesive with full contact. Step into place and position so that no cupping occurs.
- C. Apply adhesive to the top surface of insulation. Embed the second layer of insulation into adhesive, with joints staggered minimum 12 inch from joints of first layer.
- D. Place the constant thickness first layer and the tapered thickness insulation second layer to the required slope pattern in accordance with manufacturer's instructions.
- E. Minimum total Insulation thickness: 2 inches.
- F. Place Boards perpendicular to deck flutes with edges over top flute surface for bearing support.
- G. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- H. Lay tapered boards in full compliance with approved tapered insulation shop drawings layout.
- I. Apply no more insulation than can be covered with high density, closed cell, polyisocyanurate cover board in same day.
- J. Tape joints of insulation in accordance with insulation manufacturer's instruction.
- K. Leading edge of tapered insulation shall be ½ inch with 0 to ½ inch tapered edge strips provided for a flush transition. Fully adhere.
- L. Install two-way tapered saddles and edge strips in adhesive, as indicated on the drawings. Step into place and position so that no cupping occurs.
- M. Insulation shall have surface joints ¼ inch or less in width.
- N. Repair all joints or holes greater than ¼ inch in diameter with same material.
- O. Field cut tapered and base insulation to fit around the differing deck elevations and roof curbs.
- P. Tapered insulation shall originate at center of the roof drain and be cut perpendicular to the drain flange at the clamping ring.

3.8 INSULATION APPLICATION: Mechanically Fastened.

- A. Ensure vapor retarder is clean and dry.
- B. Mechanically fasten insulation to deck in accordance with insulation manufacturer's instructions, utilizing FM approved screw fasteners and stress plates at one per two square feet using stand-up pneumatic screw fasteners hand-gun installation tool (e.g. Accutrak 11 by Buildex) into top flute of metal deck only.
- C. Place the second layer of insulation with joints staggered minimum of 18 inches from joints of first layer.
- D. Place one FM approved screw fastener and stress plate per 2 square feet of insulation board

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- into top flute of metal roof deck.
- E. Place the constant thickness first layer and the tapered thickness insulation second layer to the required slope pattern in accordance with manufacturer's instructions.
 - F. Minimum total Insulation thickness: 2 inches.
 - G. Place boards perpendicular to deck flutes with edges over to flute surface for bearing support.
 - H. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
 - I. Lay tapered boards in full compliance with approved tapered insulation shop drawings layout.
 - J. Tape joints of insulation in accordance with insulation manufacturer's instructions.
 - K. Leading edge of tapered insulation shall be ½ inch with 0 to ½ inch tapered edge strips provided for a flush transition. Mechanically fasten tapered edge strips at 12 inches on center.
 - L. Install two-way tapered saddles and edge strips in hot asphalt, as indicated on the drawings. Mechanically fasten.
 - M. Top layer of insulation shall have surface joints ¼ inch or less in width.
 - N. Repair all joints or holes greater than ¼ inch in diameter with same material or spray foam insulation.
 - O. Field cut tapered and base insulation to fit around the differing deck elevations and roof curbs.
 - P. Tapered insulation shall originate at center of the roof drain and be cut perpendicular to the drain flange at the clamping ring.

3.9 MEMBRANE

- A. Install reinforced 60 mil EPDM securement strip at the perimeter conditions.
- B. Position membrane without stretching over the substrate.
- C. Allow the membrane to relax for approximately 1/2 hour before adhering.
- D. Fold sheet in half longitudinally.
- E. Apply bonding adhesive to insulation and SPM after adhesive has dried to where it does not string or stick when pushed into with finger.
 - 1. Roll EPDM into bonding adhesive.
 - 2. Broom EPDM flush to insulation to achieve positive bonding.
- F. Repeat steps B through E for remaining portion of the roof.
- G. Membrane should be fully adhered to insulation and perimeter wood blocking with bond adhesive and to securement strip with splice adhesive. Membrane should extend up and over perimeter wood blocking and down 1 inch minimum onto the masonry, fully adhere and nail 6 inches on center with cap nails on the same day installed.
- H. Exposed corners of the perimeter wood blocking are to be flashed with uncured EPDM extending 1 inch down onto masonry and nailed at 6 inches on center with ecap nails.
- I. Install water cut-offs at end of the day's work using water cut-off mastic. Remove water cut-off mastic prior to beginning the next day's work.
- J. Where applicable, fold the EPDM field sheet into corners and create a "pig's ear" to eliminate excess material. Do not cut membrane. Adhere the pig's ear to the EPDM with splice adhesive.
- K. Lap joints shall be a minimum of 5 feet from roof drains.
 - 1. Seams shall be water lapped.

3.10 LAP SEAM TAPE SPLICES

- A. All field lap seams to be fabricated using tape adhesive.
- B. Shingle lay membrane 5 inches towards the roof drain.
- C. Mark 1 inch to the low side of the overlapping sheet with a crayon.
- D. Tack back the overlaying sheet with primer at 4 feet on center.
- E. Thoroughly clean and prime membrane, both on the overlap and the underlap conditions. Allow to dry.
- F. When washing and priming seam, be sure to wash lengthwise across the sheet, except at factory seams where you should wash in direction of factory seam to remove talc.
- G. Install tape in proper alignment so it will protrude out ¼ inch to ½ inch beyond the overlaying sheet.
- H. Roll seam tape with 4 inches hand roller. Using hand pressure only is not acceptable.

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- I. Bring overlapping membrane over the top of the seam tape and release the paper.
- J. Remove release paper by pulling at a 45 degree angle.
- K. At seam tape laps, lap seam tape 1 inch.
- L. Untack the EPDM sheet and allow it to fall into place.
- M. Following removal of the release paper, broom membrane into sealant tape.
- N. Roll seam with 1-1/2 inches silicone roller at 45 degree angle to the seam.
- O. All products used in seam must be supplied by membrane manufacturer.
- P. All SPM field lap seams to be covered with 6 inches uncured EPDM, self-adhering EPDM cover strips.
- Q. In irregular areas where ¼ inch seam tape is not shown and at tee-joints, patches of uncured EPDM will be required.
- R. At tee-joints, cut out portion of membrane below cover piece to offer full adherence of all pieces of membrane. Following this, install 6 inches x 6 inches patches of uncured EPDM over same. Use a soft bristled push broom.
- S. Following approval by Architect and/or membrane manufacturer, clean and prime top of completed seam at the edge and install a continuous bead of SPM lap sealant.

3.11 LAP SEAM COVER STRIPS

- A. Following Architect's inspection of lap seam and the Architect's approval of same, wash the lap seam and EPDM membrane 6 inches to each side of the lap seam edge to remove any accumulated debris with clean water.
- B. Scrub the power washed lap seam and EPDM membrane with water and soap, using a scrub brush. Rinse thoroughly.
- C. Splice wash cleaned area. Prime 6 inches to each side of lap splice edge.
- D. Install splice adhesive across the primed membrane with either a roller or a paint brush.
- E. When the splice adhesive has been flashed off and is tacky to a finger-push test, install a 6 inches piece of self-adhering cured EPDM; center down lap splice edge.
- F. Thoroughly roll the self-adhering cured EPDM cover strip into place with a rubber roller
 - 1. The salvaged adhesive edge of cover strip shall be thoroughly rolled into place.
 - 2. At cover strip laps and laps with other membranes, carefully roll along the covered edge.
- G. At the cover strip laps, tee joints and other membrane location laps, an uncured EPDM patch, large enough to extend a minimum of 3 inches beyond the lap in all directions is to be installed. All patch corners are to be ROUNDED.
- H. Splice wash all edges of the cured EPDM cover strip and the uncured EPDM patches.
- I. Install a continuous bead of lap sealant over the edge of the cover strip and patches. Using an SPM lap sealant screed, tool lap sealant into and over the edge of the cover strip and patching membrane.
- J. All lap seam cover strip application to be reviewed and approved by the Architect, prior to the installation of the gravel ballast and/or concrete pavers.

3.12 ROOF CURB AND BASE FLASHING

- A. Secure field membrane by screwing through metal anchor bar at 6 inches on center with approved screw fasteners, where possible install reinforced 60 mil EPDM securement strip previously fastened at 6 inches on center.
- B. Extend roofing membrane up wall or vertical surface or over wood blocking nailer, as indicated and fully adhere to reinforcement strip vertical surface.
- C. Nail top of base flashing to wood nailer strip at 6 inches on center with 1 inch hard roofing nails with cap nails.
- D. All flashings and termination shall be done in accord with the manufacturer's standard details or as detailed, whichever is more stringent.
- E. Use prefabricated, self adhering corners where possible.
- F. Cover anchor bar strips with SPM flashing, extending above anchor bar and 6 inches out on horizontal roof surface.
- G. Apply appropriate adhesive to the SPM flashing, the roofing membrane, and the curb wall.

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- H. After the lap cement dries to a point where it does not string or stick to the dry finger touch, roll the base flashing into the adhesive and roll with steel roller to achieve positive bonding.
- I. Clean the edges of completed SPM flashing laps with an approved splice wash. Then apply the lap sealant along both edges of the SPM flashing. Feather.
- J. All vertical splice laps shall be covered with a 6 inches minimum cover strip of uncured EPDM extend 3 inches beyond horizontally on the flat.
- K. Fold SPM flashing into corners to create a "pig's ear" and eliminate excess material. Do not cut off membrane. Adhere "pig's ear" to SPM.
- L. Cover the vertical surfaces of end wall flashing with the uncured neoprene flashing. Apply SPM lap sealant to exposed edges of uncured neoprene flashing.
- M. Terminate top of flashing on masonry with 1/8 x 1 inch aluminum termination bar with manufacturer-approved expansion anchors at 6 inches on center.
 - 1. Install water cut-off mastic between masonry and SPM, prior to installation of termination bar.
 - 2. Cut EPDM flush to top of termination bar.
 - 3. Install SPM lap sealant to top of termination bar.
- N. Terminate vertical flashing ends on masonry with 1/8 inch aluminum termination bar with manufacturer-approved expansion anchors at 4 inches on center.
 - 1. Install the water-cut off mastic between masonry and SPM prior to installation of the termination bar.
 - 2. Cut EPDM flush to top of termination bar.
 - 3. Install SPM lap sealant to top of termination bar.
- O. Cover termination bar with metal counterflashing.
- P. Secure top of flashing on plywood and wood blocking with aluminum nails at 4 inches on center. Seal top of flashing with SPM Lap Sealant installed same day as flashing.
- Q. The 1/8 inch thick aluminum termination bar must be installed atop base flashing on day base flashing is installed.

3.13 PIPE PENETRATIONS

- A. Flash pipe with premolded pipe flashings with self adhering flange where installation is possible.
- B. Where the molded pipe flashings cannot be installed, use field fabricated flashing techniques using uncured EPDM.
- C. Raise the pipe penetrations and roof vents to maintain a minimum of 8 inches projection above surface of new roof surface. Verify that all pipe penetrations extend to a minimum of 8 inches above the finished roof surface.
- D. Apply lap sealant at all flashing edges.
- E. Provide water cut-off mastic between the pipe and molded pipe flashing.
- F. Install stainless steel clamping ring around pipe at top of premolded pipe flashing.
- G. Install SPM lap sealant at top pipe boot/field flashing.
- H. Premolded pipe boot:
 - 1. When flashing must be cut to fit pipe penetration and top of premolded boot is below 8 inches above SPM, pipe penetration is to be wrapped in uncured EPDM.
 - 2. Top edge is to be a minimum of 8 inches above the SPM. Premolded pipe boot is then to be installed.
 - 3. Wrap all gas vent pipe penetration with cured EPDM membrane following completion of field flashing.
 - a. Field Flashings
 - 1) Install stainless steel rain cap around pipe and over tip of field flashing.

3.14 ROOF DRAINS

- A. Insert base insulation and tapered insulation under drain extension ring. Twist extension ring tight into insulation.
- B. Originate tapered insulation at center of the drain. Cut high density, closed cell, polyisocyanurate cover board insulation perpendicular to drain flange at the clamping ring.

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SINGLE PLY ROOFING-FULLY ADHERED EPDM

- C. Seal between the membrane and drain flange with water cut-off mastic, as indicated in manufacturer's standard details.
- D. Set clamping rings and secure.

3.15 DAILY SEAL

- A. Temporarily seal loose edges of membrane with water cut-off mastic or adhesive at end of the working day. Loose night seals are unacceptable.
 - 1. Surface shall be clean and dry.
 - 2. Apply water cut-off mastic at a rate of 100 lineal feet per gallon, 12 inches back from edge of sheet onto exposed surface.
 - 3. If necessary, use a trowel to spread material in order to achieve complete seal.
- B. After embedding the membrane in night seal, check for continuous contact. Weight edge, providing continuous pressure over length of the cut off.
- C. When the work is resumed, pull sheet face free before continuing installation.
- D. Cut off and remove a portion of SPM with water cut-off mastic on it.

3.16 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements: Field inspection and Testing.
- B. Correct identified defects or irregularities.
- C. Require site attendance of roofing and insulation materials' manufacturer during installation of the Work.

3.17 CLEANING

- A. Section 01780 - Closeout Submittals: Cleaning installed work.
- B. In areas where finished surfaces are soiled by Work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.18 EXTRA STOCK

- A. Upon completion of all roofing work, provide the Owner with the following extra stock materials.
 - 1. 1 case SPM lap sealant
 - 2. 1 gallon can manufacturer's splice wash
 - 3. 1 case 6' diameter self-adhering uncured EPDM patches
- B. Provide MSDS sheets on each material applied as extra stock.
- C. Provide training to the Owner as to the appropriate installation of the self-adhering uncured EPDM patch.

3.19 PROTECTION OF FINISHED WORK

- A. Section 01780 - Closeout Submittals: Protecting installed work.
- B. Protect building surfaces against damage from roofing work.
- C. Where traffic must continue over finished roof membrane, protect surfaces.

END OF SECTION

SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Copings, flashings, counter-flashings, gutters, downspouts, fabricated sheet metal items, and fabricated sheet metal items, and through wall rigid flashings.
- B. Reglets and accessories.

1.2 RELATED SECTIONS

- A. Section 04810 - Unit Masonry Assemblies: Rigid Through-wall flashings in masonry.
- B. Section 06100 - Rough Carpentry: Wood blocking for metal roofing substrate profiles.
- C. Section 06114 - Wood Blocking and Curbing
- D. Section 07900 - Joint Sealers.

1.3 REFERENCES

- A. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2000.
- B. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction; 1998.
- C. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 1997a.
- D. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 1993, Fifth Edition.

1.4 DESIGN REQUIREMENTS

- A. Sheet Metal Flashings: Comply with the criteria of SMACNA "Architectural Sheet Metal Manual." and Copper Development Association "Copper in Architecture - Handbook."]

1.5 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two full size samples, 12" inches long illustrating typical coping material and finish. Include continuous cleats, backer plates, cover plates and/or drive cleats.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

- A. Section 01700 - Execution Requirements Procedures for submittals.
- B. Warranty: Submit manufacturer's 20 year material warranty. Ensure forms have been completed in Owner's name and registered with manufacturer.
- C. Warranty: Submit contractor's two year workmanship warranty.

1.7 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.
- B. Maintain one copy of each document on site.
- C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with five years of documented experience.

1.8 PRE-INSTALLATION CONFERENCE

- A. See Section 01300 - Administrative Requirements for additional requirements.
- B. Convene one week before starting work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Transport, handle, store, and protect.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

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SHEET METAL FLASHING AND TRIM

1. When material is stored on the roof it must be placed on ½" minimum plywood on 1" rigid insulation. Ends of plywood shall exceed end of sheet metal goods by 2'-0".
- C. All field cutting of sheet metal performed over new roofing shall be permitted only where the new roof is protected by ½" minimum plywood on 1" rigid insulation.
- D. Prevent contact with materials which may cause discoloration or staining.

1.10 PROJECT CONDITIONS

- A. Project Coordination: Section 01300 - Administrative Requirements.
- B. Coordinate with the work of Section 04810 for installing recessed flashing reglets and rigid through wall flashings.

1.11 WARRANTY

- A. Section 01780 - Closeout Submittals
- B. Sheet Metal Contractor to issue guarantee of workmanship to correct defective work within a two year period after Date of Substantial Completion. Defective work includes failure of water-tightness or seals and oil canning due to rupture restricted expansion/contractors or faulty workmanship.
- C. Material warranty from the sheet metal manufacturer for a period of 20 years against deterioration of color, chalking and film integrity.

PART 2 – PRODUCTS

2.1 SHEET MATERIALS

- A. Pre-Finished Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum 0.02 inch 24 gauge core steel, shop pre-coated with PVDF coating; color as selected by Architect from Manufacturer's standard range.
 1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as scheduled.
- B. Pre-Finished Aluminum Sheet: ASTM B 209 (ASTM B 209M), H005 alloy, H12 or H14 temper;.063 inch thick; plain finish shop pre coated with PVDF coating of color as selected by Architect from Manufacturer's standard range.
- C. Stainless Steel: ASTM A 666 Type 304, soft temper, 0.015 inch thick; smooth No. 4 finish.
- D. Copper: ASTM B370, cold rolled 20 oz/sq ft thick; natural finish.
- E. Lead Coated Copper: ASTM B 101, 24 (7320) ounce-weight of bare copper, H00 (cold-rolled) temper.

2.2 ACCESSORIES

- A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.
- B. Underlayment: ASTM D 226, organic roofing felt, Type I ("No. 15").
- C. Slip Sheet: Rosin sized building paper.
- D. Primer: Zinc Molybdate type.
- E. Protective Backing Paint: Zinc molybdate alkyd.
- F. Sealant: Polyurethane type, manufactured by:
 1. Tremco: Dymeric
 2. Sonnoborn: NPI.

2.3 FABRICATION - GENERAL

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet, minimum 3 inches wide, interlocking with sheet a minimum of 1/2 inch.
 1. Drill pilot holes at 4" o.c. for attachment to wood.
 2. Drill pilot holes at 6" o.c. for attachment to masonry or concrete.
- C. All fastener locations will have predrilled pilot holes:
 1. Nails - 1/4" diameter @ 4" o.c.

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2. Screw Fasteners - 5/16" diameter @ 1'-0" o.c.
- D. Form pieces in longest possible lengths.
- E. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- F. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- G. Fabricate corners from one piece with minimum 24-inch long legs; welded for rigidity, seal with sealant and post finished to match adjacent finish..
- H. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- I. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.4 GUTTER AND DOWNSPOUT FABRICATION

- A. Gutters: Profile as indicated.
- B. Downspouts: Rectangular profile, unless indicated otherwise.
- C. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 5 years in accordance with SMACNA Architectural Sheet Metal Manual.
 1. Fabricate gutters to profile and size specified in Design Requirements Article of this Section.
 2. Fabricate gutters to rectangular profile.
- D. Accessories: Profiled to suit gutters and downspouts.
 1. Anchorage Devices: In accordance with SMACNA requirements.
 2. Gutter Supports: Brackets.
 3. Downspout Supports: Brackets.
- E. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.
- F. Seal metal joints.

2.5 FACTORY FINISHING

- A. PVDF coating: Multiple coat, thermally cured, fluoropolymer system conforming to AAMA 605.2.
- B. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.
 1. All metal materials to be delivered to the site with protective, strippable plastic film.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- C. Verify roofing termination and base flashings are in place, sealed, and secure.
 1. Verify that surfaces to receive sheet metal are smooth and clean will not impinge upon the integrity of the sheet metal.
- D. Verify that all wood blocking to receive sheet metal is properly installed, anchored without warps and covered with EPDM.
- E. Do not start sheet metal work until conditions relevant to sheet metal work are acceptable. Commencing of work will indicate acceptance of condition.

3.2 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.
- C. Lay out joints to be symmetrical about the building corners. May require more than one run be cut down to attain symmetry.

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SHEET METAL FLASHING AND TRIM

- D. Paint dissimilar metals with bituminous paint to form a complete barrier.

