PROJECT MANUAL

for

West Branch – Rose City Area Schools
2022 Bond Issue – Bid Package No. 6

Ogemaw Heights High Schools
Water Supply Upgrade

PROJECT NO. 294-22

September 26, 2024

ANTHONY P. ESSON
ARCHITECT
PO BOX 479 GAYLORD, MICHIGAN 49734
TELEPHONE: (989) 732-0585

DOCUMENT 00 01 01

PROJECT TITLE PAGE

PROJECT NAME: West Branch – Rose City Area Schools
2022 Bond Issue – Bid Package No. 6
Ogemaw Heights High School Water Supply Upgrade
AEA Project No. 294-22

OWNER: West Branch – Rose City Area Schools
PO Box 308
West Branch, MI 48661
Contact: Gail Hughey, Superintendent
Telephone: (989) 343-2019

ARCHITECT: Anthony Esson, Architect

Mailing Address:
P.O. Box 479
Gaylord, MI 49734

Shipping Address:
2111 Forester Drive
Frederic, MI 49733

Contact: Anthony P. Esson, Architect, LEED AP
PH: (989) 732-0585
tony@anthonyessonarchitect.com

CIVIL ENGINEER: Gourdie Fraser, Inc.
123 West Front Street
Traverse City, MI 49684
Contact: Jennifer Graham, PE
Telephone: (231) 946-5874
Email: jennifer@gfa.tc

MEP ENGINEER: JLK Engineering
795 Fairway Drive
Gaylord, MI 49735
Contact: Justin Kowatch, PE
PH: 989-614-4225
jkowatch@jlkengineering.com

DOCUMENT 00 01 10

TABLE OF CONTENTS

DIVISION 04 - MASONRY

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

DIVISION 08 - OPENINGS

DIVISION 09 - FINISHES

FACILITY SERVICES SUBGROUP

DIVISION 23 – HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

DIVISION 26 - ELECTRCAL

DIVISION 31 – EARTHWORK

DIVISION 32 – EXTERIOR IMPROVEMENTS

END OF SECTION

DOCUMENT 00 11 16

INVITATION TO BID

Project: West Branch – Rose City Schools; 2022 Bond Issue Bid Package No. 6; Ogemaw Heights High School Water Supply Upgrade

Owner:

West Branch – Rose City Area Schools
PO Box 308
West Branch, MI 48661

Architect/Engineer:

Anthony P. Esson, Architect, PLLC
PO Box 479
Gaylord, MI 49734

Date: September 26, 2024

West Branch – Rose City Area Schools will receive Bids from Bidders for upgrades to the existing domestic water supply system at Ogemaw Heights High School.

Sealed Bids should be delivered in person to West Branch – Rose City Area Schools Central Office, c/o Gail Hughey, Superintendent, 960 HWY M33, West Branch, MI 48661. Bids must be received prior to 1:00 PM local time on January 31, 2024. Bids will be opened publically and read aloud immediately following the closure of the bidding period, in the West Branch – Rose City Area Schools Central Office located at 960 S. M33, West Branch, MI 48661. The Owner will not consider or accept a bid received after the date and time specified for bid submission. Post Bid Interviews with the apparent low Bidder(s) will be scheduled following receipt of Bids. All Bids will be evaluated at a later date.

A Pre-bid Conference will not be held. Bidders should address any question regarding bidding requirements to the Architect.

Bidding Documents will be available on or about December 16, 2024. Bidding Documents will be available to Bidders in electronic format (.pdf) free of charge. Interested Bidders may view and download bidding documents at www.anthonyessonarchitect.com. Select West Branch – Rose City Area Schools; 2022 Bond Issue Bid Package No. 6 under the Bid Docs button.

Each Bidder shall include with its Bid, a sworn and notarized statement disclosing any familial relationships that exist between the owner or any employee of the Bidder and any member of the Board of Education of the Superintendent of the School District.

Compliance with the Iran Economic Sanctions Act (PA 517 of 2012) is required. Each Bidder shall include a sworn and notarized certification that they are not an "Iran Linked Business" as the term is defined in the Act.

A Bid security in the amount of no less than 5 percent of the Bid Sum in the form of a Bid Bond, or certified check payable to the Owner shall accompany each Bid. A personal or company check does not constitute a Bid security.

Refer to other bidding requirements described in Document 00 21 13.

Bids shall be submitted on the Bid Form provided in the Bidding Documents.

The successful Bidder will be required to furnish Performance and Labor/Material Payment Bonds in the amount of 100% of the contract amount.