3.3 INSTALLATION

- A. Secure flashings in place using concealed fasteners as indicated.
1. Apply plastic cement compound between metal flashings and felt flashings.
 - a. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles. Install work watertight, without buckles, warps, fastening stresses or distortion. Allow for expansion and contraction.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- D. Seal metal joints watertight.
- E. Continuous Cleats: Set in water cut-off mastic supplied by the Roofing Contractor or sealant, as indicated in the drawings. Secure to the surface with nail fasteners through 1/4-inch predrilled pilot holes at 4-inch on center.
- F. Verify that height of roof base flashing and termination bar allows for installation of counter-flashing and sealant below weep holes and through-wall flashing.
- G. Copings: Set continuous cleat in a full bed of water cut-off mastic supplied by the roofing contractor. Cover roof edge with rosin paper. Set the outside and inside corners. Secure with 3/4" x 1/4" Atlas HHA stainless steel Type A point screw fasteners with neoprene washers that are covered with sealant, following Architect's approval.
1. Lay out coping joints symmetrical about the building corners. May require multiple cutting at 10'-0" lengths to achieve same. Install backer plates at joint locations. Nail through predrilled 1/4-inch pilot holes. Apply continuous sealant to backer plate vertical and horizontal surfaces as indicated in drawings.
 2. Run joints at +10'-0", except where the cut pieces are required for symmetry between existing corners.
 3. Secure coping to continuous cleat and pull coping over roof edge wood block. Cut 10'-0" lengths to size to provide symmetrical placement between existing building corners.
 4. Verify coping is tight to wood blocking. Anchor with 1-1/4" x 1/4" Atlas HHA stainless steel screw fasteners, Type A points with neoprene washers. Cover with sealant, following Architect's approval.
 5. Install sealant to each side of joints.
 6. Install drive cleat.
- H. Fascias:
1. Set continuous cleat in full bed of [sealant] water cut-off mastic supplied by Roofing Contractor. Secure with nails at 4" on center through 1/4" pre-drilled pilot holes.
 2. Set the outside and inside corners. Secure with nails at 4" o.c. through 1/4" pre-drilled pilot holes.
 3. Lay out fascia joints symmetrical about corners. May require multiple cutting to achieve lengths of 10'-0".
 4. Install backer plates at joint locations in full bed of water cut-off mastic supplied by the roofing contractor. Nail through pre-drilled pilot holes. Install bond breaker tape down the center, as indicated on drawings.
 5. Apply continuous sealant to backer plate vertical and horizontal surfaces as indicated in drawings.
 6. Apply continuous sealant to top of backer plate.
 7. Running joints at +10'-0", except where the cut pieces are required for symmetry between the existing corners.
 8. Secure fascia to continuous cleat and nail at 4" o.c. through 1/4-inch pre-drilled pilot holes.
- I. Counter-flashing:
1. Overlap the base flashing a minimum of 3".
 2. Install continuous butyl caulk tape to vertical portion of the counter-flashing.
 3. Secure to the masonry with 1-1/4" x 3/16" tapcons with climaseal corrosion resistive coating and neoprene washers at 1'-0" on center through 5/16" pre-drilled pilot holes. Cover with

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- sealant following the Architect's approval.
- 4. Lap counter-flashing pieces 3" with bead of sealant and between pieces.
- 5. Cover fastener heads with sealant after the Architect's approval.
- 6. Fill sealant reservoir with sealant to shed water.
- 7. Counter-flashing Corner Pieces: Install pieces per Steps 1 through 6 in 3.3.P.. above.
- J. End Wall Flashings:
 - 1. Set in full bed of water cut-off mastic.
 - 2. Secure with screw fasteners through ¼" pre-drilled pilot holes as indicated on drawings.
 - 3. Coordinate installation with roofing contractor.
 - 4. Have the roofing contractor flash in vertical flange of end wall flashing.
 - 5. Install coping, or standing seam siding, over the end wall flashing by:
 - 6. Secure to end wall flashing vertical flange and pulling coping over the roof edge wood blocking, or, securing to the continuous clip and laying against mansard
- K. Thru Wall Flashing: Coordinate with masonry contractor.
- L. Miscellaneous Flashings: Install as indicated on drawings.
 - 1. Coordinate with interfacing contractors.

3.4 CLEANING

- A. Leave material clean and free of stains.
- B. Remove all sheet metal debris from roof top daily.
- C. Remove all sheet metal debris from site daily.

3.5 FIELD QUALITY CONTROL

- A. See Section 01400 - Quality Requirements, for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.6 SCHEDULE

- A. Copings:
- B. Fascias:
- C. Endwall flashings
- D. Through-Wall Flashing in Masonry:
 - 1. Material: Stainless Steel.

END OF SECTION

SECTION 07900

JOINT SEALERS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Sealants and joint backing.

1.2 REFERENCES

- A. ASTM C 834 - Standard Specification for Latex Sealants; 2000.
- B. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications; 2002.
- C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2002.
- D. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2000.
- E. ASTM D 1667 - Standard Specification for Flexible Cellular Materials--Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam); 1997.

1.3 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section with minimum 3 years experience and approved by manufacturer.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.6 WARRANTY

- A. See section 01780 – Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after the Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Silicone Sealants:
 - 1. Bostik Findley; www.bostikfindley-us.com.
 - 2. GE Plastics; www.geplastics.com.
 - 3. Pecora Corporation; www.pecora.com.
 - 4. Sonneborn, ChemRex, Inc; www.chemrex.com.
 - 5. Dow Corning; www.dowcorning.com
 - 6. Tremco, Inc; www.tremcosealants.com.
 - 7. Substitutions: See Section 01600 - Product Requirements.
- B. Polyurethane Sealants:
 - 1. Bostik Findley; www.bostikfindley-us.com.
 - 2. Pecora Corporation; www.pecora.com.
 - 3. Sonneborn, ChemRex, Inc; www.chemrex.com.
 - 4. Tremco, Inc; www.tremcosealants.com.
 - 5. Substitutions: See Section 01600 - Product Requirements.
- C. Butyl Sealants:
 - 1. Bostik Findley; www.bostikfindley-us.com.
 - 2. Pecora Corporation; www.pecora.com.
 - 3. TEC Specialty Products Inc.
 - 4. Tremco, Inc; www.tremcosealants.com.

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JOINT SEALERS

5. Substitutions: See Section 01600 - Product Requirements.
- D. Preformed Compressible Foam Sealers:
 1. Emseal Joint Systems, Ltd: www.emseal.com.
 2. Sandell Manufacturing Company, Inc: www.sandellmfg.com.
 3. Polytite Manufacturing Corporation: www.polytite.com.
 4. Substitutions: See Section 01600 - Product Requirements.

2.2 SEALANTS

- A. Type S1 - General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component.
 1. Color: As selected by Architect from Manufacturer's full line of colors.
 2. Applications:
 - a. Control, expansion and soft joints in masonry.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.
 - d. Other exterior joints for which no other sealant is indicated.
- B. Type S2 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.
 1. Color: As selected by Architect from Manufacturer's full line of colors.
 2. Applications:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces.
 - c. Other interior joints for which no other sealant is indicated.
- C. Type S3 - Acoustical Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
 1. Color: N/A.
 2. Applications:
 - a. For concealed locations only.
 - b. Sealant bead between top stud runner and structure; and between bottom stud track and floor.
- D. Type S4 - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Grade P, Class 25, Uses T, M and A; single component.
 1. Color: As selected by Architect from Manufacturer's full line of colors.
 2. Applications:
 - a. Approved by manufacturer for wide joints up to 1-1/2 inches.
 - b. Expansion joints in floors.
- E. Type S5 - Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Class 25, Uses T, I, M and A; single component.
 1. Color: As selected by Architect from Manufacturer's full line of colors.
 2. Applications:
 - a. Joints in sidewalks and vehicular paving.
 - b. Compressible filler joints adjacent to foundations.

2.3 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

SECTION 07900

JOINT SEALERS

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C 1193.
- C. Perform acoustical sealant application work in accordance with ASTM C 919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker where joint backing is not used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool joints concave.

3.4 CLEANING

- A. Clean adjacent soiled surfaces.

3.5 PROTECTION OF FINISHED WORK

- A. Protect sealants until cured.

3.6 SCHEDULE

- A. Exterior Joints for Which No Other Sealant Type is Indicated: Type S1; colors as selected.
- B. Control and Expansion Joints in Paving: Type S5.
- C. Exterior Wall Expansion Joints: Type S1.
- D. Joints Between Exterior Metal Frames and Adjacent Work (except masonry): Type S1.
- E. Interior Joints for Which No Other Sealant is Indicated: Type S2.
- F. Control and Expansion Joints in Interior Concrete Slabs and Floors: Type S4.
- G. In STC-Rated Walls, Between Metal Stud Track/Runner and Adjacent Construction: Type S3.
- H. Joints Between Plumbing Fixtures and Walls and Floors, and Between Countertops and Walls: Type S2.

END OF SECTION

SECTION 08255

FRP FLUSH DOOR SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Fiberglass reinforced polyester (FRP) flush doors with aluminum frames.

1.2 RELATED SECTIONS

- A. Section 08710 - Door Hardware.

1.3 REFERENCES

- A. AAMA 1503-98 - Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- B. ANSI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.
- C. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.
- D. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- E. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- F. ASTM D 256 - Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
- G. ASTM D 543 - Evaluating the Resistance of Plastics to Chemical Reagents.
- H. ASTM D 570 - Water Absorption of Plastics.
- I. ASTM D 638 - Tensile Properties of Plastics.
- J. ASTM D 790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- K. ASTM D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes
- L. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
- M. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
- N. ASTM D 2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging.
- O. ASTM D 2583 - Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
- P. ASTM D 5420 - Impact Resistance of Flat Rigid Plastic Specimens by Means of a Falling Weight.
- Q. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.
- R. ASTM E 84 - Surface Burning Characteristics of Building Materials.
- S. ASTM E 90 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
- T. ASTM E 283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- U. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- V. ASTM E 331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- W. ASTM F 476 - Security of Swinging Door Assemblies.
- X. ASTM F 1642-04 - Standard Test Method for Glazing Systems Subject to Air blast Loading
- Y. NWWDA T.M. 7-90 - Cycle Slam Test Method
- Z. SFBC PA 201 - Impact Test Procedures.
- AA. SFBC PA 203 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
- BB. SFBC 3603.2 (b)(5) - Forced Entry Resistance Test.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.
- B. Air Infiltration: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.24 psf. Door shall not exceed 0.90 cfm per linear foot of perimeter crack.
- C. Water Resistance: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.

SECTION 08255

FRP FLUSH DOOR SYSTEMS

- D. Swinging Door Cycle Test, Doors and Frames, ANSI A250.4: Minimum of 25,000,000 cycles.
- E. Cycle Slam Test Method, NWWDA T.M. 7-90: Minimum 5,000,000 Cycles.
- F. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.
- G. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503-98: Maximum of 0.29 BTU/hr x sf x degrees F. Minimum of 55 CRF value.
- H. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
 - 1. Flame Spread: Maximum of 200, Class C.
 - 2. Smoke Developed: Maximum of 450, Class C.
- I. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
 - 1. Flame Spread: Maximum of 25.
 - 2. Smoke Developed: Maximum of 450.
- J. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 15.0 foot-pounds per inch of notch.
- K. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.
- L. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.
- M. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.
- N. Indentation Hardness, FRP Doors and Panels, Nominal Value, ASTM D 2583: 55.
- O. Gardner Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 5420: 120 in-lb.
- P. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.
- Q. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to crayon and crankcase oil.
- R. Chemical Resistance, ASTM D 543. Excellent rating.
 - 1. Acetic acid, Concentrated.
 - 2. Ammonium Hydroxide, Concentrated.
 - 3. Citric Acid, 10%.
 - 4. Formaldehyde.
 - 5. Hydrochloric Acid, 10%
 - 6. Sodium hypochlorite, 4 to 6 percent solution.
- S. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.
- T. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi
- U. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi
- V. Thermal and Humid Aging, Foam Core, Nominal Value, 158 Degrees F and 100 Percent Humidity for 14 Days, ASTM D 2126: Minus 5.14 percent volume change.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.
- B. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections, and details, indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, hardware schedule, and finish.
- C. Samples:
 - 1. Door: Submit manufacturer's sample of door showing face sheets, core, framing, and finish.
 - 2. Color: Submit manufacturer's samples of standard colors of doors and frames.
- D. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
- E. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.
- F. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.
- G. Warranty: Submit manufacturer's standard warranty.

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FRP FLUSH DOOR SYSTEMS

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 25 years successful experience.
 - 2. Door and frame components from same manufacturer.
 - 3. Evidence of a compliant documented quality management system.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying opening door mark and manufacturer.
- B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
- C. Handling: Protect materials and finish from damage during handling and installation.

1.8 WARRANTY

- A. Warrant doors, frames, and factory hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.
- B. Warranty Period: Ten years starting on date of shipment. In addition, a limited lifetime (while the door is in its specified application in its original installation) warranty covering: failure of corner joinery, core deterioration, delamination or bubbling of door skin.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Special-Lite, Inc., www.special-lite.com.
- B. Simon Door Company, LLC; www.simondoor.com
- C. Substitutions: See Section 01600 – Product Requirements

2.2 FRP FLUSH DOORS

- A. Model: SL-17 Flush Doors with SpecLite3 fiberglass reinforced polyester (FRP) face sheets.
- B. Door Opening Size: As indicated on the Drawings.
- C. Construction:
 - 1. Door Thickness: 1-3/4 inches.
 - 2. Stiles and Rails: Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T5 alloy recovered from industrial processes, minimum of 2-5/16-inch depth.
 - 3. Corners: Mitered.
 - 4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom integral to standard tubular shaped stiles and rails reinforced to accept hardware as specified.
 - 5. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, glue, or other methods are not acceptable.
 - 6. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.
 - 7. Rail caps or other face sheet capture methods are not acceptable.
 - 8. Extrude top and bottom rail legs for interlocking continuous weather bar.
 - 9. Meeting Stiles: Pile brush weatherseals. Extrude meeting stile to include integral pocket to accept pile brush weatherseals.
 - 10. Bottom of Door: Install bottom weather bar with nylon brush weatherstripping into extruded interlocking edge of bottom rail.
 - 11. Glue: Use of glue to bond sheet to core or extrusions is not acceptable.
- D. Face Sheet:
 - 1. Material: FRP, 0.120-inch thickness, finish color throughout.

SECTION 08255

FRP FLUSH DOOR SYSTEMS

2. Protective coating: Abuse-resistant engineered surface. Provide FRP with protective coating, or equal.
3. Texture: To be chosen by Architect from manufacturer's full texture line.
4. Color: To be chosen by Architect from manufacturer's full color line.
5. Adhesion: The use of glue to bond face sheet to foam core is prohibited.
- E. Core:
 1. Material: Poured-in-place polyurethane foam.
 2. Density: Minimum of 5 pounds per cubic foot.
 3. R-Value: Minimum of 9.
- F. Hardware:
 1. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
 2. Factory install hardware.

2.3 MATERIALS

- A. Aluminum Members:
 1. Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T5 alloy recovered from industrial processes: ASTM B 221.
 2. Sheet and Plate: ASTM B 209.
 3. Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.
- B. Components: Door and frame components from same manufacturer.
- C. Fasteners:
 1. Material: Aluminum, 18-8 stainless steel, or other noncorrosive metal.
 2. Compatibility: Compatible with items to be fastened.
 3. Exposed Fasteners: Screws with finish matching items to be fastened.

2.4 FABRICATION

- A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated on the Drawings.
- B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.
- C. Assembly:
 1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
 2. Remove burrs from cut edges.
- D. Welding: Welding of doors or frames is not acceptable.
- E. Fit:
 1. Maintain continuity of line and accurate relation of planes and angles.
 2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

2.5 ALUMINUM DOOR FRAMING SYSTEMS

- A. Tubular Framing:
 1. Size and Type: As indicated on the Drawings.
 2. Materials: Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T5 alloy recovered from industrial processes, 1/8-inch minimum wall thickness.
 3. Applied Door Stops: 0.625-inch high, with screws and weatherstripping. Door stop shall incorporate pressure gasketing for weathering seal. Counterpunch fastener holes in door stop to preserve full metal thickness under fastener head.
 4. Frame Members: Box type with 4 enclosed sides. Open-back framing is not acceptable.
 5. Caulking: Caulk joints before assembling frame members.
 6. Joints:
 - a. Secure joints with fasteners.
 - b. Provide hairline butt joint appearance.
 7. Field Fabrication: Field fabrication of framing using stick material is not acceptable.

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FRP FLUSH DOOR SYSTEMS

8. Anchors:
 - a. Anchors appropriate for wall conditions to anchor framing to wall materials.
 - b. Door Jamb and Header Mounting Holes: Maximum of 24-inch centers.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPERATION

- A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

3.3 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions.
- B. Install doors plumb, level, square, true to line, and without warp or rack.
- C. Anchor frames securely in place.
- D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.
- E. Install exterior doors to be weathertight in closed position.
- F. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- G. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.4 ADJUSTING

- A. Adjust doors, hinges, and locksets for smooth operation without binding.

3.5 CLEANING AND PROTECTION

- A. Clean doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage finish.
- C. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 08710

DOOR HARDWARE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
 - 3. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 08 Section "Door Hardware Schedule".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series
 - 2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.

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DOOR HARDWARE

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
 - a. Keying Conference to occur prior to submitting door hardware schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Proof of Certification: Provide copy of manufacturer(s) official certification or accreditation document indicating proof of status as a qualified installer of Windstorm assemblies.
- E. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- F. Informational Submittals:
 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- G. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

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DOOR HARDWARE

- E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

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DOOR HARDWARE

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Ten years for mortise locks and latches.
 - 2. Seven years for heavy duty cylindrical (bored) locks and latches.
 - 3. Five years for exit hardware.
 - 4. Twenty five years for manual surface door closer bodies.
 - 5. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 – PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
- C. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- D. Substitutions: None permitted. Hardware listed is District Standard.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity, unless otherwise indicated
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

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DOOR HARDWARE

- a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
- b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
- 4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
- B. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 Grade 1-600 certified pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed teflon coated stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.

2.3 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
 - 1. Manual flush bolts to be furnished with top rod of sufficient length to allow bolt location approximately six feet from the floor.
 - 2. Furnish dust proof strikes for bottom bolts.
 - 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 - 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
- B. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
 - 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
 - 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
 - 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
 - 4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years' experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinders: Original manufacturer cylinders complying with the following:
 - 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 - 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 - 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 - 5. Keyway:
- D. District wide key system – Removable Core, Schlage 6 pin E Keyway, 0 bitted. Master Key System Code #470545
- E. Key Quantity: Provide the following minimum number of keys:
 - 1. Change Keys per Cylinder: Two (2)
 - 2. Master Keys (per Master Key Level/Group): Five (5).
 - 3. Construction Keys (where required): Ten (10).
- F. Construction Keying: Provide construction master keyed cylinders.

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- G. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.
- H. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
 - 1. Provide (1) key control cabinet per school.
- I. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into "Key Wizard" software.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Schlage ADA Lever Handled, type as specified below in Hardware Groups.
- B. Cylindrical Locksets, Schlage ADA Lever Handled, type as specified below in Hardware Groups.

2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 3. Strikes for Auxiliary Deadlocks: BHMA A156.5.
 - 4. Dustproof Strikes: BHMA A156.16.

2.7 ELECTRIC STRIKES

- A. Standard Electric Strikes: Heavy duty, cylindrical and mortise lock electric strikes conforming to ANSI/BHMA A156.31, Grade 1, UL listed for both Burglary Resistance and for use on fire rated door assemblies. Stainless steel construction with dual interlocking plunger design tested to exceed 3000 lbs. of static strength and 350 ft-lbs. of dynamic strength. Strikes tested for a minimum 1 million operating cycles. Provide strikes with 12 or 24 VDC capability and supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.
- B. Surface Mounted Rim Electric Strikes: Surface mounted rim exit device electric strikes conforming to ANSI/BHMA A156.31, Grade 1, and UL Listed for both Burglary Resistance and for use on fire rated door assemblies. Construction includes internally mounted solenoid with two heavy-duty, stainless steel locking mechanisms operating independently to provide tamper resistance. Strikes tested for a minimum of 500,000 operating cycles. Provide strikes with 12 or 24 VDC capability supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike. Strike requires no cutting to the jamb prior to installation.

2.8 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

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1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
6. Vertical Rod Exit Devices: Provide and install interior surface and concealed vertical rod exit devices as Less Bottom Rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

2.9 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
 4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
 5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates, and through-bolt and security type fasteners as required for proper installation.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to

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DOOR HARDWARE

be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

- C. Door Closers, Surface Mounted (Unitrol): Unitrol arms to have door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.

2.10 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, .050-inch thick.
4. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

2.11 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

2.12 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

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2.13 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.14 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

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DOOR HARDWARE

- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SCHEDULE

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. Manufacturer's Abbreviations:
 - 1. ADA – Adams Rite
 - 2. GLY – Glynn-Johnson
 - 3. IVE – Ives
 - 4. LCN – LCN / Allegion
 - 5. SCH – Schlage
 - 6. VON – Von Duprin
 - 7. ZER – Zero International

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DOOR HARDWARE

3.9 HARDWARE GROUPS

HARDWARE GROUP NO. 01

FOR USE ON DOOR #(S):

1

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224HD	628	IVE
1	EA	CONT. HINGE	224HD EPT	628	IVE
1	EA	POWER TRANSFER	EPT2	689	VON
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM W/DEADBOLT	L9480R 07A	626	SCH
1	EA	ELECTRIC STRIKE	6216 FSE	630	VON
1	EA	COORDINATOR	COR X FL	US28	IVE
2	EA	MOUNTING BRACKET	MB1	689	IVE
2	EA	OH STOP	90S J	630	GLY
2	EA	SURFACE CLOSER	4011	689	LCN
1	EA	GASKETING	328AA-S	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	625A-223	A	ZER
1	EA	GASKETING	188SBK PSA	BK	ZER
1	EA	POWER SUPPLY	PS902		VON

*CARD READER TO RELEASE ELECTRIC STRIKE.

*PRECISION CONTROLS CARD READER BY OTHERS.

*PRIMUS E KEYWAY (PRIMUS NUMBER P02286, LEVEL 3G).

END OF SECTION

SECTION 09511

SUSPENDED ACOUSTICAL CEILINGS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Acoustical ceiling panels.
- B. Suspension system.
- C. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

1.2 RELATED SECTIONS

- A. Division 15 – refer to drawings.
- B. Division 16 – Lighting, Lighting Systems, and Controls – refer to drawings and specifications.

1.3 REFERENCES

- A. Unless noted otherwise, the most current issue of the reference shall be used.
- B. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- C. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- D. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- E. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- F. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- G. ASTM C 636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- H. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- I. ASTM E 580 – Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint.
- J. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
- K. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.
- L. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products.
- M. ASTM E 1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- N. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- O. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components.
- D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.
- E. Samples: Submit two samples of each panel type; 12 x 12 inch in size illustrating material and finish of acoustical units.
- F. Samples: Submit two samples of each suspension system type; 12 inches long, of main runner, cross runner, and perimeter molding.
- G. Manufacturer's Installation Instructions: Indicate special procedures.

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SUSPENDED ACOUSTICAL CEILINGS

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
- B. Fire-Resistive Assemblies: Complete assembly listed and classified by UL for the fire resistance indicated.
- C. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - 1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
 - a. Flame Spread: 25 or less
 - b. Smoke Developed: 50 or less
- D. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- E. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain uniform temperature of minimum 60 degrees F and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.8 PROJECT CONDITIONS

- A. All ceiling products and suspension systems must be installed and maintained in accordance with manufacturer's written installation instructions for that product in effect at the time of installation and best industry practice.
- B. Prior to installation, the ceiling product must be kept clean and dry, in an environment that is between 32°F and 120°F and not subject to Abnormal Conditions. Abnormal conditions include exposure to chemical fumes, vibrations, moisture from conditions such as building leaks or condensation, excessive humidity, or excessive dirt or dust buildup.
- C. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- D. Install acoustical units after interior wet work is dry.

1.9 WARRANTY

- A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
 - 1. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
 - 2. Grid System: Rusting and manufacturer's defects
 - 3. Acoustical Panels designated as inherently resistive to the growth of micro-organisms: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
- B. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

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SUSPENDED ACOUSTICAL CEILINGS

1.10 EXTRA MATERIALS

- A. See Section 01600 - Product Requirements, for additional provisions.
- B. Provide 10 percent of total acoustical unit area of each type of acoustical unit for Owner's use in maintenance of project.

PART 2 – PRODUCTS

2.1 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc.: www.armstrong.com
 - 2. CertainTeed Ceilings: www.certainteed.com
 - 3. USG Interiors, Inc.: www.usg.com
 - 4. Substitutions: See Section 01600 - Product Requirements.
- B. Acoustical Units - General: ASTM E 1264, Class A.
 - 1. Units for Installation in Fire-Rated Suspension System: Listed and classified for the fire-resistive assembly the suspension system is a part of.
- C. Acoustical Panels – Type I: Painted mineral fiber, ASTM E 1264 Type III, with the following characteristics:
 - 1. Size: 24 x 48 inches.
 - 2. Thickness: 5/8 inches.
 - 3. Composition: Wet felted.
 - 4. Density: 1.05 lb/cu ft.
 - 5. Light Reflectance: 84 percent, determined as specified in ASTM E 1264.
 - 6. NRC Range: .55 to .65, determined as specified in ASTM E 1264.
 - 7. Edge: Square.
 - 8. Surface Color: White.
 - 9. Surface Pattern: Non-directional fissured.
 - 10. Products:
 - a. Armstrong: "Fine Fissured Medium Texture #1729".
 - b. CertainTeed: "Vantage 10 #VAN-197".
 - c. USG Interiors: "Radar ClimaPlus #2410".
 - 11. Suspension System: Exposed grid.

2.2 SUSPENSION SYSTEMS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc.: www.armstrong.com
 - 2. USG Interiors, Inc.: www.usg.com
 - 3. Chicago Metallic Corp.; www.chicagometallic.com
 - 4. Substitutions: See Section 01600 - Product Requirements.
- B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, and perimeter moldings as required.
- C. Exposed Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
 - 1. Profile: Tee, **15/16 inch wide face**.
 - 2. Finish: White painted.

2.3 ACCESSORIES

- A. Support Channels and Hangers: Match material and finish of suspension system; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as suspension system.
 - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Gasket for Perimeter Moldings: Closed cell rubber sponge tape.

SECTION 09511

SUSPENDED ACOUSTICAL CEILINGS

- D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.
- C. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.2 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.
- J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Install with continuous gasket.
 - 2. Use longest practical lengths.
 - 3. Overlap and rivet corners.
- K. Coordinate all existing pipe, conduit, and power pole penetrations through ceiling system. Provide trim plates at all penetrations to match finish of ceiling grid.

3.3 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile and finish as factory edges.
- G. Coordinate all existing pipe, conduit, and power pole penetrations through ceiling system. Provide trim plates at all penetrations to match finish of ceiling grid.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

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SUSPENDED ACOUSTICAL CEILINGS

3.5 ADJUSTING AND CLEANING

- A. Replace damaged and broken panels.
- B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.
- C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09900

PAINTS AND COATINGS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints, stains, varnishes, and other coatings.
- C. See Schedule - Surfaces to be Finished, at end of Section.

1.2 REFERENCES

- A. Unless noted otherwise, the most current issue of the reference shall be used.
- B. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.

1.3 DEFINITIONS

- A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two paper chip samples, 4 x 4 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years experience.

1.6 REGULATORY REQUIREMENTS

- A. Comply with applicable code for flame and smoke rating requirements for products and finishes.

1.7 MOCK-UP

- A. See Section 01400 - Quality Requirements, for general requirements for mock-up.
- B. Provide 8' x 8' panel as directed by Architect, illustrating special coating color, texture and finish.
- C. Provide door frame assembly illustrating paint color, texture and finish.
- D. Approved mock-up may remain as part of the work. Rejected mock-up must be re-done.

1.8 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

SECTION 09900

PAINTS AND COATINGS

1.10 EXTRA MATERIALS

- A. See Section 01600 - Product Requirements, for additional provisions.
- B. Supply 1 gallon of each color; store where directed.
- C. Label each container with color in addition to the manufacturer's label.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Paints:
 - 1. Glidden Professional; www.gliddenprofessional.com
 - 2. Benjamin Moore & Co.; www.benjaminmoore.com
 - 3. PPG Pittsburgh Paints; www.ppg.com
 - 4. Sherwin-Williams Co; www.sherwin-williams.com
- B. Transparent Finishes:
 - 1. Glidden Professional; www.gliddenprofessional.com
 - 2. Benjamin Moore & Co.; www.benjaminmoore.com
 - 3. PPG Pittsburgh Paints; www.ppg.com
 - 4. Sherwin-Williams Co; www.sherwin-williams.com
- C. Stains:
 - 1. Glidden Professional; www.gliddenprofessional.com
 - 2. Benjamin Moore & Co.; www.benjaminmoore.com
 - 3. PPG Pittsburgh Paints; www.ppg.com
 - 4. Sherwin-Williams Co; www.sherwin-williams.com
- D. Primer Sealers:
 - 1. Glidden Professional; www.gliddenprofessional.com
 - 2. Benjamin Moore & Co.; www.benjaminmoore.com
 - 3. PPG Pittsburgh Paints; www.ppg.com
 - 4. Sherwin-Williams Co; www.sherwin-williams.com
- E. Block Fillers:
 - 1. Glidden Professional; www.gliddenprofessional.com
 - 2. Benjamin Moore & Co.; www.benjaminmoore.com
 - 3. PPG Pittsburgh Paints; www.ppg.com
 - 4. Sherwin-Williams Co; www.sherwin-williams.com
- F. Substitutions: See Section 01600 - Product Requirements.

2.2 PAINTS AND COATINGS – GENERAL

- A. Paints and Coatings: Ready mixed, except field-catalyzed coatings. Prepare pigments:
 - 1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
 - 2. For good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.

2.3 PAINT SYSTEMS - EXTERIOR

- A. Paint ME-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
 - 1. One coat of alkyd primer.
 - a. Glidden Professional: 4360-XXXX Devguard Low VOC Multi-Purpose Tank & Structural Primer.
 - b. Benjamin Moore & Co.: P06 Super Spec HP® Alkyd Metal Primer
 - c. Sherwin-Williams Kem Bond HS, B50WZ Series
 - 2. Semi-gloss: Two coats of alkyd enamel.
 - a. Glidden Professional: GP2406-XXXX Fortis 350 Exterior 100 Percent Acrylic Semi-Gloss Finish.
 - b. Benjamin Moore & Co.: Moorcraft Super Spec Latex House & Trim #170
 - c. Sherwin-Williams A-100 Exterior Coating, A8 Series

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PAINTS AND COATINGS

- B. Paint MgE-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
1. Galvanize primer.
 - a. Glidden Professional: Devoe Coatings 4360 Devguard Low VOC Multi-Purpose Tank & Structural Primer.
 - b. Benjamin Moore: Super Spec HP® Acrylic Metal Primer P04
 - c. Sherwin Williams ProIndustrial ProCryl Metal Primer, B66-310 Series
 2. Gloss: Alkyd enamel.
 - a. Glidden Professional: Devoe Coatings 4309 Devguard Rust Preventative Gloss Enamel.
 - b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Gloss Enamel #P26
 - c. Sherwin-Williams ProIndustrial Industrial Urethane Alkyd Enamel, B54-150 Series
 3. Semi-gloss: Alkyd enamel.
 - a. Glidden Professional: Devoe Coatings 4306 Devguard Rust Preventative Semi-Gloss Enamel.
 - b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Semi-Gloss #P24
 - c. Sherwin-Williams Metalastic DTM Alkyd Enamel, B55 series

2.4 PAINT SYSTEMS – INTERIOR

- A. Paint WI-OP-3L - Wood, Opaque, Latex, 3 Coat:
1. Latex primer sealer.
 - a. Glidden Professional: GP3210 Gripper Interior/Exterior Primer.
 - b. Benjamin Moore: Fresh Start All Purpose 100% Acrylic Primer #046
 - c. Sherwin-Williams: Problock Latex Primer/Sealer, B51W20
 2. Gloss: Two coats of latex enamel.
 - a. Glidden Professional: GP3028 Ultra-Hide 250 Interior Gloss Paint.
 - b. Benjamin Moore: Super Spec HP Acrylic Gloss Enamel #P28
 - c. Sherwin-Williams: All Surface Enamel Latex Gloss, A41 Series
 3. Semi-gloss: Two coats of latex enamel.
 - a. Glidden Professional: GP1416 Ultra-Hide 150 Interior Semi-Gloss Paint.
 - b. Benjamin Moore: Super Spec Latex Semi-Gloss Enamel #276
 - c. Sherwin-Williams: ProMar 400 Interior Latex Semi-Gloss, B31-4450 Series
 4. Eggshell: Two coats of latex enamel.
 - a. Glidden Professional: GP1412 Ultra-Hide 150 Interior Eggshell Paint.
 - b. Benjamin Moore: Super Spec Latex Eggshell Enamel #274
 - c. Sherwin-Williams: ProMar 400 Interior Latex EgShel, B20-4450 Series
 5. Flat: Latex enamel.
 - a. Glidden Professional: GP1210 Ultra-Hide 150 Interior Flat Paint.
 - b. Benjamin Moore: Super Spec Latex Flat #275
 - c. Sherwin-Williams: ProMar 400 Interior Latex Flat, B30-4450 Series
- B. Paint WI-TR-VS - Wood, Transparent, Varnish, Stain:
1. Filler coat.
 2. One coat of stain; All colors to be selected by Architect from manufacturer's full range-maximum 3 colors.
 - a. Glidden Professional: GP1700V WoodPride Water-Based Interior Wood Stain.
 - b. Benjamin Moore: Benwood® Interior Wood Finishes Waterborne Stain 205
 - c. Sherwin-Williams: WoodClassics 250 Oil Stain, A49 Series
 3. Gloss: Two coats of varnish.
 - a. Glidden Professional: GP1808 Woodpride Interior Gloss Water-Based Varnish.
 - b. Benjamin Moore & Co.: Benwood Finishes® Polyurethane Finish High Gloss 428
 - c. Sherwin Williams WoodClassics WB Polyurethane Gloss, A68V91
 4. Satin: Two coats of varnish.
 - a. Glidden Professional: GP1802 Woodpride Interior Satin, Water-Based Varnish.
 - b. Benjamin Moore & Co.: Benwood Finishes® Polyurethane Finish Low Lustre C435
 - c. Sherwin Williams WoodClassics WB Polyurethane Satin, A68F90
- C. Paint CI-OP-3L - Concrete/Masonry, Opaque, Latex, 3 Coat:

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1. Primer.
 - a. Glidden Professional: GP3210 Gripper Interior /Exterior Primer
 - b. Benjamin Moore: Fresh Start All Purpose 100% Acrylic Primer #046
 - c. Sherwin-Williams: Problock Latex Primer/Sealer, B51W20
2. Semi-gloss: Latex enamel.
 - a. Glidden Professional: GP1416 Ultra-Hide 150 Interior Semi-Gloss Paint
 - b. Benjamin Moore: Super Spec Latex Semi-Gloss Enamel #276
 - c. Sherwin-Williams: ProMar 400 Interior Latex Semi-Gloss, B31-4450 Series
3. Flat: Latex enamel.
 - a. Glidden Professional: GP1210 Ultra-Hide 150 Interior Flat Paint
 - b. Benjamin Moore: Super Spec Latex Flat #275
 - c. Sherwin-Williams: ProMar 400 Interior Latex Flat, B30-4450 Series
- D. Paint MI-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
 1. One coat of alkyd primer.
 - a. Glidden Professional: Devoe Coatings 4360 Devguard Low VOC Multi-Purpose Tank & Structural Prime.
 - b. Benjamin Moore: P06 Super Spec HP® Alkyd Metal Primer
 - c. Sherwin-Williams: Kem Bond HS Metal Primer, B50WZ Series
 2. Gloss: Two coats of alkyd enamel.
 - a. Glidden Professional: Devoe Coatings 4309 Devguard Rust Preventative Gloss Enamel.
 - b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Gloss Enamel #P26
 - c. Sherwin-Williams: ProIndustrial Industrial Urethane Alkyd Enamel, B54-150 Series
 3. Semi-gloss: Two coats of alkyd enamel.
 - a. Glidden Professional: Devoe Coatings 4306 Devguard Rust Preventative Semi-Gloss Enamel.
 - b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Semi-Gloss #P24
 - c. Sherwin-Williams: Metalastic DTM Alkyd Enamel, B55 Series
- E. Paint MI-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
 1. Touch-up with alkyd primer.
 - a. Glidden Professional: Devoe Coatings 4360 Devguard Low VOC Multi-Purpose Tank & Structural Primer.
 - b. Benjamin Moore: P06 Super Spec HP® Alkyd Metal Primer
 - c. Sherwin-Williams: Kem Bond HS Metal Primer, B50WZ Series
 2. Gloss: Two coats of alkyd enamel.
 - a. Glidden Professional: Devoe Coatings 4309 Devguard Rust Preventative Gloss Enamel.
 - b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Gloss Enamel #26
 - c. Sherwin-Williams: ProIndustrial Industrial Urethane Alkyd Enamel, B54-150 Series
 3. Semi-gloss: Two coats of alkyd enamel.
 - a. Glidden Professional: Devoe Coatings 4306 Devguard Rust Preventative Semi-Gloss Enamel.
 - b. Benjamin Moore: Super Spec HP D.T.M. Alkyd Semi-Gloss #P24
 - c. Sherwin-Williams: Metalastic DTM Alkyd Enamel, B55 Series
- F. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
 1. One coat of fast-drying latex primer sealer.
 - a. Glidden Professional: 1000 High-Hiding Interior Primer.
 - b. Benjamin Moore: Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer #253
 - c. Sherwin-Williams: ProMar 400 Interior Latex Primer, B28W8400
 2. Semi-gloss: Latex enamel.
 - a. Glidden Professional: GP1416 Ultra-Hide 150 Interior Semi-Gloss Paint.
 - b. Benjamin Moore: Super Spec Latex Eggshell Enamel #274
 - c. Sherwin-Williams: ProMar 400 Interior Latex Semi-Gloss, B31-4450 Series

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3. Eggshell: Latex enamel.
 - a. Glidden Professional: GP1412 Ultra-Hide 150 Interior Eggshell Paint.
 - b. Benjamin Moore: Super Spec Latex Eggshell Enamel #274
 - c. Sherwin-Williams: ProMar 400 Interior Latex EgShel, B20-4450 Series
4. Flat: Latex enamel.
 - a. Glidden Professional: GP1210 Ultra-Hide 150 Interior Flat Paint.
 - b. Benjamin Moore: Super Spec Latex Flat #275
 - c. Sherwin-Williams: ProMar 400 Interior Latex Flat, B30-4450 Series

2.5 ACCESSORY MATERIALS

- A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Plaster and Gypsum Board: 12 Percent
 2. Masonry, Concrete and Concrete Masonry Unit: 12 Percent
 3. Interior Wood: 15 Percent, measured in accordance with ASTM D 4442.
 4. Concrete Floors: 8 Percent.

3.2 PREPARATION

- A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- C. Marks: Seal with shellac those which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- F. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- H. Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
- I. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

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- J. Interior Wood Items to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- K. Interior Wood Items to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- L. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.
- M. Metal Doors to be painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Refer to Section 15075 and Section 16075 for schedule of color coding of equipment, duct work, piping, and conduit.
- B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- C. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 CLEANING

- A. Collect waste material, which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 SCHEDULE - SURFACES TO BE FINISHED

- A. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically noted.
 - 2. Fire rating labels, equipment serial number and capacity labels.
- B. Paint the surfaces described below under Schedule - Paint Systems.
- C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
 - 1. Paint all insulated and exposed pipes occurring in finished areas to match background surfaces, unless otherwise indicated.
 - 2. Paint shop-primed items occurring in finished areas.
 - 3. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - 4. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

3.7 SCHEDULE - PAINT SYSTEMS

- A. Concrete, Concrete Block, Brick Masonry: Finish all surfaces exposed to view.
 - 1. Exterior: CE-OP-3A, flat.
 - 2. Interior: CI-OP-3L, semi-gloss.
- B. Gypsum Board: Finish all surfaces exposed to view.
 - 1. Interior Ceilings and Bulkheads: GI-OP-3L, flat.
 - 2. Interior Walls: GI-OP-3A, semi-gloss.
- C. Wood Doors: WI-TR-VS.
- D. Steel Doors and Frames: Finish all surfaces exposed to view; MI-OP-3A, gloss.

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- E. Steel Fabrications: Finish all surfaces exposed to view.
 - 1. Exterior: ME-OP-3A, gloss; finish all surfaces, including concealed surfaces, before installation.
 - 2. Interior: MI-OP-3L, gloss.
- F. Shop-Primed Metal Items: Finish all surfaces exposed to view.
 - 1. Finish the following items:
 - a. Exposed surfaces of lintels.
 - b. Elevator pit ladders.
 - c. Exposed surfaces of steel stairs and railings.
 - d. Mechanical equipment.
 - e. Electrical equipment.

3.8 SCHEDULE

- A. PT-1: Field Color 1
- B. PT-2: Exposed Metal Deck and Structure Paint
- C. PT-3: Exterior Steel Lintel
- D. PT-4: Match Existing Door and Frame Color
- E. PT-5: To be selected by Architect During Construction
- F. Additional colors may be required for miscellaneous patching and painting throughout the project. The Contractor shall verify in-field, and match to existing, adjacent surfaces.

END OF SECTION

SECTION 16050

ELECTRICAL WORK GENERAL CONDITIONS

PART 1 - GENERAL

- A. Drawings and General Provisions of Contract, including General Conditions and Special provisions, Division 1, apply to work of Division 16.
- B. This Section is a part of each Division 16 section as applicable to the work specified therein.

1.1 DESCRIPTION OF WORK:

- A. The articles under this section form a part of electrical work contracts.
- B. Provide the complete Electrical System as shown on the drawings and specified herein. Such work includes, but is not limited, to the following:
 - 1. Power distribution panelboards
 - 2. Motor control centers, starters and control wiring
 - 3. Safety disconnect switches
 - 4. Pull boxes and cabinets
 - 5. Receptacles, devices, switches and special outlets
 - 6. Branch circuit conduit and wiring
 - 7. Grounding systems
 - 8. Lighting fixtures and lamps (Note: All lamps to be installed at substantial completion. Any lamps used prior to substantial completion must be replaced)
 - 9. Control panels, control devices and system wiring
 - 10. Wiring equipment installed by others
 - 11. Receiving, unload, store, protect, install, wire, connect and test equipment furnished by others
 - 12. Conduit for communication systems
 - 13. Temporary power and lighting with lamps
 - 14. Temperature control system and wiring of all HVAC equipment
 - 15. Process control and system wiring of equipment

1.2 STANDARDS:

- A. Work shall conform with federal and local codes having jurisdiction. All material and equipment shall be new and conform to NEMA, Underwriters' Laboratories, Inc., ANSI, and IEEE Standards.
- B. All work shall be installed with code jurisdiction as a minimum requirement. All work shall be installed as specified or as required by code.
- C. In cases of difference between building codes, specifications, state laws, federal and local ordinances, industry standards, and utility company regulations, and the contract documents, the most stringent shall govern. The contractor shall promptly notify the Architect/Engineer in writing of any such differences prior to installation of work.
- D. Should contractor perform any work that does not comply with requirements of applicable building codes, state laws, federal and local ordinances, industry standards, and utility company regulations, he shall bear all costs arising for correction of non-complying items.
- E. The use of equipment or materials containing P.C.B.s (polychlorinated biphenols) and/or asbestos is not permitted.

1.3 PRODUCTS, MATERIALS, AND WORKMANSHIP:

- A. Materials used through this installation shall be the best of their respective kind and the same shall be installed in a neat, accurate, and workmanlike manner, and in a manner to permit the work of other trades to also be installed wherever the work covered by this specification meets with, or must be considered, in connection with the work of other trades working on this installation. This workmanship and these materials must be executed and furnished in a manner entirely satisfactory to the Architect and the Engineer.

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- B. Wherever in the specifications, a particular article or material is definitely mentioned, it shall be provided and no substitutions shall be allowed, especially insofar as the submittal of the base bid is concerned. Should this contractor desire to substitute other materials for those specified, he may submit these substitutions in the form of voluntary alternates to the base bid, designating appropriate additions or deductions for each alternate. Should no alternates be submitted, the contract shall be entered into on the basis of the specified base bid equipment. Final review of equipment shall be by the Architect/Engineer. Voluntary alternates will only be recognized at the time of bid.
- C. A specification item followed by one (1) or more manufacturers; names of other manufacturers may be submitted for review to the Architect/Engineer a minimum of seven (7) days prior to receiving bids. Acceptance will be granted only if issued by addendum (no exceptions).
- D. A specification item followed by one (1) or more manufacturers and "or equal" is open to all equal products or materials. However, contractor shall supply one (1) of the listed manufacturers at no additional cost if Engineer determines substituted product unsatisfactory.
- E. Lighting substitution requests shall include the following:
 - 1. Specified and proposed manufacturer's product data sheet, noting options and features.
 - 2. Provide dimensioned drawing of luminaire.
 - 3. Provide photometric data in form of an electronic IES file on 3-1/2" on CD, for use in a recognized computer lighting program.
 - 4. Substitution supplier shall perform complete photometric studies for Engineer evaluation to prove fixture performance meets or exceeds specified fixture. Final decision by the Engineer.
 - 5. Fixtures not meeting the performance level of the specified fixtures, in the opinion of the Engineer, will not be allowed.
 - 6. Fixtures not meeting the quality level and appearance criteria of the specified luminaires, in the opinion of the Engineer, will not be allowed.
- F. Electrical items of identical or similar characteristics shall be of the same manufacturer to facilitate maintenance and spare parts.
- G. All equipment requiring servicing shall be selected from manufacturers who have local dealers or distributors when possible. In any case, contractor shall deliver a complete inventory of installed items listing the source for servicing, spare parts and replacement units.

1.4 SHOP DRAWINGS AND REVIEW OF MATERIALS:

- A. Architect/Engineer shall review all materials, equipment, fixtures, motor control centers, panelboards, control panels, etc., and other appurtenances provided for this work before proceeding with the purchase and installation.
- B. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Architect to ascertain that the proposed equipment/fixtures and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment/fixtures being submitted.
- C. Submittals for individual systems and equipment assemblies, which consist of more than one item or component, shall be made for the system as a whole. Where necessary, submit plans of the system drawn on sheet sizes same as the contract drawings. Partial submittals will not be considered for review.
- D. Contractor shall submit six (6) shop drawing copies for all equipment for review by the Architect/Engineer. All equipment, conduit, light fixtures, etc. installed before submission and review of shop drawings is subject to removal and relocation at the contractor's expense as directed by the Architect/Engineer.
- E. Engineer's review of shop drawings will be rendered as a service only and shall not be considered as a guarantee of measurements or of building conditions, nor shall it be construed as relieving the contractor of basic responsibilities under his contract.

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- F. If the shop drawings show variations from contract requirements because of shop practice or other reasons, contractor shall make specific reference to such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise contractor will not be relieved of the responsibility for executing the work in accordance with contract documents even though such shop drawings have been reviewed.
- G. All shop drawings shall be submitted to permit Architect/Engineer ample time to review before material is released for delivery to job.
- H. Contractor shall maintain a permanent file of shop drawings to turn over to Architect at completion of project.

1.5 PERMITS AND FEES:

- A. Obtain and pay for all licenses, permits, and inspections for all work covered by this contract. Final Certificate of Inspection shall be delivered to the Architect before application is made for final payment.
- B. Immediately correct all work which is found unacceptable by the Architect/Engineer; work shall be considered unacceptable when it is contrary to the plans and/or specifications and/or the National Electric Code, local jurisdiction, and/or accepted standards of good workmanship.

1.6 RECORD DRAWINGS:

- A. Provide to Architect one (1) complete set of sepia mylar tracings, two (2) sets of prints (as installed), and one (1) electronic file showing complete electrical plans with all changes correctly shown thereon. Plans shall include the actual routing of raceways larger than 2".
- B. Provide complete set of shop drawings bound in permanent binder.
- C. Provide typewritten list of each type, quantity and manufacturer of lamp installed.
- D. Provide typewritten list of each type, quantity, size and manufacturer of fuse, motor overload heater, etc., installed.
- E. Provide a complete list of all replaceable components for maintenance purposes.

1.7 MAINTENANCE & OPERATING MANUALS:

- A. Maintenance and Operation Manual, submit as required for systems and equipment specified in the technical sections. Furnish five (5) copies, bound in hardback binders, manufacturer's standard binders or an approved equivalent. Furnish one complete manual as specified in the technical section but in no case later than prior to performance of systems or equipment test and furnish the remaining manuals prior to contract completion.
- B. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, equipment, building, name of contractor and contract number. Include in the manual the names, addresses and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.
- C. Provide a "Table of Contents" and assemble the manual to conform to the table of contents, with tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.
- D. The manual shall include:
 - 1. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment
 - 2. A control sequence describing start-up, operation and shutdown
 - 3. Description of the function of each principal item of equipment
 - 4. Installation and maintenance instructions
 - 5. Safety precautions
 - 6. Diagrams and illustrations
 - 7. Testing methods

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8. Performance data
9. Lubrication schedule including type, grade, temperature range and frequency
10. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts and name of servicing organization.
11. Appendix list qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.

1.8 POSTED OPERATING INSTRUCTIONS:

- A. Furnish approved operating instructions for systems and equipment indicated in the technical sections for use by operation personnel. The operating instructions shall include wiring diagrams, control diagrams and control sequence for each principal system and equipment. Print or engrave operating instructions and frame under glass or in approved laminated plastic. Post instructions where directed. Attach or post operating instructions adjacent to each principal system and equipment including start-up, operating, shutdown, safety precautions and procedure in the event of equipment failure. Provide weather-resistant materials or weatherproof enclosures for operating instructions exposed to the weather. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal.

1.9 MANUFACTURER'S RECOMMENDATIONS:

- A. Where installation procedures or any part thereof are required to be in accordance with manufacturers' recommendations, furnish printed copies of the recommendations prior to installation. Installation of the item shall not proceed until recommendations are received. Failure to furnish recommendations shall be cause for rejection of the equipment or material.

1.10 CODES:

- A. The electrical system shall comply with the latest edition of National Electrical Code, hereinafter referred to as "code." The electrical equipment and installation shall also conform to the requirements of the National Fire Protection Association, Americans with Disabilities Act, local electric utility company, and all other local and municipal bureaus and departments which have authority over the project; anything in these specifications or shown on the drawings contrary to these requirements notwithstanding. This shall not be construed as waiving compliance with any requirements of the plans and specifications which may be excess of any requirements or providing such work as may be required by said organizations and codes even though work may not be shown on drawings or specified.

1.11 EXISTING HAZARDS:

- A. Contractor to field verify if existing asbestos will be encountered prior to starting work. If asbestos is present, promptly notify the Owner. It will be the contractor's responsibility to take any and all steps necessary to protect all persons involved with construction and all persons at, and in the vicinity of, the site from asbestos until asbestos abatement services are provided by the Owner. The contractor assumes all liabilities resulting from asbestos exposure in connection with this project and agrees to hold the Owner and Architect harmless in regard to this matter for the period beginning from the discovery of asbestos until asbestos abatement work is started.

1.12 COORDINATION:

- A. Lay out all work to be installed in consultation with the Architect in coordination with all trades engaged on this project. Cooperate with all other trades in order to coordinate all work and eliminate conflicts between this work and that of other trades. Cooperate with all other trades to coordinate all work to maintain maximum accessibility and serviceability to all equipment, dampers, valves, etc.

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- B. This contractor shall be fully responsible for all conflicts between this work and that of other trades engaged on this project.
- C. Any and all lighting, conduit, cable tray, low voltage devices and wiring, which have been installed without checking for interferences and without maintaining maximum accessibility and serviceability, shall be modified without additional expense to the Owner.
- D. Trade priority list shall be as follows unless Architect directs otherwise:
 - 1. Electrical Lighting Fixtures
 - 2. Mechanical Grilles and Diffusers
 - 3. Mechanical Ductwork
 - 4. Electrical Conduit
 - 5. Piping Systems Cable Tray
 - 6. Low Voltage Devices and Wiring

PART 2 - MATERIALS (Not Applicable)

PART 3 - EXECUTION

3.1 ERECTION AND WORKMANSHIP:

- A. Adapt all work to job conditions and make such changes as required and permitted by the Architect, such as moving his work to avoid interferences with openings, ductwork, etc., all as required or as job conditions dictate, without any extra cost. Coordinate work with other trades before fixing location of outlets, conduits, cabinets, etc.
- B. Material and equipment shall be installed and connected with the best engineering practice and in accordance with the manufacturer's instructions and recommendations. Fittings, connections, etc., recommended by the manufacturer or as required for proper operation, shall be provided without any additional cost.

3.2 LAYING OUT WORK:

- A. Work to be installed under this Section be laid out in consultation with the Architect and in coordination with all work specified in other sections of the specifications.
- B. Equipment shall be installed with ample space allowed for its removal for repairs or changes. Ready accessibility to removable parts of equipment and to wiring shall be provided so that other equipment, in place or to be installed, need not be moved at any time.
- C. Sufficient access for the installation of electrical equipment shall be determined prior to delivery.
- D. Compare all contract drawings and specifications to determine the intent of the two together. In case of any discrepancy between the drawings and specifications, the matter shall be referred to the Architect/Engineer before any work is installed. The interpretation of the intent shall rest solely with the Architect/Engineer, and his decision shall be considered final.
- E. Refer to the architectural structural plans, etc., for all construction details, and large scale drawings and equipment shop drawings of equipment being furnished under other specification sections, for exact location of electrical outlets and connections required.
- F. Any changes of the electrical layout necessary to make the work conform to the entire facility as constructed, fit the work of other trades, or conform to the rules of the city and state and/or other regulating bodies (Public Health, NFPA, etc.) shall be made without additional cost.
- G. Omission in the contract drawings and/or specifications of any items necessary for the proper completion or operation of the work outlined in this specification shall not relieve the contractor from furnishing same without additional cost.
- H. Provide proper size lugs in all electrical equipment for connections to feeder/conductor sizes as shown on the drawings. Coordinate with equipment supplier.

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3.3 JURISDICTION OF WORK:

- A. Whenever it becomes necessary for the complete fulfillment of this specification to furnish labor or materials, other than that which is generally accepted by trade agreement or general practice to belong to his particular trade or branch of work, he shall sublet such work or shall employ workmen regularly employed, to the end that there will be no delay or stoppage of work due to infringement or alleged infringement of trade agreements as to jurisdiction.

3.4 OPERATION:

- A. Equipment and systems or portions thereof, which are a part of this contract, shall be ready for continuous and satisfactory operation, in a manner acceptable to the Architect/Engineer.

3.5 DUST PROTECTION:

- A. Temporary partitions or barriers required to protect equipment shall be provided as required. Maintain a safe clean work area with daily clean-up.

3.6 EXAMINATION OF SITE:

- A. Visit and carefully examine the site in and on which this work is to be performed and examine conditions that will affect this contract. Proper allowances shall be included in bid to cover unforeseen conditions at the project site.
- B. The Architect will receive the bid with an understanding that the contractor has complete knowledge of the conditions at the site and the requirements of this specification and included proper allowances in his bid for contingencies.

3.7 STORING ELECTRICAL EQUIPMENT AND MATERIALS:

- A. Store electrical materials and equipment prior to installation in a dry location to avoid corrosion and damage from moisture.
- B. Switchgear, panelboards, fixtures, and other electrical equipment stored on site shall be adequately protected to exclude dust, moisture and vermin.
- C. Locate on site and schedule delivery as directed by Architect.

3.8 CARE AND PROTECTION:

- A. Exposed surfaces of all material and equipment provided under this contract shall be protected against oxidation and rusting.
- B. Touch-up all damaged prefinished surfaces as required or as directed by the Architect before completion of the installation.
- C. All material and equipment furnished under this specification shall be left in a clean, presentable condition to the satisfaction of the Architect.
- D. All panels and cabinets, starters, motors, lighting fixtures, etc., shall be clean of dust, plaster, or other debris before the Owner takes possession of the building. All contacts in the above equipment and control equipment shall be free from dust deposits.

3.9 IDENTIFICATION:

- A. Provide identification for each distribution and lighting panel with a typewritten directory accurately indicating rooms and/or equipment being serviced, sealed in plastic and attached to door interior, etc. Note: Each index shall be sequenced in accord with actual panel circuiting (i.e.: left side - 1, 3, 5, 7, etc., right side - 2, 4, 6, etc.). Standard cards printed 1, 2, 3, etc., will not be acceptable.

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- B. Identify all safety switches, panelboards, motor control centers, motor starters, remote control pushbutton stations, etc., with engraved plastic nameplates. Nameplates shall be mechanically fastened to equipment substrate. Where fasteners cannot or should not penetrate the substrate, use a permanent adhesive.
- C. The nameplates shall be in addition to the manufacturer's marking/identification tags required by NEMA/NEC requirements. The nameplates shall be 1-1/4" x 3" white with black core, plastic. Secure with two (2) #40 self-tapping screws. Lettering shall be engraved, 1/4" high minimum. Submit list of identification plate wording to Architect for review before engraving same.
- D. Plastic field applied tag markers shall be placed at both terminating points of each feeder and control wire, and at each intermediate point where it is spliced or connected to a terminal block within a terminal box or piece of electrical equipment such as a starter or control panel.
- E. All electrical conduit which is accessible of maintenance operations (except conduits in finished spaces) including conduits in Equipment Rooms, above lay-in ceilings, and all unoccupied and/or unfinished spaces accessible, shall be identified with approved stencils or semi-rigid plastic identification markers equal to "Setmark" pipe markers, electrical marker, or equal.
- F. Setmark Type "SNA" snap-around electrical markers (or approved equal by SETON or NEBCO) to be used on diameters 3/4" through 5".
- G. Covers of junction boxes (inside and outside) shall be labeled or stenciled (in lieu of conduit) with approved permanent labels denoting voltage inside box (for single phase legs, label voltage to ground; for two (2) or more phase legs, label the phase-to-phase voltage and combinations shall be suitably labeled).
- H. All devices that are located remote from their main circuit protective device shall have approved identification installed where and as directed which indicates the origin of the power supply and location of main protective device, (i.e.: "Feeder #3, Main Switchboard - Circuit 13", etc.) as is applicable.
- I. Provide "Danger - 480 Volts" (red with white letters) warning signs on all 480 volt equipment.

3.10 FINAL COMPLETION:

- A. Work shall be cleaned prior to the date of "Substantial Completion" as determined by the Architect.
- B. Clean equipment, restore all damaged materials, remove grease, oil, chemicals, paint spots and/or stains, etc., and generally leave the work in A-1 condition.
- C. Retouch and/or repaint all factory painted prime and/or finish coats where scratched or damaged. Whenever retouching will not be satisfactory, in the opinion of the Architect/Engineer, the Architect/Engineer has the option to require complete repainting until the desired appearance is obtained.
- D. Lamps, fixtures, lenses, reflectors, etc., shall be cleaned and not sooner than ten (10) days prior to date of substantial completion.
- E. Remove from site all tools, equipment, surplus materials, and rubbish pertaining to contract work and include all costs for such removal and disposition. All rubbish left will be removed by Owner and services for same shall be back-charged to contractor against final payout on contract.

3.11 DEMONSTRATION OF COMPLETED SYSTEMS:

- A. Verify completed systems and arrange date agreeable with Owner for a demonstration of completed systems. Demonstrate, at time of completion, to the Architect, in the presence of the Engineer, the essential features of the electrical allied systems and their compliance with the specifications. Riser diagram and relation to function of equipment and corresponding location in the project structure shall be demonstrated.
- B. Show by start/stop operation, etc., the manner of control, resetting of protective devices and the replacement of fuses, etc.

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- C. Demonstrate area lighting and show the location of panelboards, dimmers, time switches and settings, etc.
- D. Include a total of 16 hours for demonstration purposes. Hours and arrangement to be scheduled by Architect. All demonstration must be video recorded by the contractor and two (2) copies provided to the Architect.

3.12 EXCAVATION AND BACKFILLING:

- A. Excavations are to be conducted so that no walls or footings are disturbed or injured in any way. Remove all surplus earth not needed for backfilling and dispose of same on the premises or as directed. Backfill shall be clean sand, free of roots, debris, and organic materials, and shall be firmly tamped in place in 8" increments.
- B. Trenches shall be opened in a straight line and bottomed out at least 4" below conduits or ducts. Exterior trenches shall have a depth which shall maintain minimum 36" depth between top of largest conduit or duct and finish grade.
- C. Where roots of live trees are encountered in excavations, they shall be carefully protected during construction. Cut or remove interfering trees, remove all stumps, rocks, etc., in the line of the excavation; however, Architect shall determine if any tree is removed or cut. Any shrubbery in line of excavation shall be removed with a ball of dirt and replaced at completion of excavation.
- D. Where excavation is necessary in an existing lawn, carefully remove and store sod. After backfilling trench, replace sod or apply top dressing of black dirt and seed to match existing lawn. Care shall be exercised during the work to see that no unnecessary damage is done to lawns in the storing of dirt or other construction material. Damaged areas shall be reconditioned to original condition.
- E. Where excavation is necessary in existing paved or concrete areas, saw cut surface in straight line and patch to match existing construction and surfaces.
- F. Provide and maintain warning barricades, flags, warning lights, etc., and conduct work so as to create a minimum amount of inconvenience to others, traffic construction, and the like. Temporary suspension of work does not relieve the responsibility for the above requirements.
- G. Provide OSHA approved marker tape 12" above buried electric line (i.e.: cable in conduit or direct burial (cable)) identifying "Electric lines 12" below this tape."

3.13 TESTS:

- A. During the course of construction, verify that electrical characteristics of all equipment is proper before connecting same and conduct the following tests or adjustments on the electrical installation:
 - 1. The service entrance ground shall be tested in accordance with IEEE Standards, two (2) point method. Grounding system electrode shall be provided to limit the resistance to ground to less than 5 ohms. This test is to include measuring the resistance of the grounding electrodes and checking the continuity of the grounding system. Submit results to the Architect/Engineer, as requested.
 - 2. Verify motors for proper rotation prior to operation.
 - 3. Test all motor controls for proper operations.
 - 4. All general purpose type transformers (i.e.: 480v, 3ph, 3W primary to 208/120v, 3ph, 4w- or 480v single phase to 240/120v single phase, 3 wire). Neutral shall be properly grounded on the secondary side as required by code.
 - 5. Test all duplex receptacles for proper polarity and grounding. Measure voltages between neutral and ground. This value shall not be more than 2 volts. Check for other voltage abnormalities such as floating voltage, etc. Investigate the cause of floating voltage or neutral to ground voltage values exceeding 2 volts. Provide corrective measures in an approved manner and as required.

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6. Provide three (3) typewritten copies of the recordings in bound booklets prior to request for final payment.
7. Demonstrate by tests, at the request of the Engineer or the Architect, the compliance of the installation with these specifications, the drawings, the National Electric Code, and the accepted standards of good workmanship. These tests shall include operation of lights and equipment, continuity of the conduit system, grounding resistances, and insulation resistances on not more than ten (10) representative circuits and any other circuits for which a justifiable reason exists for such tests. All labor and testing equipment for the performance of these tests shall be furnished by the contractor.
8. All SPD units installed shall be tested prior to installation. Provide test results in test reports.

3.14 CUTTING AND PATCHING:

- A. Contractor shall include all cutting and patching of masonry, concrete, sheet metal or iron work belonging to the construction which must be done in order that the electrical work may be properly installed. Disturbed construction or finish must be replaced or "patched-to-match" to the Architect's satisfaction. Under no condition shall structural work be cut except upon review of the Architect.
- B. Cutting through floors, walls, and partitions is to be avoided and only where indicated on drawings and where necessary will same be permitted. When it is necessary, cutting shall be done with a power drill in a careful manner and openings filled as directed.

3.15 DAMAGE:

- A. Contractor shall be responsible for all damage caused by this work. All costs for patching, replacement or repairing shall be included in the contract.

3.16 PROVISIONS FOR LATER INSTALLATION:

- A. Where any electrical work cannot be installed as the structure is being erected, provide and arrange for the building-in of boxes, sleeves, inserts, fixtures, or devices necessary to permit installation of the omitted work during later phase of construction. Arrange for any lay-out, chases, holes, or other openings which must be provided in masonry, concrete or other work.

3.17 CONCRETE WORK:

- A. Concrete work required in the electrical contract shall be provided as indicated on drawings or in the specifications.
- B. Provide 3" high concrete curb with sloped top around all exposed conduits passing through floor and under all floor mounted electrical equipment.

3.18 STRUCTURAL DIFFICULTIES:

- A. Should any structural difficulties prevent the installation of any electrical work at points shown on the drawings, minor deviations therefrom, as approved by the Architect, may be permitted and must be made without additional cost.

3.19 UNIT PRICES:

- A. Submit as requested an "Electrical Work - Unit Price Schedule:"
 1. Changes in electrical plans showing relocations or rearrangements which do not add to the amount of materials required shall not be subject to extra cost.
 2. Only the net quantity of material added to or deducted from the job shall be figured in the unit-priced extras or deductions. For instance, if a conduit run is lengthened, only the number of feet (to the nearest 10' length) added are to be computed in the extra.
 3. Provide a complete fixture schedule list with a unit price for each luminaire listed in the schedule for add/deduct price. The unit price for each luminaire shall include the cost of furnishing and installing the luminaire.

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- B. These unit prices shall be the basis upon which the additions to and deductions from the contract shall be computed. Any part of the additional work which is covered by unit prices shall be so figured even though other items may be figured by other methods.
- C. Unit prices shall govern during the life of the contract.

3.20 RETURN AIR PLENUM:

- A. All electrical work to be installed in return air plenum shall be installed in full compliance with national, federal, state and local codes. All lighting fixtures (whether scheduled or not) shall be approved for such use as the installation requires.

3.21 TEMPERATURE CONTROL SYSTEM WIRING:

- A. All work related to "temperature control" shall be by others unless specifically noted on the plans or in the specifications.
- B. Provide all necessary 120 volt power to temperature control panels as required. Verify all locations and requirements with mechanical contractor.
- C. Electric heating equipment with built-in or remote thermostats shall be furnished, installed and wired complete by electrical contractor.

3.22 DEFINITIONS:

- A. Wherever the term "--this ELECTRICAL DIVISION--" is used, such term means this DIVISION 16 and includes every section in DIVISION 16.
- B. Wherever the term "--provide--" is used, such term means that the electrical trade shall furnish and install the subject equipment and/or material, or both.
- C. Whenever the term "--install--" is used, such term means that the electrical trade shall install only the subject equipment and/or material, or both.
- D. Wherever the term "--furnish--" is used, such term means that the electrical trade shall furnish only the subject equipment and/or material.

3.23 RELATED WORK SPECIFIED ELSEWHERE:

- A. Openings: Wall, floor, ceiling and roof openings specifically shown and identified on the architectural and structural drawings are to be provided under other DIVISIONS if proper information is furnished on Schedule by this ELECTRICAL DIVISION. Openings not so identified are to be part of this ELECTRICAL DIVISION.
- B. Roof Sleeves: Roof sleeves furnished and installed under this ELECTRICAL DIVISION are to be incorporated into the finished roofing and made weathertight under another DIVISION. Contractor shall maintain any current roof warranties by following the manufacturer's requirements.
- C. Painting: Painting of all exposed-to-view conduit, pipes, ducts, hangers, supports and equipment, insulated or not, both in finished and unfinished areas, will be performed under another DIVISION. Under this ELECTRICAL DIVISION, furnish all manufactured equipment in factory-finished baked enamel, unless otherwise specified.
- D. Equipment Furnished by Others: Equipment furnished by other DIVISIONS and requiring electrical supply is to be erected, aligned, leveled and prepared for operation by other DIVISIONS. That DIVISION will also provide required controls and accessories along with installation instructions, diagrams, dimensions and supervision of installation and start-up. Under this ELECTRICAL DIVISION, provide the required electrical rough-ins and verify the electrical controls and accessories furnished under the specifications for the other DIVISIONS. Install those controls and accessories not located in the MECHANICAL piping and ductwork. Provide additional electrical controls, accessories, fittings and devices not specified under the equipment but required for a finished, operating job. Make all final electrical connections. Participate in the start-up and test procedure.

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3.24 SUPERVISION:

- A. Provide a job superintendent or foreman acceptable to the Architect to be on the job at all times during its progress with authority to act for the contractor (or subcontractor) and to supervise the installation of the work and to consult with other trades as to the proper execution and conduct of the work so that same may be carried on as rapidly as possible and in cooperation with other work that may be going on at the building at such time.

3.25 GUARANTEE:

- A. Guarantee contract for a period of one (1) year from the date of acceptance. This guarantee shall include labor and material to repair or replace any defective item or portion of work as indicated in this specification and as shown on the plans. Such repairs and/or replacement shall be done immediately, at no additional cost.

END OF SECTION 16050

SECTION 16051

WORK IN EXISTING BUILDING

PART 1 - GENERAL

1.1 SCOPE:

- A. Perform all work in existing building as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

- A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

- A. Work shall comply with national, federal and local electrical codes.
- B. Material and equipment shall be new and shall conform to the NEMA, Underwriters' Laboratories, Inc., ANSI, and IEEE Standards, where applicable standards have been established.

PART 2 - REQUIREMENTS

2.1 REVISIONS TO EXISTING BUILDING:

- A. Electrical contractor shall note the revisions to the existing building and revise the existing systems affected complete as required. Note the existing systems affected complete as required. Note the new equipment, conduit, etc., which is indicated to be provided in the existing building, including any work which is to be provided there to serve equipment in the new building. Survey the premises thoroughly and include in base bid, all work necessary for the completion of all electrical work in the existing building, including cutting and patching. Verify, during the bidding period, the feasibility of the indicated locations of new and relocated equipment and the feasibility of all conduit routes. Where other conduit routes and equipment locations are necessary, submit them with the bid.
- B. Maintain electrical service to all existing areas not being remodeled. Maintain continuity of wiring for any communication or alarm system where the remodeling work breaks the continuity. The above maintenance shall be for the entire period of construction.
- C. All work shall be done with a minimum of interruption to existing services and functions.
- D. Permission shall be obtained in writing, from the Owner, before any interruptions of service.
- E. In areas where alterations are being made and existing outlets are not retained, outlets and wiring shall be removed. Lighting fixtures and electrical equipment in these areas, which are affected by the alterations, shall be disconnected and removed. Where new lighting only is shown, the receptacle outlets generally will be retained.
- F. All fixtures and equipment being removed and not relocated shall remain the property of the Owner and shall be turned over to the Owner and/or stored on the premises at the place directed in the field or abandoned and removed from site as directed.
- G. Wire and conduit removed shall become the property of the electrical contractor and shall be removed from the premises.
- H. Where existing outlets are removed, the wires shall be removed to the last outlet or junction box retained. Boxes shall be retained only if they remain accessible. Abandoned exposed conduit runs shall be removed except as otherwise directed.

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- I. Where ceilings are taken down and reinstalled, as where ducts, pipes, etc., are installed in, and/or removed from spaces above ceilings, the electrical contractor shall disconnect and remove the lighting fixtures and/or other electrical equipment/devices as required. Reinstall and reconnect the fixtures and/or equipment/devices at the proper time, coordinating this work with that of other trades involved. Where ceilings must be taken down because of electrical work, the electrical contractor shall do this work and shall also include the removal and reinstalling of the ceiling.
- J. In both new and existing construction, except in wire closets and unfinished Mechanical Equipment Rooms, outlets shall be flush with the finished wall or ceiling and conduits shall be concealed. For two (2) wire extensions in existing plaster, steel oval duct may be used. If a new suspended ceiling is installed, conduit shall be installed as for new construction and necessary wiring shall be done for existing work remaining in use. Where acoustical material will be applied to the existing ceiling, necessary box extensions shall be provided on existing outlets.
- K. Where removal of existing wiring results in the loss of service to outlets or lighting which are not to be removed or abandoned, the circuits shall be reconnected to restore service to these outlets or lighting. Where an existing panelboard is relocated or removed, all existing branch circuits and feeders associated with relocated/removed panel shall be rerouted to the new location off relocated/new panelboard and connected as required. Temporary service shall be provided as required.
- L. Refer to the drawings and to other portions of these electrical work specifications for special items regarding the existing installation and for items to be located in the existing building or required conduit, etc., to be provided in the existing building. The requirements of this section shall apply to all such work.

END OF SECTION 16051

SECTION 16110

RACEWAYS

PART 1 - GENERAL

1.1 SCOPE:

- A. Provide raceways as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

- A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

- A. Work shall comply with national, federal and local electrical codes for application, size, location and installation of each type of raceway used.
- B. Metal Conduit and Tubing: Provide conduit and tubing in conformance with the following standards:
 - 1. Rigid steel conduit zinc coated shall conform to American National Standards Institute (ANSI) C80.2, "Rigid and Steel Conduit."
 - 2. Electrical metallic tubing (EMT), zinc coated shall conform to American National Standards Institute (ANSI) C80.3, "Electrical Metallic Tubing - Zinc Coated."
 - 3. PVC externally coated galvanized rigid steel conduit and intermediate metal conduit shall conform to National Electrical Manufacturers Association (NEMA) RN1, "Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit."
 - 4. Flexible metal electrical conduit shall conform to UL 1, "Flexible Metal Conduit."
 - 5. Liquid-tight flexible steel conduit shall conform to UL 360, "Liquid-Tight Flexible."
 - 6. Intermediate metal conduit (IMC) shall conform to Underwriters Laboratories, Inc. (UL) 1242, "Intermediate Metal Conduit."
- C. Wireways, Auxiliary Gutters and Associated Fittings: Provide in conformance with ANSI 870, "Wireways, Auxiliary Gutters, and Associated Fittings."
- D. Surface Metal Raceways and Fittings: Provide in conformance with UL 5, "Surface Metal Raceways and Fittings."
- E. Metal and Plastic Conduit and Raceway Fittings:
 - 1. Fittings for conduit and outlet boxes shall conform to UL 514B, "Fittings for Conduit and Outlet Boxes."
 - 2. Outlet boxes and fittings for use in hazardous (classified) locations shall conform to UL 886, "Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations."
 - 3. PVC fittings for use with rigid PVC conduit and tubing shall conform to NEMA TC 3, "PVC Fittings for Use with Rigid PVC Conduit and Tubing."
 - 4. Surface metal electrical raceways and fittings shall conform to UL 5.

1.4 SUBMITTALS:

- A. Submit shop drawings in accordance with Section 16050 -1.04.

PART 2 - PRODUCTS AND EXECUTION

2.1 CONDUIT:

- A. All conduit shall be rigidly supported to structure with appropriate supports.
- B. All conduit shall be installed in a neat, accurate manner and shall emerge from floors, concrete surfaces and ceilings at right angles thereto.

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- C. Install exposed conduits parallel to or at right angles with the lines of the building and structures. Make bends with standard conduit ells or field bend conduit in accordance with NEC Tables. All bends shall be free from dents or flattening. Do not use more than the equivalent of three 90 degree bends in any run between cabinets, outlets and junction or pullboxes.
- D. Conduits shall be continuous from outlet to outlet and from outlets to cabinets, junction or pullboxes and shall enter and be secured to all boxes in such a manner that each system shall be electrically continuous from point of service to all outlets. Terminate all conduits with two (2) locknuts and bushings. Joints shall be cut square, reamed smooth and drawn up tight. Plug the ends of each conduit to prevent the entrance of foreign materials when exposed during construction. Conduit systems shall be completely cleaned before conductors are installed.
- E. Securely support all conduit and electrical metallic tubing at intervals not exceeding 8'. Straps shall be one (1) hole malleable type. Support single conduit runs with rod hangers securely anchored to structure. Support groups of conduit with rod hangers and galvanized racks. Do not use perforated straps, wire, etc., for supporting conduit. Conduit shall not be suspended from or fastened to work of mechanical trades or from roof deck.
- F. Electrical work shall not impair the structural strength of the building. Do not install an excessive amount of conduit in structural members, place sleeves at stress points, etc. American Concrete Institute Standard 318-71, Paragraph 6.3, shall govern placement of conduit in concrete construction.
- G. Wires shall be installed in conduit, including control and grounding wires, unless indicated otherwise. Where the term "wiring" is used in the specifications or on the drawings, it shall be understood that conduit (or other indicated type raceway) shall be provided.
- H. Conduit shall not be routed in the masonry void between CMU and face brick without written approval of the Architect/Engineer and written confirmation of the continuous insulation not being affected.
- I. Minimum conduit size shall be 3/4" except for three (3) wires or less or control wiring within building, which may be 1/2" conduit.
- J. Electric Metallic Tubing (EMT) shall be installed in the following locations:
 - 1. Concealed in ceiling cavities.
 - 2. Concealed in interior partitions.
 - 3. Maximum allowed trade size for EMT is 2" unless otherwise noted.
 - 4. Do not bury in ground or in slabs on grade.
 - 5. Do not use in concrete where vibrators are to be used in its placement.
- K. Rigid heavy wall or IMC, galvanized steel conduit shall be installed in the following locations:
 - 1. For direct burial in or below concrete floor slabs or grade. Field coat with asphalt before installation.
 - 2. Encased in concrete. Field coat with asphalt before installation.
 - 3. Exposed to weather.
 - 4. Where conduits larger than 2" are to be installed.
 - 5. Where physical damage is possible (generally all exposed work above finished concrete floor slab or encasement).
 - 6. Provide chromium plated where exposed in food handling facilities and other locations where pipes are chromium plated.
- L. PVC Externally Coated Galvanized Rigid Steel and Intermediate Metal Conduit:
 - 1. May be used for direct burial in ground and in slabs on grade.
 - 2. Use in corrosive environments.
- M. Flexible Metal Electrical Conduit:
 - 1. Use in dry location, maximum 6' – 0" lengths.
 - 2. Do not use in corrosive atmosphere, exterior locations, damp or wet locations.

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3. Use to connect motors, transformers and recessed ceiling fixture, wherever equipment must be isolated or shifted to its final position.
 4. Use where conduit must be fished in building voids.
- N. Liquid-Tight Flexible Steel Conduit:
1. Use for exterior locations, maximum 6' – 0" lengths.
 2. Sizes 1-1/4-inch and smaller, provide with a continuous copper bonding conductor wound spirally between convolutions.
 3. Sizes 1-1/2-inch and larger, provide with an internal grounding conductor and grounding bushings.
- O. Wireways, Auxiliary Gutters:
1. May be used to facilitate installation and future changes in wiring between panelboards, safety switches in close proximity to each other on same or adjacent walls or in same electrical equipment room or area.
 2. Provide weatherproof enclosure where outdoors or subject to moisture and similar elements.
 3. Use where shown on drawings or specified.
 4. Shall be completely accessible.
- P. Surface Metal Raceways and Multi-Outlet Assembly:
1. Do not use where subject to physical damage or wet locations.
 2. Use only where shown on drawings or specified.
 3. Provide continuous ground conductor.
- Q. Raceway Fittings, Couplings and Connectors:
1. Use fittings listed and approved for specific conduit or raceway system used; e.g.: Use PVC coated fittings with PVC coated conduit.
 2. For threaded rigid steel conduit do not use threadless or compression type fittings.
 3. For EMT, provide steel or malleable iron "concrete-tight" or "rain-tight" couplings and connectors, compression, set screw or stainless steel multiple locking type. Do not use indentation type of fitting.
 4. Bushing and connectors shall be insulated type which maintain continuity of conduit grounding system. Insulating material shall be molded or locked into metallic body of the fitting. Bushing made entirely of nonmetallic material will not be allowed.
 5. Set screw connectors and couplings body shall have wall thickness at least equal to wall thickness of conduit used. Couplings or conduit trade size 1/2 through 2-inch shall have two set screws per fitting and 2-1/2 through 4-inch shall have four set screws per fitting. Set screws shall be case hardened steel with hex head and cup point.
 6. Provide flexible metal conduit fittings made of steel or malleable iron. They shall be insulated and one of the following types:
 - a. Wedge and screw type having an angular wedge fitting between the convolutions of the conduit.
 - b. Squeeze or clamp type having a bearing surface contoured to wrap around the conduit and clamped by one or more screws.
 - c. Steel, multiple point type, for threading into internal wall of the conduit convolutions.
 7. Liquid-tight flexible metal conduit shall incorporate a threaded grounding cone, a steel, nylon or equal plastic compression ring and a gland for tightening. Fitting shall be steel, or malleable iron with insulated throat, with male thread and locknut or male bushing with or without "O" ring seal.
 8. Provide expansion fittings for all rigidly fastened conduits spanning a building expansion joint and if not otherwise provided, for all runs 1-1/2-inch or larger, exceeding 150 feet in length. Fittings shall be hot-dipped galvanized malleable iron with a packing ring to prevent entrance of water, a pressure ring, a grounding ring and a separate external copper bonding jumper.
 9. Inferior material such as "pot metal" shall not be used for any type of fitting.
 10. All locknuts shall be the bonding type with sharp edges for digging into the metal wall of an enclosure.

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- R. Heavy wall conduit shall be hot dipped galvanized. Thinwall and IMC conduit shall be hot dipped galvanized on the outer surface and shall be enameled on the inner surface. Conduit shall be manufactured by Allied Tube and Conduit Corporation, Triangle Conduit and Cable Corporation, Wheatland Tube Company or equal.
- S. Conduit shall be installed concealed wherever possible, except as otherwise indicated. In unfinished Mechanical Equipment Rooms where exact locations or ventilation ducts, etc., are not known, install the conduit exposed and avoid interference with such equipment. Utilize Wiremold surface raceway in finished areas where concealment is impossible.
- T. Fittings for rigid conduit shall be malleable iron shall be supplied with covers having captive stainless steel screws, shall have tapered threaded hubs and shall conform to UL Standard #514. Each hub shall have smooth, rounded integral bushing, free from burrs and sharp edges which could damage conductor insulation. Unused hub openings shall be tightly closed with threaded close-up plugs. In moist or outdoor areas, the fitting covers shall have gaskets to provide weatherproof installation. Conduit fittings of Type C and LB for 1-1/4" conduit and larger shall have built-in rollers when conductors of Size #3 AWG and larger are installed and shall be Crouse Hinds #LBD 4400 Series or equal.
- U. Flexible connections shall generally be made with UL listed flexible metallic conduit. All connections to motors and in areas where such connections will be exposed to oil, grease, water or weather, the conduit shall be liquid-tight type. Anaconda Type UA Sealtite, Electrifax Liqueatite, Crouse-Hinds Type LTB or equal. In no instance will the use of BX cable be permitted. For flexible metallic conduit, fittings shall be steel with nylon angular wedge fittings between the convolutions of the conduit, similar to T & B 3110 Series. For liquid-tight conduit, fittings shall be steel with nylon compression ring and a grounding cone with nylon insulated throat; for connections at unthreaded opening, provide an "O" type sealing ring of single piece design with Buna-N sealing material. The flexible metallic conduit shall be considered as a grounding means when no longer than 6 feet and where both the conduit and fittings are UL listed for grounding.
- V. Installation of conduits in concrete shall conform with the following:
 - 1. In certain types of slab construction, generally those with a very thin slab, no conduits will be permitted.
 - 2. Coordinate the work for installation of conduits in slabs with the general construction work. Establish a time for installation that will minimize danger of damage to the conduits.
 - 3. Conduits larger than 1" nominal diameter shall not be installed in a slab except where shown on the drawings or as directed by the Owner's Representative.
 - 4. In slabs, conduits shall be located in the middle 1/3 of the slab thickness. The outside diameter of the conduit shall not exceed 1/3 the thickness of the slab. As the minimum conduit size is 3/4", no conduits may be installed in slabs of less than 3" thickness.
 - 5. Use conduit under floor slab on grade when outside diameter of conduit exceeds one-third of the slab thickness. Encase conduit in concrete having a minimum coverage 2" all around and between conduits. Concrete shall be a minimum 3,000 psi air entrained ready-mixed concrete conforming to ASTM C94. Pour concrete from one end to the other end, never from both ends to the center.
 - 6. Conduits shall not be spaced closer than three (3) diameters on center. Conduits which pass vertically through a slab shall also have a minimum spacing of three (3) diameters on center.
 - 7. Conduits shall cross in slabs only where permitted by the Owner's representative and in no case shall cross at an angle of less than 45°.
 - 8. Conduits shall not pass through beams unless so noted and as reviewed by Owner's Representative.
- W. Additional corrosion protection shall be provided where all galvanized conduit and sleeves enter or exit concrete. Conduit shall be thoroughly coated with two (2) coats of an approved asphaltic paint, at least 6" into the concrete and 6" after exiting the concrete.

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RACEWAYS

- X. Expansion fittings shall be provided at expansion joints or in exposed conduits runs over 125' in length and shall be O.Z. Type EX or AX or equal. Underwriters' listed bonding jumpers shall be provided where required.
- Y. Running threads shall not be used. Where conduits with tapered threads cannot be coupled with standard conduit couplings, O.Z. or T & B split couplings or Raco 1502 three (3) piece couplings shall be used. Installation in concrete shall be concrete-tight.
- Z. Insulated throat bushings shall be used with conduit sizes 1-1/4" and larger and/or with cable sizes #4 and larger. For rigid conduit, they shall be equal to O.Z. B type with body, threads, and conduit stop all made of malleable iron or steel and with phenolic insulation. For thinwall conduit, the bushings shall be Type SBT. Provide grounding bushings where required.
- AA. Conduit seals (factory made fittings) shall be provided where conduits enter an area which at any time is at a low or high temperature. Crouse Hinds #EYS21 or equal.
- BB. When penetrations of fire rated floors and/or walls are made, the spaces around the wires shall be sealed to prevent the spread of smoke, fire, toxic gas or water through the penetration neither before, during, or after a fire. The fire rating of the penetration seal shall be at least that of the floor or wall into which it is installed, so that the original fire rating of the floor or wall is maintained as required by Article 300-21 of the National Electric Code.
 - 1. Sealant shall remain soft and pliable to allow for the removal and/or addition of cables without the necessity of drilling holes. It shall adhere to itself perfectly to allow any repairs to be made with the same material. It shall be capable of being installed by a single tradesman, working from one side of a floor or wall.
 - 2. When sealant is injected into a penetration, it shall expand to surround items within the penetration and maintain pressure against the walls of the penetration.
 - 3. Sealant shall meet fire test and hose stream test requirements of ASTM E119-73 and shall be UL classified as a wall opening protective device. Sealant shall be 3M Fire Barrier 2001 Silicone RTV Foam or equal.

2.2 SURFACE MOUNTED RACEWAY:

- A. All wireways which are to be surface mounted on finished room surfaces shall be Wiremold or approved equal.
- B. Minimum Wiremold size to be #2000 unless noted otherwise on the drawing.
- C. Surface raceway installations shall be complete with proper fittings and all appurtenances. Entire system shall be securely anchored in an approved manner. All runs shall be straight and parallel or perpendicular to wall and ceiling surfaces.

END OF SECTION 16110

SECTION 16120

WIRES AND CABLES

PART 1 - GENERAL

1.1 SCOPE:

- A. Provide wires and cables as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

- A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

- A. Work shall comply with national, federal and local electrical codes for application, size, location and installation of each type of wire and cable.
- B. American Society for Testing and Materials (ASTM): Comply with requirements of the following:
 - 1. B 3 - Standard Specification for Soft or Annealed Copper Wire
 - 2. B 8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
- C. Electrical Testing Laboratories (ETL): Provide wiring, cabling and connector products which are ETL listed and labeled.
- D. Institute of Electrical and Electronics Engineers (IEEE): Comply with the following standards which apply to wiring systems:
 - 1. 82 - Test Procedure for Impulse Voltage Tests on Insulated Conductors
 - 2. 241 - Recommended Practice for Electric Power Systems in Commercial Buildings (Gray Book)
- E. NFPA: Comply with NFPA 70 requirements for construction, installation and color coding of electrical wire, cable and connections.
- F. National Electrical Manufacturers Association (NEMA): Comply with requirements of the following:
 - 1. ANSI/ICEA S95-658/NEMA WC 70
- G. UL: Provide material conforming to the following standards:
 - 1. 4 - Armored Cable
 - 2. 44 - Rubber-Insulated Wires and Cables
 - 3. 83 - Thermoplastic-Insulated Wires and Cables
 - 4. 486A - Wire Connectors and Soldering Lugs for Use with Copper (or aluminum or copper clas aluminum) Conductors
 - 5. 854 - Service-Entrance Cables
- H. UL Labels: Provide wiring, cabling and connector products which are UL listed and labeled.
- I. Materials and equipment shall be new and shall conform to NEMA, Underwriters Laboratories, Inc., ANSI, and IEEE Standards where applicable standards have been established.

1.4 SUBMITTALS:

- A. Submit shop drawings in accordance with Section 16050 -1.04.

PART 2 - PRODUCTS AND EXECUTION

2.1 MANUFACTURERS:

- A. Encore
- B. General Cable Corporation
- C. Superior Essex

SECTION 16120

WIRES AND CABLES

D. Southwire

2.2 WIRES:

- A. Electrical distribution (feeders and panelboard circuits) wires shall be in accordance with the contract documents. Note any special applications specified in other electric work.
- B. Voltage Drop:
 - 1. It is intended that the voltage drop shall not exceed 3 percent from the branch panel to the last outlet.
 - 2. Wire not smaller than #12 AWG shall be used on 2 or 3 wire 120/208 volt branch circuits up to 75' length of run and not less than #10 AWG shall be used up to 120' length, except circuits exceeding 1500 watts at 120V shall be wired with not less than #10 AWG, or as denoted on drawings.
 - 3. For 277V, 20 ampere circuits the maximum circuit length for #12 AWG is 170' and #10 AWG shall be used for 20 ampere circuits longer than 170' up to 250', thence use #8 for longer circuits, or as denoted on drawings.
- C. Harmonics:
 - 1. Where a shared neutral conductor for a 208Y/120V system (for non-linear loads) must be used for multiple phases, use a neutral conductor having at least 173% ampacity of the phase conductors.
- D. Wire shall be copper with "THWN/THHN-2" insulation, rated at 600 volts, unless otherwise indicated.
- E. Wire within fluorescent channels shall be listed for such use.
- F. It is acceptable to use stranded wiring in building power wiring applications.
- G. Wire shall have factory color-coded covering in accordance with code requirements and shall be installed with wires of the same phase being of one (1) color.
 - 1. 208/120 Volt System: Phase A-Black, B-Red, C-Blue.
 - 2. 480/277 Volt System: Phase A-Brown, B-Orange, C-Yellow.
 - 3. Neutral wires shall be White for 208Y/120V.
 - 4. Neutral wires shall be Gray or White with colored (other than green) tracer for 480/277 volt.
 - 5. Green shall be used for grounding only.
 - 6. 3-way and 4-way switch travelers and control wires shall have distinctive colors.
- H. The use of aluminum conductors is prohibited.
- I. The use of non-metallic sheathed cable type NM or NMC, armored-bushed cable (BX) and armor clad cable (AC) is prohibited.
- J. No wires smaller than #12 shall be used except where specifically indicated otherwise. Wires and cables shall be of sufficient size and capacity to guarantee minimum allowable voltage drop.

2.3 CONNECTORS AND SPLICES:

- A. General: Provide UL listed metal connectors of sizes, ampacity, temperature ratings, materials, and classes required by NFPA 70 and NEMA standards for applications and services indicated.
- B. Branch Circuits: For wires No. 10 AWG and smaller, provide solderless, insulated pressure cable type connectors, 600V, of the compression or indent type or wire nut connectors. Temperature rating of connectors shall be at least equal to that of the wire on which they are used.

SECTION 16120

WIRES AND CABLES

- C. Copper Conductors: For No. 8 AWG and larger wire, provide socket head cap, hex screw, or bolt clamp type connectors, manufactured of high conductivity copper alloy or bronze castings. Select proper connector for each wire size. Cable sizes 250 MCM and larger shall be retained in the connector by twin clamping elements.

2.4 INSULATING TAPE, PUTTY, RESIN AND SUPPORTS:

- A. Tape: Provide plastic electrical insulating tape which is flame retardant, cold and weather resistant. Tape for use in areas subject to temperatures 30° C. to 105° C., or where the tape will be subjected to an oil splash, tape shall have a minimum thickness of 8.5 mils, and shall consist of an oil-resistant vinyl backing with an oil-resistant acrylic adhesive.
- B. Materials: Provide insulating materials for splices and connections such as glass and synthetic tapes, putties, resins, splice cases, or compositions of the type approved for the particular use, location, voltage and temperature, and apply and install in an approved manner, in accordance with the manufacturer's recommendations.
- C. Supports: Provide cable supports of the wedge type which firmly clamp each individual cable and tighten due to the cable weight.

2.5 WIRE AND CABLE INSTALLATION:

- A. During the installation period and until the work is finally accepted, adequately protect from damage all wire and cable installed. In the event of injury to wire or cable due to negligence by the contractor, the damaged cable or wire shall be repaired or replaced at no additional cost.
- B. Conductors shall be carefully handled during installation to avoid damage of any kind. Unreeling and coiling shall be done slowly in order to prevent damage to the insulation or sheath. Repeated bending shall be avoided, and the manufacturer's recommended minimum bending radius shall be observed.
- C. Wire and cable shall be pulled into raceways with a minimum number of changes in direction. Cable-pulling tensions shall not exceed manufacturer's recommended values. Only cable lubricants approved for the type of jacket material or insulation shall be used.
- D. Each conduit shall be free of moisture and debris before conductors are installed. Remove moisture from conduits by swabbing. Check conduit after 72 hours for any new moisture. If new moisture is present, correct conduit installation to be watertight and swab and recheck in 72 hours. Repeat process as necessary.
- E. Wire and cable manufactured more than 12 months prior to date of delivery to the site shall not be used.
- F. Feeders and motor branch circuit wiring shall be installed in continuous lengths. Splicing of conductors will not be permitted. Obtain written approval from the Owner prior to splicing conductors, if warranted by working conditions.
- G. Limit the number of conductors in boxes in accordance with NEC Table 370-16.
- H. Provide separate grounding conductor in each "home run." Ground to ground bar in panel.
- I. Wire and cable shall be derated in accordance with NEC when the number of current carrying conductors exceeds three (3) in a raceway.

2.6 FISH WIRE:

- A. Each length of conduit which is to be used for the communications systems shall contain a #14 gauge nylon fish wire.
- B. Conduits which are left empty shall contain fish wire of such a gauge required to pull in wire or cable to fill the conduit as determined by code.
- C. Terminations of all empty conduits shall be properly tagged.

SECTION 16120

WIRES AND CABLES

2.7 GROUNDING SYSTEM:

- A. A complete grounding system with all accessories and appurtenances shall be provided as required and specified. The entire system shall be in accord with applicable standards of the ANSI, IEEE, and NEC federal and local governing codes.
- B. Electrical system neutrals and ground bus bars, as well as all non-current carrying metal parts of the electrical wiring system, shall be grounded. All major equipment frames shall be grounded.
- C. In general, conduit connections to outlets, junction boxes, pull boxes, cabinets, and motor starting equipment shall have sufficient ground connection. Draw up conduit connections tight and secure to ensure proper continuity throughout the conduit system.
- D. At all wet locations, or as denoted on the drawings, provide a separate grounding wire for all devices and equipment required by code.
- E. Grounding conductors shall be copper 600 volt insulated bare, or bus bar as indicated. Insulated wires shall be Type THW or THHN/THWN. Connections to ground rods shall be made by Thermit Welding.
- F. Motor frames and control enclosures shall be considered grounding through associated metallic conduit connections, but grounding jumpers shall be provided where necessary to assure effective grounding, particularly across flexible connections.
- G. Interior metal piping systems that may become energized shall be properly bonded.

END OF SECTION 16120

SECTION 16130

BOXES

PART 1 - GENERAL

1.1 SCOPE:

- A. Provide boxes as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

- A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

- A. Work shall comply with national, federal and local electrical codes.
- B. National Electrical Manufacturers Association (NEMA):
 - 1. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports, for sheet-steel outlet boxes, devices boxes, covers and box supports.
 - 2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies, for fittings, cast metal boxes and conduit bodies.
- C. National Fire Protection Association (NFPA): Comply with NFPA 70, "National Electrical Code," for construction and installation of electrical wiring boxes and fittings.
- D. Underwriters Laboratories, Inc. (UL): Provide electrical boxes and fittings which are UL-listed and labeled, and conform to:
 - 1. UL 50 - Cabinets and Boxes
 - 2. UL 514A - Metallic Outlet Boxes
 - 3. UL 514B - Fittings for Conduit and Outlet Boxes
 - 4. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers
 - 5. UL 886 - Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations

1.4 SUBMITTALS:

- A. Submit shop drawings in accordance with Section 16050 -1.04.

PART 2 - PRODUCTS AND EXECUTION

2.1 MANUFACTURERS:

- A. Appleton
- B. Raco
- C. Steel City

2.2 FABRICATED MATERIALS:

- A. Interior Outlet Boxes: Provide minimum 4-inch square by 1-1/2" deep, one piece, deep-drawn, galvanized steel, outlet boxes for general use. Provide 4-inch octagonal concrete boxes and hung ceiling boxes of the folded or welded type where required by project conditions. Provide square cornered, straight sided gang boxes wherever required by NFPA 70 or more than two wiring devices are indicated in the same location. Provide boxes of increased depth where required by the project.
 - 1. Construct with stamped knockouts in the back and sides.
 - 2. Provide threaded screw holes with corrosion-resistant screws for securing box covers and wiring devices.

SECTION 16130

BOXES

- B. Interior Outlet Box Accessories: Provide outlet box accessories as required for each installation, including plaster covers, mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used and fulfilling requirements of individual wiring situations.
- C. Weatherproof Outlet Boxes: Provide corrosion-resistant cast-metal weatherproof outlet boxes, of types, shapes and sizes, including depth of boxes, with threaded conduit ends, cast-metal face plates with spring-hinged waterproof caps suitably configured for each application, including face plate gaskets and corrosion-resistant fasteners.
- D. Junction and Pull Boxes: Provide galvanized sheet steel junction and pull boxes, with screw-on covers and of types, shapes and sizes, to suit each respective location and installation.
 - 1. Provide welded seams and stainless steel nuts, bolts, screws and washers.
 - 2. Conform to the applicable requirements of NFPA 70 and to UL 50 for boxes over 100 cubic inches volume, except as modified below.
 - 3. Where necessary for boxes to provide a rigid assembly, provide integral structural steel bracing.
- E. Floor Boxes: Provide galvanized steel stack floor boxes where indicated, with adjustable conduit knockouts, vertical adjustment rings, gaskets, floor plates and flush hinged or screw-on covers.
 - 1. Provide means for combination telephone or signal and receptacle outlet use for these boxes where indicated.
 - 2. Provide multi-section boxes with individual section covers within a common flush floor plate where indicated.
- F. Weatherproof: Provide corrosion resistant cast-iron weatherproof adjustable floor boxes where indicated, with threaded-conduit entrances, vertical adjusting rings, gaskets, brass floor plates and flush, screw-on covers.
- G. Floor Box Accessories: Provide two-wire, three-pole, flush grounding-type 125 V, 20 A, floor type receptacles with flanges where indicated. Provide duplex receptacles, 125 V, 20 A, recessed mounted within combination boxes where indicated.
- H. Conduit Bodies: Provide galvanized cast-metal conduit bodies, of types, shapes and sizes, to suit respective locations and installation, construct with threaded-conduit-entrance ends, removable covers, and corrosion-resistant screws.
- I. Bushings, Knockout Closures and Locknuts: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts, malleable iron conduit bushings and offset connectors of types and sizes to suit respective uses and installation.
- J. Boxes for Hazardous Locations: Provide boxes UL listed for the particular type and class of hazard involved.
- K. Poke-Through Fittings: Provide electrical fitting of the "poke-through" type in accordance with the requirements of NFPA 70. Fittings shall provide a galvanized steel junction box below the floor slab and a capped 2-inch diameter insert flush with the finished floor slab. The fittings shall provide raceways for both power and communication completely separated from each other. Provide fittings having fire retardant materials of the type which expand in the presence of fire to provide not less than a two hour fire rating.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL BOXES AND FITTINGS, GENERAL:

- A. Coordination: Coordinate installation of electrical boxes and fittings with wire/cable and raceway installation work, and with general construction work.
- B. Weatherproof: Provide weatherproof outlets for all interior and exterior locations exposed to weather or moisture.

SECTION 16130

BOXES

- C. Knockout Caps: Provide knockout closures to cap unused knockout holes where blanks have been removed.
- D. Anchoring: Support and fasten boxes securely.
- E. Sizes: Provide boxes of sizes adequate to meet NFPA 70 volume requirements, but in no case smaller than sizes indicated.

3.2 INSTALLATION OF OUTLET BOXES:

- A. Grounding: Provide each box to which a lighting fixture or receptacle is to be attached with a grounding terminal, consisting of either a green-colored washer-in-head machine screw, not smaller than No. 10-32, screwed into a tapped hole or a grounding bushing attached to one of the conduits.
- B. Mounting Height: The "mounting height" of a wall-mounted outlet box is defined as the height from the finished floor to the horizontal center line of the cover plate.
 - 1. Where mounting heights are not indicated or where heights and locations interfere with mechanical, architectural or structural features, install outlet boxes in an approved location, without additional cost.
 - 2. Where a ceiling outlet and a dropped beam or other change in ceiling level are shown at the same location, place the outlet at least 9" from the finished edge of the beam or change in level, except as otherwise indicated.
- C. Device Back Boxes: Shall be mounted recessed in finished where possible, mounting exposed in mechanical rooms is acceptable.
- D. Pan Construction: In pan construction, where the normal slab is of insufficient thickness to accommodate the box, thicken the slab to enclose the box completely in concrete.
- E. Windows: Locate outlet boxes indicated at windows close to window trim.
- F. Doors: For outlets indicated above doors center outlets above the door opening, 6" above the door head, except as otherwise indicated or required.
 - 1. Locate boxes for switches near doors on the side opposite the hinges as indicated on architectural drawings and close to door trim.
- G. Locate outlet boxes for switches and receptacles on columns or pilasters approximately 4" off the centers of the columns to allow for future installation of partitions.
- H. Special Finishes: For outlet boxes for receptacles and switches mounted in desks or furniture cabinets or in glazed tile, concrete block, marble, brick, stone or wood walls, use rectangular shaped boxes with square corners and straight sides.
 - 1. Install boxes without plaster rings.
 - 2. Saw cut all recesses for outlet boxes in exposed masonry walls.
- I. Vertical Axis: Except as otherwise indicated, mount outlet boxes for switches with the long axis vertical.
 - 1. Mount boxes for receptacles either vertically or horizontally but consistently one way.
 - 2. Three or more gang boxes shall be mounted with the long axis horizontal.
 - 3. Locate boxes, covers or device plates not to span different types of building finishes either vertically or horizontally.
- J. Ceilings: For outlets in ceilings where wiring is concealed, use outlet boxes 4" square by 1-1/2" deep, minimum.
- K. Prohibited Work:
 - 1. Do not use sectional (gangable) boxes.
 - 2. Do not use device plates as covers for boxes in exposed locations.
 - 3. Do not use round boxes where conduit must enter box through side of box, which would result in difficult and insecure connections when fastened with locknut or bushing on rounded surface.

SECTION 16130

BOXES

- L. Protection: Protect outlet boxes to prevent entrance of plaster, and debris. Thoroughly clean foreign material from boxes before conductors are installed.
- M. Threaded Hubs: At the following locations use threaded hub type boxes with gasketed weatherproof covers:
 - 1. Exterior locations.
 - 2. Where installed on unfinished walls, columns or plasters. Cover gaskets may be omitted in dry locations.
 - 3. Where exposed to moisture laden atmosphere.
 - 4. Where indicated.
 - 5. At kitchen and cafeteria equipment with, or within 4' of, steam connections.
- N. Deep Boxes: Use extra deep concrete boxes maximum 6", where necessary to permit side conduit entrance without interfering with reinforcing.
- O. Extension Rings: Where extension rings are required on existing outlet boxes, drill new mounting holes in the rings to align with the mounting holes on the existing boxes.

3.3 PULL AND JUNCTION BOXES:

- A. Installation: For installation of junction and pull boxes, conform to NFPA 70 and the following:
 - 1. For boxes exposed to rain or installed in wet locations use weatherproof type.
 - 2. For boxes in main feeder conduit runs use sizes not smaller than 8" square by 4" deep.
 - 3. Do not exceed 6 conductors entering and 6 leaving raceways in a single box.
 - 4. Conductors in any pull or junction box including equipment grounding conductors shall not exceed:

Size of Largest Conductors	Maximum No. of Conductors
No. 4/0 AWG	30
250 MCM	20
500 MCM	15
Over 500 MCM	10

- B. Supports: Provide in each box, including boxes above switchboards and motor control centers, with sufficient clamps, grids, or devices to which cables are secured in neat and orderly fashion permitting ready identification and so that no cable will have an unsupported length of more than 30".
- C. Adjacent Boxes: Locate no box within 2' of any other pull or junction box.
- D. Flush Mount: Mount pull boxes concealed in non-accessible walls or ceilings, with the covers flush with the finished wall or ceiling.
- E. Low Voltage Connectivity: Unless otherwise indicated provide pull and junction boxes for data, signal and other systems, at least 50 percent larger than would be required by NFPA 70. Locate boxes strategically and provide such shapes as to permit easy pulling of future wires or cables of types normally used in such systems.

END OF SECTION 16130

SECTION 16140

WIRING DEVICES

PART 1 - GENERAL

1.1 SCOPE:

- A. Provide wiring devices as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

- A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

- A. Work shall comply with national, federal and local electrical codes.
- B. Provide wiring devices conforming to the following:
 - 1. American National Standards Institute (ANSI): Provide plugs and receptacle devices constructed in accordance with ANSI C73, "Attachment Plugs and Receptacles, Dimensions of."
 - 2. Institute of Electrical and Electronics Engineers (IEEE): Construct and install wiring devices in accordance with requirements of IEEE 241, "Recommended Practice for Electric Power Systems in Commercial Buildings."
 - 3. National Electrical Manufacturers Association (NEMA): Provide wiring devices constructed and configured in accordance with the requirements of:
 - a. WD 1 - General Requirements for Wiring Devices
 - b. WD 2 - Semiconductor Dimmers for Incandescent Lamps
 - c. WD 6 - Wiring Devices - Dimensional Requirements
 - 4. National Fire Protection Association (NFPA): Comply with NFPA 70, "National Electrical Code" as applicable to construction and installation of electrical wiring devices.
 - 5. Underwriters Laboratories, Inc. (Latest UL): Provide wiring devices which are UL listed and comply with the requirements of:
 - a. 20 - General-Use Snap Switches
 - b. 498 - Attachment Plugs and Receptacles
 - c. 943 - Ground-Fault Circuit Interrupters

1.4 SUBMITTALS:

- A. Submit shop drawings in accordance with Section 16050-1.04.

PART 2 - PRODUCTS

2.1 WIRING DEVICES:

- A. General: Provide factory-fabricated wiring devices, in types, colors, and electrical ratings for applications indicated and which comply with NEMA WD 1. Provide devices and wall plates of color as selected by Architect except as otherwise indicated; submit color selection.
 - 1. For computer services receptacles, provide orange colored receptacles as dedicated computer service circuits having separate grounds.
 - 2. For duplex receptacles on emergency circuit, provide red receptacles with red baked enamel cover plates and pilot light.

SECTION 16140

WIRING DEVICES

2.2 RECEPTACLES:

- A. Duplex Receptacles: Provide specification grade duplex receptacles, 2-pole, 3-wire grounding, with green hexagonal equipment ground screw, pivoted ground system on steel mounting strap, 20 A, 125 V, with metal plaster ears, design for side wiring with four captively held binding screws and provisions for back wiring from four separate metal wiring clamps, with spring loaded, screw activated pressure plate, with NEMA configuration 5-20R unless otherwise indicated.
- B. Ground Fault Interrupter: Provide termination type ground fault circuit interrupters, with duplex receptacles, capable of protecting connected receptacles on single circuit, and installed in a 2-3/4 inch deep outlet box without adapter. Provide grounding type UL rated Class A, Group 1, rated 20 A, 125 V, 60 Hz; solid-state ground fault sensing and signaling with 5 milliamperes ground fault trip level, equip with NEMA configuration 5-20R.
- C. Weatherproof Receptacles: Provide duplex receptacles, 20 A, 125 V, NEMA 5-20R in cast metal box with gasketed, weatherproof cast metal cover plate and gasketed cap over each receptacle opening. Provide cap with spring hinged cover flap.

2.3 SWITCHES:

- A. General: Provide specification grade switches as indicated on the drawings conforming to NEMA WD 1 and to the following.
- B. Snap Switches: Provide specification grade, general duty flush single pole toggle AC quiet switches, 20 A, 120-277 V, with mounting yoke insulated from mechanism, equip with plaster ears, switch handle and back or side-wired screw terminals. Provide captive or terminal type terminal screws not smaller than No. 8. Provide back-wired devices with holes for wiring.
- C. Three Way Switches: Provide specification grade, general duty flush 3-way AC quiet switches, 20 A, 120-277 V, with mounting yoke insulated from mechanism, equip with plaster ears, lock type switch handles, back or side wired screw terminals, with break-off tab features, which allows wiring with separate or common feed. Provide captive terminal type terminal screws not smaller than No. 8. Provide back wired devices with holes for wiring.

2.4 WIRING DEVICE ACCESSORIES:

- A. Wall plates: Provide wall plate for each switch, receptacle, signal and telephone outlet and special purpose outlet. Do not use sectional gang plates. Provide multi-gang outlet plates for multi-gang boxes. Wall plates shall be in accordance with UL 514A, UL 514B, and UL 514C.
 - 1. Material and Finish: Provide [brown] finish, phenol-resin or urea-resin plates of approved design, in unfinished areas, mechanical spaces, fan rooms, wire closets, transformer rooms, storage rooms, and on walls that are painted. Provide stainless steel or chromium finished plates in lobbies, corridors, special finished areas, toilet rooms, kitchens, or on walls finished with marble, plastics, glazed ceramic interior tile. Provide finishes that are [corrosion-resisting steel (18 percent chromium, 8 percent nickel) with satin finish]. [Provide nonferrous metal plates of 0.04-inch minimum thickness.] [Provide ferrous plates of 0.03-inch minimum thickness.] Match the finish of fastening screws with the plates. Provide plates for exposed screw jointed fittings that match the fittings with edges of plates flush with edges of fittings and made of heavy cadmium plated steel. Provide plates for cast type boxes at locations subject to wet or rain covers for "push" action type flush switches that are neoprene gasketed.
 - 2. Telephone and Signal Outlets: Provide wall plates for telephone and signal outlets with a 3/8-inch bushed opening in the center. Provide wall plates for push-button and buzzer outlets with openings to suit the push-button and buzzers. Provide material which matches other device plates.

SECTION 16140

WIRING DEVICES

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRING DEVICES:

- A. General: Install wiring devices as indicated, in accordance with manufacturer's written instructions, applicable requirements of NFPA 70 and NEMA "Standard of Installation," and in accordance with ADA (Americans with Disabilities Act) requirement. Where not indicated, mount switch adjacent to latch jamb of door.
- B. Coordination: Coordinate with other work, including painting, electrical boxes and wiring work, as necessary to interface installation of wiring devices with other work.
- C. Boxes: Install wiring devices only in electrical boxes which are clean; free from excess building materials, dirt, and debris.
- D. Receptacles: Install receptacles vertically and 18" above the finished floor, unless otherwise noted or specified.
- E. Work Sequence: Install wiring devices after wiring work is completed.
- F. Connectors and Terminals: Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for wiring devices. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors". Use properly scaled torque indicating hand tool.
- G. Switches: Do not connect switches in the neutral conductor. Install switches indicated with sub-letter to control the lights indicated; however if sub-letter is omitted, install switches to control all lighting. If there is only one switch indicated in the room, install the switch to control all lighting in the room even though they are not indicated by sub-letter. Install switches with centerline located 42" above finished floor unless otherwise indicated by numerals, indicating inches above floor, shown adjacent to letter "a" or by on appropriate note on drawings. Install switches rigidly attached to outlet boxes by means of two screws.

3.2 PROTECTION OF WALL PLATES AND RECEPTACLES:

- A. General: Upon installation of wall plates and receptacles, advise Owner regarding proper and cautious use of convenience outlets. At time of substantial completion, replace those items which have been damaged, including those burned and scored by faulty plugs.

3.3 GROUNDING:

- A. General: Provide equipment grounding connections for wiring devices, unless otherwise indicated. Tighten connections to comply with tightening torques specified in UL 486A to assure permanent and effective grounds.

3.4 TESTING:

- A. General: Test wiring devices for electrical continuity, and for short-circuits prior to energizing circuitry. Ensure proper polarity of connections is maintained. Subsequent to energization, test wiring devices to demonstrate compliance with requirements.

END OF SECTION 16140

SECTION 16170

CIRCUITS AND MOTOR DISCONNECTS

PART 1 - GENERAL

1.1 SCOPE:

- A. Provide motor and equipment circuits as shown and specified. Work of this section shall include all accessories and appurtenances necessary for a complete and operating installation.

1.2 CONDITIONS OF THE CONTRACT:

- A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

- A. Work shall comply with national, federal and local electrical codes.
- B. Materials and equipment shall be new and shall conform to NEMA, Underwriters' Laboratories, Inc., ANSI, and IEEE Standards where applicable standards have been established.

PART 2 - PRODUCTS AND EXECUTION

2.1 MOTORS AND EQUIPMENT CONNECTIONS:

- A. Motors and equipment shall be furnished and set in place by others, unless otherwise noted on the drawings or in this specification.
- B. Provide all conduit and wire and make all final power connection to all systems: heating, ventilating, air conditioning, plumbing equipment, etc., as required.
- C. Provide all conduit and wire and make all final power connections as required to exhaust fans and miscellaneous equipment furnished with motorized backdraft dampers. Dampers shall be connected to equipment 120 volt power circuit so as to interlock the motorized damper with the exhaust fan. For three (3) phase motors, provide an additional 120 volt circuit routed through an auxiliary contact in the motor starter.
- D. Final connections to motors shall be made with a flexible conduit, not to exceed 24" in length for conduit 1-1/2" and smaller. For conduit larger than 1-1/2", length may be longer with proper support when approved in writing by the Owner/Engineer to facilitate the removal or adjustment of the motor.
- E. Motors and equipment connected through flexible conduits shall have the equipment and motor frames bonded to the rigid conduit system with a separate (green) grounding wire.

2.2 MOTOR STARTERS AND CONTROL EQUIPMENT:

- A. Provide all motor-starting and control equipment, complete with properly sized thermal overload protecting elements, not furnished under other sections of the specifications involved. In general, this covers starting and control equipment for fans, pumps, and miscellaneous motors used for building utilities, heating, ventilating, and air conditioning with the exception of certain machines where noted on the drawings which are furnished complete with controls by the vendor. Connect all starters supplied as integral parts of package units. Install and connect all starters furnished under other sections of the specifications.
- B. It is the intent that the starting equipment be selected so as to obtain uniformity in quality, appearance, maximum efficiency, and adequate protection for the motors.
- C. Except as otherwise noted, provide combination across-the-line type magnetic starters with fused short circuit protection and thermal overloads on each phase. Provide three (3) auxiliary contacts (two (2) N.O. and one (1) N.C.), pilot lights and HOA switch in face of starter.
- D. Where a magnetic starter without a line disconnect switch is furnished by others with a motor, provide a suitable fused or unfused safety switch in sight of motor as required.

SECTION 16170

CIRCUITS AND MOTOR DISCONNECTS

- E. Starters shall be as manufactured by Cutler-Hammer/Westinghouse, Square D, Allen-Bradley or equal.
- F. It shall be the responsibility of the electrical contractor to provide overload heater elements properly sized according to the nameplate full load current rating of the motor (adjusted for ambient conditions) and per starter manufacturer instructions.
- G. Circuit breakers feeding heating, ventilation, air conditioning and refrigeration equipment shall be "HACR" type.

2.3 SINGLE PHASE PROTECTION:

- A. Provide single phase protection equipment on poly-phase equipment installed as part of contract documents. This equipment shall be provided only where single phase protection is not integral to the starters or controls supplied with the poly-phase equipment. Submit detailed product literature for review.

END OF SECTION 16170

SECTION 16190

SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SCOPE:

- A. Provide supporting devices as shown and specified. Work of this section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

- A. Work shall be in accordance with the terms and conditions of the contract documents.

1.3 STANDARDS:

- A. Work shall comply with national, federal and local electrical codes.
- B. Materials and equipment shall be new and shall conform to NEMA, Underwriters' Laboratories, Inc., ANSI and IEEE Standards where applicable standards have been established.

1.4 SUBMITTALS:

- A. Submit shop drawings in accordance with Section 16050, 1.04.

PART 2 - PRODUCTS AND EXECUTION

2.1 PRODUCTS:

- A. General: Provide supporting devices with manufacturer's standard materials, designed and constructed in accordance with published product information, for a complete installation and as herein specified.
- B. Corrosion Resistance: Provide all supports, support hardware and fasteners hot-dipped galvanized or cadmium plated.
- C. For Raceway Supports: Provide manufacturer's standard supports including clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze, wall brackets and spring steel clamps.
- D. Fasteners: Provide fasteners of types, sizes and materials indicated with the following construction features:
 - 1. 1/2-inch lead expansion anchors approximately 38 pounds weight per 100 units.
 - 2. 3/16-inch by 4-inch springhead toggle bolts approximately 5 pounds weight per 100 units.
- E. Sleeves and Seals: Provide sleeves and seals, of types, sizes and materials indicated with the following features:
 - 1. Provide factory-assembled watertight wall and floor seals, of types and sizes indicated or required suitable for sealing around conduit, pipe, or tubing passing through concrete floors and walls. Construct with steel sleeves, malleable iron body, neoprene sealing grommets and rings, metal pressure rings, pressure clamps, and cap screws.
 - 2. Smoke and fire stop seals shall have a UL fire rating of 3 hours where installed in fire rated construction or as indicated. Seals shall be internal (unflanged) type to occupy minimum space.
- F. Cable Supports: Provide cable supports in risers as required by the NFPA 70 for non-armored type electrical cables. Furnish cable supports constructed with hot-dipped galvanized cast malleable iron having an insulating liner with tapered surface. Provide an insulating wedging plug for insertion within the support body. Provide pull boxes on conduit risers to contain cable supports.
- G. U-Channel Strut Systems: Provide U-channel strut system for mounting and supporting electrical equipment. Fabricate strut from 16-gauge hot-dip galvanized steel sheet, 9/16-inch diameter holes, 8-inches on center on top surface. Fittings shall mate with the U-channel.

SECTION 16190

SUPPORTING DEVICES

- H. Lead and Oakum: Caulk between sleeve and pipe where a fire rated seal is not required or specified.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Compliance: Install hangers, sleeves, seals, U-channel supports and fasteners as indicated and in accordance with manufacturer's written instructions. Comply with requirements of NFPA 70 and American National Standards Institute (ANSI)/National Electrical Manufacturers Association (NEMA) for installation of supporting devices.
- B. Coordination: Coordinate with other electrical work, including raceway and wiring work.
- C. Raceway Supports:
 - 1. Provide raceway support meeting the requirements of these specifications and NFPA 70. Conform to manufacturer's recommendations. For each support provide strength equal to the maximum weight of the present local plus all future raceways for which the support provides space, times a safety factor. Except as otherwise indicated, use a safety factor greater than four where necessary to provide a minimum safety allowance of 200 pounds. Provide additional support strength where required to prevent distortion of raceway during wire pulling.
 - 2. Provide individual and multiple (trapeze) raceway hangers, and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assembly, and for securing hanger rods and conduits.
 - 3. Arrange for grouping of parallel runs of horizontal raceways to be supported together on trapeze type hangers where possible.
 - 4. Support individual horizontal conduits and EMT 1-1/2-inch size and smaller by either one-hole pipe straps or separate pipe hangers, use separate pipe hangers for larger sizes. Spring steel fasteners may be used in lieu of pipe straps or hangers for sizes 1-1/2-inch and smaller in dry locations. For hanger rods with spring steel fasteners, use 1/4-inch diameter or larger threaded steel. Use steel fasteners that are specifically designed for supporting single conduits or EMT. Unless otherwise indicated, do not use wire as a means of support. Use spring steel conduit supports only for lighting system branch circuit raceway in suspended ceilings in dry locations.
 - 5. Except as otherwise indicated, space supports for metallic and non-metallic raceways in accordance with the requirements of this Section and the requirements of the NFPA 70.
 - 6. Provide support for exposed or concealed raceway as close as practical to and not exceeding one foot from an unsupported box or access fitting. In horizontal runs a support at a box or access fitting may be omitted when the box or access fitting is independently supported and the raceway termination is not made with a close nipple or threadless box connector.
 - 7. In vertical runs provide such support that the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports, with no weight load on raceway terminations or conductor terminals.
- D. Miscellaneous Supports:
 - 1. Provide supports for all miscellaneous electrical components as required to produce the same safety allowances as specified for raceway supports above. Provide metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes etc.

SECTION 16190

SUPPORTING DEVICES

2. In open overhead spaces, cast boxes threaded to raceways need not be separately supported except where used for fixture support; support sheet metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type fastener not more than 24 inches from the box. When penetrating reinforced-concrete members, avoid cutting any reinforcing steel.
- E. Cable Supports:
1. Install in strict compliance with manufacturer's instructions.
 2. Spacing not to exceed NFPA 70 tabulation for spacing of conductor supports.
 3. Allow adequate slack in conductors to prevent any stress on terminations. Take into consideration conductor thermal contraction.
- F. Fasteners:
1. Unless otherwise indicated securely fasten all electrical items and their supporting hardware including, but not limited to, conduits, raceways, cables, cable trays, busways, cabinets, panelboards, wall-mounted transformers, boxes, disconnect switches and control components to the building structure.
 2. Fasten by means of wood screws or screw-type nails on wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; by machine screws; welded threaded studs, or spring-tension clamps on steel work. Threaded studs driven in by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts or machine or wood screws. Do not weld conduits or pipe straps to steel structures. In partitions of light steel construction use sheet metal screws.
 3. Holes cut to a depth of more than 1-1/2 inches in reinforced concrete beams or to a depth of more than 3/4-inch in concrete joints shall not cut the main reinforcing bars. Fill holes that are not used.
 4. Loads applied to any fastener shall not exceed one-fifth of the proof test load. Use vibration and shock-resistant fasteners
- G. Sleeves and Seals:
1. Tighten sleeve seal nuts until sealing grommets have expanded to form watertight and smoketight seal.
 2. Sleeves: Where installed in existing slabs or partitions completely fill the void between the sleeve and masonry with expanding cement grout.

END OF SECTION 16190

SECTION 16440

DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 SCOPE:

- A. Provide disconnect switches as indicated on the drawings and schedules.

1.2 CONDITIONS OF CONTRACT:

- A. All work shall be in accordance with the terms and conditions of the contract documents.

1.3 STANDARDS:

- A. All work shall comply with national, federal and local electrical codes.
- B. National Electrical Manufacturers Association (NEMA): Provide switches conforming to NEMA KS 1, "Enclosed Switches."
- C. NEMA: Construct enclosures conforming to NEMA 250, "Enclosures for Electrical Equipment (1000 Volts Maximum)."
- D. Underwriters Laboratories, Inc. (UL): Manufacture switches conforming to the requirements of UL 98, "Enclosed and Dead-Front Switches."
 - 1. Provide switches listed and labeled by UL.
 - 2. Provide fuse holders conforming to UL 512, "Fuseholders."
 - 3. Provide cabinets conforming to UL 50, "Cabinets and Boxes."

1.4 SUBMITTALS:

- A. Submit shop drawings in accordance with Section 16050 -1.04.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Square D
- B. Cutler Hammer/Westinghouse
- C. ITE Siemens
- D. GE

2.2 SWITCHES:

- A. General: Provide individually enclosed air-break switches as indicated and scheduled on the drawings, with all current-carrying parts enclosed and manually operable by means of external handles. Switches shall be heavy duty (HD) type, ampere and horsepower rated.
 - 1. Provide cartridge enclosed fuses and rejection fuse holders when fused switches are indicated.
 - 2. Provide electrically tripped switches where indicated.
 - 3. Provide NEMA 1 enclosure for indoors, NEMA 3R enclosure for outdoors, or as indicated on the drawings.
- B. Ratings: Conform to NEMA KS 1 for voltage and horsepower ratings.
 - 1. Voltages shall be 250 or 600 as determined by the circuit voltage.
- C. Switching Action: Provide quick-make, quick-break type switch action.
- D. Construction: All current carrying parts shall be high conductivity copper, with heating ratings conforming to UL 98.
 - 1. Provide silver tungsten or silver-plated copper contacts.
 - 2. Provide fuse holders of the rejection type, sized for fuses scheduled.

SECTION 16440

DISCONNECT SWITCHES

- 3. Provide interrupting ratings minimum 10 times locked rotor current of NEMA maximum motor horsepower rating.
- 4. Arrange for padlocking with two locks in either "off" or "on" position.
- E. Fuses: Provide fuses of class, type and rating indicated on the drawings and schedules.

PART 3 - EXECUTION

3.1 INSTALLATION OF SWITCHES:

- A. Installation: Install switches in conformance with the manufacturer's requirements and NFPA 70, Article 380 "switches." Provide grounding in accordance with NFPA 70, Article 250.

END OF SECTION 16440

SECTION 16450

SECONDARY GROUNDING

PART 1 - GENERAL

1.1 SCOPE:

- A. Provide secondary grounding work as indicated on drawings and by the requirements of this Section.

1.2 CONDITIONS OF THE CONTRACT:

- A. All work shall be in accordance with the terms and conditions of the contract documents.

1.3 STANDARDS:

- A. All work shall comply with national, federal and local electrical codes.
- B. American National Standards Institute (ANSI):
 - 1. C2 - National Electric Safety Code
- C. American Society for Testing and Materials (ASTM):
 - 1. B 1 - Standard Specification for Hard-Drawn Copper Wire
 - 2. B 2 - Standard Specification for Medium-Hard-Drawn Copper Wire
 - 3. B 3 - Standard Specification for Soft or Annealed Copper Wire
 - 4. B 8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
 - 5. B 228 - Standard Specification for Concentric-Lay-Stranded Copper-Clad Steel Conductors
- D. Institute of Electrical and Electronics Engineers (IEEE):
 - 1. 141 - Recommended Practice for Electric Power Distribution for Industrial Plants
 - 2. 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems
 - 3. 241 - Recommended Practice for Electric Power Systems in Commercial Buildings
- E. Underwriters laboratories, Inc. (UL):
 - 1. 467 - Grounding and Bonding Equipment
 - 2. 869 - Service Equipment
- F. UL Labels: Provide grounding electrodes and connectors which are UL listed and labeled.

1.4 MATERIALS AND COMPONENTS:

- A. Materials: Provide an electrical system and equipment grounding system consisting of an assembly of materials including, but not limited to, cables, connectors, ground rods, bonding jumpers, surge arresters, and all accessories necessary to make a complete installation. All materials utilized in the grounding system shall meet the requirements of the standards listed and shall also meet established industry standards for the applications indicated.
- B. Components: Provide raceways, boxes and fittings for grounding conductors. Install grounding conductors in one or more of the following types of raceway unless direct buried or exposed conductors are specified:
 - 1. Galvanized rigid steel conduit
 - 2. Electric metallic tubing (EMT)
 - 3. Flexible metal conduit (Commercial Greenfield)
 - 4. Liquid tight flexible metal conduit

PART 2 – PRODUCTS

SECTION 16450

SECONDARY GROUNDING

2.1 CONDUCTORS: WIRE AND CABLE TYPE:

- A. Equipment Grounding Conductors: Provide insulated equipment grounding conductors which run in the same raceway with circuit wires where indicated.
- B. Bare Ground Conductors: Provide bare ground conductors for grounding of transformers, switchgear, other service equipment, grounding service poles and electrical equipment structures both underground and above ground. Conductors shall be stranded copper conductors.
- C. Braided Bonding Jumpers: Provide braided copper tape constructed of No. 30 gauge bare copper wires sized to suit the application.
- D. Flexible Jumper Straps: Provide flat, flexible, braided conductors consisting of minimum 480 strands of No. 30 gauge bare copper wire with 1/4-inch by 2-inch copper bus bar ends where indicated for a specific application.

2.2 GROUND BUS:

- A. General: Provide minimum 1/4-inch by 2-inch hard drawn copper system ground bus where indicated on the drawings or specified.

2.3 BONDING PLATES, CONNECTORS, TERMINALS AND CLAMPS:

- A. General: Provide copper bonding plates, connectors, terminals, lugs, and clamps meeting the requirements of NFPA 70 and UL to provide a complete secondary grounding system shown on the drawings.

2.4 GROUND RODS:

- A. Solid Copper Ground Rod: Provide solid copper type ground rods minimum 5/8-inch in diameter by a minimum of 10 feet long.
- B. Copper Clad Steel Ground Rod: Provide copper clad steel ground rods minimum 3/4-inch in diameter by a minimum of 10 feet long.
- C. Stainless Steel Ground Rod: Provide minimum 3/4-inch diameter by 10 feet long stainless steel ground rods where indicated.
- D. Multiple Ground Rods: Where the grounding resistance specified on the drawings cannot be achieved with a single rod, provide multiple ground rods as necessary to achieve the level of ground resistance required.
- E. Ground Rod Identification: On each ground rod provided, the manufacturer shall die stamp, near the top, his name or trademark and the length of the rod in feet. All rods shall have a hard, clean, smooth continuous surface throughout the entire length of the rod.

2.5 FIELD WELDING:

- A. General: Where welded connections are indicated or required, such as buried connections to cables or ground rods, such welds shall be made by the exothermic process utilizing factory provided molds.

PART 3 - EXECUTION

SECTION 16450

SECONDARY GROUNDING

3.1 INSPECTION:

- A. General: Examine all areas and conditions under which electrical grounding connections are to be made. Do not proceed with the grounding work until such unsatisfactory conditions have been corrected.

3.2 GROUNDING SECONDARY DISTRIBUTION:

- A. General: Size all required equipment grounding conductors and straps in compliance with NFPA 70. Provide green colored insulation on all equipment grounding conductors of the same type and class as that specified for the associated phase and neutral conductors of the secondary distribution system. Braze or connect the feeder and branch circuit grounding conductors to the ground bus with approved pressure connectors.
- B. Grounding Conductor: Provide a continuous grounding conductor for each feeder serving several panelboards. Connect this ground conductor to each related cabinet ground bar.
- C. Insulated Equipment Grounding Conductor: Provide a separate green insulated equipment grounding conductor for each single or three phase feeder and each branch circuit with a three phase protective device. Install the required grounding conductor in the common conduit with the related phase and neutral conductors. Where parallel feeders are installed in more than one raceway, provide a green insulated equipment grounding conductor in each raceway.
- D. Single Phase Branch Circuits For Lighting: Provide single phase branch circuits required for 120 and 277 volt lighting consisting of phase, neutral and green insulated ground conductor installed in a common metallic conduit.
- E. Single Phase Branch Circuits For Receptacles, Motors and Other Similar Equipment: Provide single phase branch circuits serving receptacles, motors, and other similar equipment consisting of phase, neutral, and green insulated equipment ground conductor installed in a common conduit.
- F. Flexible Metallic Conduit: Provide flexible metallic conduit equipment connections utilized in conjunction with single phase branch circuits with green insulated grounding conductors connected to suitable grounding terminals at each end of the flexible conduit.
- G. Single Phase Branch Circuits For Special Equipment: Provide single phase branch circuits serving special equipment, such as X-ray equipment, and all branch circuits installed in nonmetallic or flexible conduits with a separate grounding conductor.
- H. Pressure Connectors: Provide the number and size of pressure connectors required for all equipment grounding bars in panelboards and other electrical equipment for the termination of equipment grounding conductors. Provide pressure connectors for all active and all spare circuits.

3.3 BRANCH CIRCUIT GROUNDING REQUIREMENTS:

- A. General: Provide, in the same raceway with the associated phase and neutral conductors, a green colored equipment ground conductor having the same type and class insulation as the associated branch circuit conductors. Provide each ground conductor with spade type terminals or solderless pressure connectors to suit the requirements of the circuit.
- B. Branch Circuit Ground Conductors: Connect ground conductors for branch circuits as follows:
 - 1. Connect the ground conductor, accompanying the circuit serving the receptacle, to a green No. 10-32 "washer-in-head" machine screw threaded to the receptacle outlet box. Extend a green insulated ground wire from the ground terminal on the receptacle to this ground screw. Receptacles with special cast boxes having factory designed and approved ground paths shall not require a separate ground jumper.

SECTION 16450

SECONDARY GROUNDING

2. Provide an insulated ground wire from the green No. 10-32 machine screw in each ceiling outlet box or above ceiling junction box through the stem or flexible conduit to the ground terminal on each luminaire.
3. Provide an insulated ground wire from the ground terminal in the associated junction box or disconnect enclosure to a motor through the flexible conduit connection.
4. From the associated motor starter to each motor provide an insulated ground conductor in the same conduit as the associated phase conductors. Connect to the starter enclosure and the motor connection box. Originate the ground conductor at the ground bus of the panelboard serving the motor and bond to all intermediate devices.
5. Provide a green insulated ground conductor from the equipment ground bus in each motor control center through conduit and flexible metallic conduit to the ground terminal in the connection box mounted on each motor.
6. Provide a green insulated ground wire from the ground bus in the switchgear, switchboard, or distribution panel to the equipment ground bar on a busway. Make all connections between the ground buses in an approved manner.
7. Provide a separate green insulated ground wire from a computer area power panel ground bus through each branch circuit connected to this power panel. Size these ground conductors as required by NFPA 70 but provide conductors and connections of sufficient size to ensure that no ground circuit shall exceed 3 ohms resistance between the final connection point and the building grounding system. Where the 3 ohm limit is exceeded, provide larger conductors at no additional cost.
8. Provide a separate green insulated ground conductor in all circuits supplying X-ray equipment.
9. Provide a green insulated equipment ground conductor in all nonmetallic conduits or ducts unless such nonmetallic conduits or ducts are used for telephone or data cables. No grounding conductors are required in telephone or electronic data raceways.
10. Provide a green insulated grounding conductor to all electric devices such as electric air cleaners or heaters. Where these devices are installed in air ducts, bond the conductor to each such unit, the air duct, and to the ground bus in the associated panelboard.
11. Provide a separate green insulated ground conductor to each electric immersion type water heater or surface anti-frost heating cables. Bond this conductor to the water piping at the unit and to the ground bus in the associated panel board.

3.4 TERMINATIONS AT EQUIPMENT WITHOUT PROVISION FOR GROUND CONDUCTOR TERMINATION:

- A. General: Where metallic conduits terminate at a metallic housing without mechanical connection, such as locknuts and bushings, provide each conduit with a ground bushing. Connect each such ground bushing with a bare copper conductor to the ground bus in the electrical equipment. Size the conductor as required by NFPA 70. Bond electrically non-continuous conduits at both entrance and exit with a ground bushing and bare jumper as described.

3.5 TESTING:

- A. General: Subject the completed equipment grounding system to a megger test at each service disconnect enclosure ground bar to ensure that the ground resistance without chemical treatment or other artificial means does not exceed the level specified.
- B. Ground Test: Provide certified test reports of the ground resistance at each service enclosure ground bus. Modify the grounding system as required to meet the specified resistance levels.

END OF SECTION 16450

SECTION 16500

LIGHTING FIXTURES

PART 1 - GENERAL

1.1 SCOPE:

- A. Provide lighting fixtures and lamps as shown and specified. Work of this Section shall include accessories and appurtenances required for a complete installation.

1.2 CONDITIONS OF THE CONTRACT:

- A. Work shall be in accordance with the terms and conditions of the Contract Documents.

1.3 STANDARDS:

- A. Work shall comply with national, federal and local electrical codes.
- B. Manufacturers: Provide products of firms regularly engaged in the manufacture of interior lighting fixtures of types and ratings required, whose products have been in satisfactory use in similar service for not less than ten (10) years.
- C. Certified Ballast Manufacturers Association (CBM) Labels: Provide fluorescent-lamp ballasts which comply with CBM standards and carry the CBM label.
- D. National Electrical Manufacturers Association (NEMA): Comply with applicable requirements of NEMA LE 4, "Recessed Luminaires, Ceiling Compatibility" pertaining to recessed luminaires.
- E. National Fire Protection Association (NFPA): Comply with NFPA 70, "National Electrical Code," as applicable to construction and installation of interior building lighting fixtures and emergency lighting.
- F. Provide emergency and exit marker lighting units that comply with NFPA 101, "Code for Safety to Life from Fire in Buildings and Structures," federal and local codes.
- G. Underwriters Laboratories, Inc. (UL): Comply with UL standards pertaining to interior lighting fixtures.
 - 1. 57 - Electric Lighting Fixtures
 - 2. 924 - Emergency Lighting and Power Equipment
 - 3. 8750 - LED Lighting
- H. UL: Provide interior lighting fixtures and emergency lighting units which have been UL listed and labeled.
- I. National Appliance Energy Conservation Act of 1987. Amendments of 1988 (Public Law 100-357 dated June 28, 1988): Requirements for Energy-Efficient Ballasts.
- J. Comply with the provisions of the Energy Policy Act of 2005 (EPACT '05) pertaining to electric lamps.

1.4 SUBMITTALS:

- A. Submit shop drawings in accordance with Section 16050 -1.04.
- B. Identify all fixtures by their type, as noted on the contract documents and their use in conjunction with special control schematics, (i.e.: dimmers, photocell, time clock, etc.).
- C. Delivery lead time shall not be a valid reason to request luminaire substitution unless lead time from the specified manufacturer is in excess of 13 weeks. It shall be the sole responsibility of the Contractor to determine necessary equipment lead times, deliver submittals for review in a timely fashion, and place orders accordingly to ensure timely delivery.
- D. If requesting a substitution, (which must be requested a minimum of 7 days prior to bid), Contractor shall provide unit and extended pricing for specified luminaire, unit and extended pricing for proposed alternate, and unit and extended savings to owner to be realized by accepting proposed alternate. Provide unit pricing for each luminaire type specified to provide a baseline comparison for substitution request.

SECTION 16500

LIGHTING FIXTURES

- E. Substitution supplier shall complete photometric studies for Engineer evaluation to prove fixture performance meets or exceeds specified fixture. Final decision by the Engineer.

PART 2 - PRODUCTS

2.1 GENERAL:

- A. Lighting Fixture Requirements: Provide fixtures which meet the requirements of these specifications and the project drawings.
- B. Provide proper and sufficient support for all lighting fixtures as required. Properly secure all lighting fixtures and ceiling mounted devices to building structural system. Furnish and install all auxiliary support hanger rods and cross angles required for Code compliance and job conditions.
- C. Due to the various switching requirements, electrical requirements, emergency requirements and architectural requirements on the project, the fixtures specified for use on the project shall be carefully and fully coordinated with the complete set of specifications and the manufacturer prior to ordering. The contractor shall review each fixture location and provide fixtures with the proper voltage, ballasts, lengths, feeds, circuiting, mounting, emergency feeds, emergency ballasts, proper suspensions, emergency accessories, overall lengths, accessories, etc., for a complete and proper fixture installation. Any failure to fully coordinate fixture requirements prior to ordering shall result in the contractor bearing any costs to remove the fixtures and provide new fixtures to fully meet the requirements of the specifications and to resolve any conflicts.
- D. General Requirements: Provide lighting fixtures of sizes, types, and ratings indicated; complete with, but not necessarily limited to, housings, lamps, lamp holders, reflectors, ballasts, starters, wiring and batteries and battery charging devices. Verify fixture finish and colors with architect.
 - 1. Form fixture sheet metal housings to prevent warping and sagging. Return or clean all edges free of all burrs or sharp spots. Provide fixtures free from light leaks after installation.
 - 2. Hinged door closure frames shall operate smoothly without binding. Fabricate frames to allow lamp installation/removal without tools. Hinge mechanism shall be designed to preclude accidental falling of hinged door closure frames during relamping operations and while secured in operating position.
 - 3. Interior light reflecting surfaces shall have reflectance of not less than 85 percent for white surfaces, 83 percent for specular surfaces, and 75 percent for specular diffusing surfaces.
 - 4. Provide manufacturer's standard finish applied over corrosion-resistant primer, free of streaks, runs, holidays, stains, blisters, or similar defects. Remove any fixtures showing evidence of rust at time of final inspection.
 - 5. Light transmitting components shall be fabricated of 100 percent virgin acrylic plastic or water white, annealed, crystal glass. Minimum average thickness of lenses for fluorescent fixtures shall be 0.125". Fabricate frames to allow for expansion of lens without distortion or cracking. For plastic lenses, diffusers, and covers, provide high resistance to yellowing due to UV radiation.
 - 6. Provide each fixture with lamps as indicated. Where lamps are not indicated, provide lamps as recommended by manufacturer.
 - 7. For locations with severe environmental conditions such as damp, high temperature, low temperature or flammable vapors provide fixtures specifically labeled and listed for the particular conditions to be encountered.
- E. Coordinate suspension length of fixtures with pendants or stems in field prior to ordering fixtures.

2.2 RECESSED AND FLUSH-MOUNTED FIXTURES:

- A. General: Provide type that can be relamped from the bottom, except as otherwise indicated. Trim for the exposed surface of flush-mounted fixtures shall be as indicated. Provide trims, mountings, supports and adapters for type of ceiling in which mounted. Verify before ordering.

SECTION 16500

LIGHTING FIXTURES

2.3 SUSPENDED FIXTURES:

- A. General: Provide hangers capable of supporting twice the combined weight of the adjoining fixtures and provide with swivel hangers to ensure a plumb installation. Hangers shall be cadmium-plated steel with swivel-ball tapped for the conduit size indicated. Where indicated, provide shock-absorbing type hangers which allow fixtures to swing within an angle of 20 degrees.
- B. Support: Brace pendants 4 feet or longer to limit swinging. Provide single-unit suspended fluorescent fixtures with twin-stem hangers.
- C. Multiple-Unit or Continuous Row Fixtures: Provide multiple-unit or continuous row fluorescent fixtures with tubing or stem for wiring at one point and a tubing or rod suspension for each unit length of chassis, including one at each end. Provide rods with minimum 3/16" diameter.
- D. Direct/Indirect Fixtures: Provide clear, flat top lens on fixtures with open lamps as the upper (indirect) component.

2.4 EXIT SIGNS:

- A. General: Provide exit signs conforming to UL 924, NFPA 70 and NFPA 101.
- B. Power: Provide exit signs as follows:
 - 1. AC powered exit signs.
 - 2. Self-Powered Exit Signs (Battery Type): Provide with automatic high/low trickle charger in a self-contained power pack with self diagnostics. Battery shall be sealed, maintenance-free, nickel cadmium type with a 15-year life expectancy and a 5-year full warranty plus 7-year pro-rata.
 - 3. Self-Powered Exit Signs (Luminous Source Type): Provide signs with solid-state tritium gas energy source which allows legibility in total darkness at 100 feet after 10 years. In addition to the requirements of UL and NFPA, signs shall be licensed for public use by the U.S. Nuclear Regulatory Commission.
- C. Luminaire Requirements:
 - 1. Letters shall be 6" tall with 3/4" strokes formed by a stencil face.
 - 2. Provide red/green fiberglass panel behind stencil face.
 - 3. Provide L.E.D., regular AC supply.
 - 4. Provide illuminated arrows as indicated.
 - 5. Provide single or double face as indicated.
 - 6. Provide ceiling, end wall, back wall or pendant mounting as indicated.
 - 7. Units mounted exposed to weather or damp/wet environment shall have a damp or wet UL label as appropriate and shall not be constructed of steel.
 - 8. Provide internal provisions for grounding.
 - 9. Provide wireguard on fixtures subject to damage from athletic equipment (gymnasium, etc.) or at locations where these fixtures are subject to damage from moving equipment.

2.5 EMERGENCY LIGHTING EQUIPMENT:

- A. General: Provide emergency lighting equipment conforming to UL 924, NFPA 70 and NFPA 101.
 - 1. Remote emergency lighting unit for use with self-contained emergency lighting units as remote power sources.
 - a. Lamps and finishes shall be compatible with primary unit with which used.
 - 2. Emergency power pack, internal type, factory installed within body of fixture as indicated in schedule and including the following features:
 - a. Packaged battery/charger/inverter unit.
 - b. Provide with test switch and LED indicator light visible and accessible without entering ceiling space.
 - c. Sealed, maintenance-free, nickel-cadmium batteries with 5-year full warranty plus 5-year pro-rata, minimum.

SECTION 16500

LIGHTING FIXTURES

- d. Fully automatic solid state charger.
- e. Operation: Relay turns associated fixture on automatically when supply circuit voltage drops to 80 percent of normal or below. Lamps operate for duration of outage, for a minimum of 5yr, 1.5 hours. When normal voltage is restored, battery is automatically recharged.
- f. Lamp output when supplied by power pack shall be 1400 lumens, minimum, for 90 minutes.
- g. Where emergency ballasts are to be provided with pendant fixtures, the installation of the specified ballast shall be fully coordinated and verified with the lighting manufacturer so that the proper circuiting and feeds may be provided to accommodate the specified emergency ballast.
- h. Emergency ballasts shall be provided with a constant hot, unswitched feed from lighting circuit to allow fixture to be switched on and off along with other lighting in room without activating emergency ballast. Upon loss of power, emergency ballast shall immediately power fixture on regardless of switch position.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Setting and Securing: Set lighting fixtures plumb, square, and level with ceiling and walls, in alignment with adjacent lighting fixtures, and secure in accordance with manufacturers' directions and approved shop drawings. Conform to the requirements of NFPA 70.
- B. Mounting: Mounting heights specified or indicated are to bottom of fixture for suspended and ceiling-mounted fixtures and to center of fixture for wall-mounted fixtures. Obtain approval of the exact mounting for lighting fixtures on the job before installation is commenced and, where applicable, after coordinating with the type, style, and pattern of the ceiling being installed.
- C. Support: Recessed and semi-recessed fixtures may be supported from suspended ceiling support system ceiling tees if the ceiling system support rods or wires are provided with a minimum of four rods or wires per fixture and located not more than 6" from each corner of each fixture.
 - 1. For round fixtures or fixtures smaller in size than the ceiling grid, provide a minimum of four rods or wires per fixture and locate at each corner of the ceiling grid in which the fixture is located.
 - 2. Do not support fixtures by ceiling acoustical panels.
 - 3. Where fixtures of sizes less than the ceiling grid are indicated to be centered in the acoustical panel, support such fixtures independently or with at least two 3/4" metal channels spanning and wired to the ceiling tees.
 - 4. Provide rods or wires for lighting fixture support under this Section of the specifications.
 - 5. Additionally, for recessed fixtures, provide support clips securely fastened to ceiling grid members, a minimum of one at or near each corner of each fixture.
- D. Coordination: Coordinate with other trades as appropriate to properly interface installation of lighting fixtures with other work.
- E. Grounding: Ground non-current-carrying parts of electrical equipment. Where the copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable for this purpose.

3.2 EXIT AND EMERGENCY LIGHTS:

- A. General: Wire exit and emergency lights on separate circuits using separate conduits other than those used for normal power unless otherwise noted.

3.3 ADJUST AND CLEAN:

- A. Clean: Clean lighting fixtures of dirt and debris upon completion of installation.

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LIGHTING FIXTURES

- B. Protection: Protect installed fixtures from damage during remainder of construction period.

3.4 FIELD QUALITY CONTROL:

- A. Tests: Upon completion of installation of lighting fixtures, and after building circuits have been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting. Provide documentation of these tests in the operation and maintenance manuals.
1. For normal and emergency building lighting, upon completion of the installation, conduct an operating test to show that the equipment operates in accordance with the requirements of this Section.
 2. Test all wiring with an insulation testing instrument, both before and after connection of fixtures and equipment. The minimum resistance shall be 250,000 ohms.
 3. Conduct ground resistance tests on each fixture. The maximum resistance to ground of grounded equipment shall not exceed 25 ohms.
 4. To demonstrate all functions and protective operations of the exit and emergency lighting system, simulate malfunctions to verify proper functioning. Provide instruments as required to make positive observation of test results. Include the following in tests:
 - a. Duration of supply.
 - b. Low battery voltage shut down.
 - c. Normal transfer to battery source and retransfer to normal.
 - d. Low supply voltage transfer.

END OF SECTION 16500

SECTION 16700

CONDUIT FOR COMMUNICATION SYSTEMS

PART 1 - GENERAL

1.1 SCOPE:

- A. The General Provisions of the Contract, including Conditions of the Contract and Division 1 of the Specifications, apply to the work in this section.
- B. This section is hereby made a part of all other sections of Division 16 as fully as if repeated in each therein.

1.2 SCOPE OF WORK:

- A. The contractor shall furnish all equipment and labor necessary for and reasonably incidental to the complete installation of the conduit for communications systems as outlined in the following specifications including, but not limited to, telephone, data and security system rough-in.
- B. Installation of the systems shall be as outlined in the following specifications, including but not limited to:
 - 1. Verification of dimensions and conditions at project site
 - 2. Installation in accordance with contract documents and applicable code requirements
 - 3. Instruction of operating personnel
 - 4. Maintenance services for one (1) year following acceptance of systems.

1.3 STANDARDS:

- A. All of the above equipment shall be installed in the conduit systems in walls, floors, and inaccessible ceilings and hereinafter specified or in surface-mounted raceway.

1.4 FIELD QUALITY CONTROL:

- A. Contractor shall show satisfactory evidence of maintaining a service organization capable of furnishing adequate inspection and service to equipment and be prepared to offer service contract for maintenance of system after guarantee period.

PART 2 - PRODUCTS:

2.1 TELEPHONE, DATA AND CATV/MATV SYSTEM:

- A. Provide conduit from the telephone service as shown on drawings. Terminate conduit with an insulating bushing at equipment location.
- B. Provide minimum 3/4" conduit from each telephone, data or CATV/MATV to an accessible ceiling location and terminate in insulating bushing. Outlet boxes and conduit shall be the same as specified for power and lighting. Cover plates shall be provided for all unused outlets per the symbol list.
- C. Coordinate telephone conduit work with local telephone utility company before installing same.

PART 3 - EXECUTION:

3.1 GENERAL:

- A. Furnish equipment, accessories and material required for installation of the systems in accordance with these specifications.
- B. Components and system shall meet or exceed minimal standards issued by EIA. Work in conjunction with this installation shall meet provisions of National Electric Code and applicable local codes.

SECTION 16700

CONDUIT FOR COMMUNICATION SYSTEMS

3.2 INSTALLATION:

- A. Provide conduit and wire as shown and as specified in other sections.
- B. Provide all equipment as indicated on drawings and/or specifications. Verify location and orientation with Owner's Representative prior to rough-in.

3.3 ADJUSTMENT AND CLEANING:

- A. Clean system equipment and cabinets of dirt and debris.

END OF SECTION 16700