Bids will be required to be submitted under a condition of irrevocability for a period of 60 days after submission.

The Owner reserves the right to accept or reject any or all Bids, either in whole or in part; to award the Contract to other than the lowest Bidder; to waive any irregularities and/or informalities; and in general, to make awards in any manner deemed to be in the best interest of the Owner.

END OF DOCUMENT

DOCUMENT 00 21 13

INSTRUCTIONS TO BIDDERS

1.1 SUMMARY

A. Document Includes:
1. Bid submission.
2. Intent.
3. Work identified in contract documents.
4. Contract Time.
5. Definitions.
6. Contract Documents identification.
7. Availability of documents.
8. Examination of documents.
9. Inquiries and Addenda.
10. Product substitutions.
11. Site examination.
12. Bidder qualifications.
13. Subcontractors.
14. Submission procedure.
15. Bid ineligibility.
16. Security deposit.
17. Performance Assurance.
18. Bid Form requirements.
19. Fees for changes in the Work.
20. Bid Form signature.
21. Additional Bid information.
22. Bid opening.
23. Duration of offer.
24. Acceptance of offer.

B. Related Documents:
1. Document 00 11 16 - Invitation to Bid.
2. Document 00 41 13 - Bid Form - Stipulated Sum (Single-Prime Contract).
3. Document 00 45 01 – Familial Disclosure Statement.
4. Document 00 45 02 – Iran Economics Sanctions Act Compliance Certificate.

C. Bids signed, executed, and dated will be received by West Branch – Rose City Area Schools until1:00 PM local time on the 31st day of December, 2024.

D. Bids submitted after the above time will be returned to Bidder unopened.

E. Amendments to submitted Bids will be permitted when received in writing prior to bid closing and when endorsed by the same party or parties who signed and sealed the Bid.

F. Bidders may withdraw their Bid by written request at any time before bid closing.

1.2 INTENT

A. The intent of this Bid request is to obtain an offer to perform work to complete upgrades to the existing domestic water supply for Ogemaw Heights High School located at Ogemaw Heights High School; 960 HWY M33, West Branch, MI 48661 for a Stipulated Price contract, in accordance with Contract Documents.

1.3 WORK IDENTIFIED IN CONTRACT DOCUMENTS

A. Work of this proposed Contract comprises general construction, including structural, mechanical and electrical.

B. Location: Ogemaw Heights High School located at 960 HWY M33, West Branch, MI 48661.

1.4 CONTRACT TIME

A. Identify Contract Time in the Bid Form. The completion date in the Agreement shall be the Contract Time added to the commencement date.

B. The Owner requires that the work be completed and ready to be placed in service during the 2025 Summer break (between mid-June and mid-August, 2025).

1.5 DEFINITIONS

A. Bidding Documents: Contract Documents supplemented with Invitation to Bid, Instructions to Bidders, Information Available to Bidders, Bid Form, and bid securities, identified

B. Contract Documents: Defined in AIA Document A104-2017, including issued Addenda.

C. Bid: Executed Bid Form and required attachments submitted in accordance with these Instructions to Bidders.

D. Bid Price: Monetary sum identified by the Bidder in the Bid Form.

1.6 CONTRACT DOCUMENTS IDENTIFICATION

A. The Contract Documents are identified as Project No. 294-22 titled West Branch – Rose City Area Schools; 2022 Bond issue Bid Package No. 6; Ogemaw Heights High School Water Supply Upgrade as prepared by Anthony P. Esson, Architect.

1.7 AVAILABILITY OF DOCUMENTS

A. Bidding Documents may be obtained as stated in document 00 11 16 - Invitation to Bid.

B. Bidding Documents will also be on file at the following Plan Rooms.
1. Builders Exchange Traverse City, Grand Rapids, Lansing, and Saginaw

C. Partial sets of Bidding Documents will not be issued to Bidders.

D. Bidding Documents are made available only for the purpose of obtaining offers for this Project. Their use does not grant a license for other purposes.

1.8 EXAMINATION OF DOCUMENTS

A. Bidders are responsible for full examination of the drawings, specifications, exhibits and any Addenda prior to submission of bids.

B. Upon receipt of Bidding Documents verify documents are complete. Notify Architect/Engineer if documents are incomplete.

C. Immediately notify Architect/Engineer upon finding discrepancies or omissions in Bidding Documents. When such discrepancies or omissions should be discovered through reasonable examination for the purpose of estimating and are not brought to the Architect's attention and clarified prior to bidding, Bidder shall include and/or shall be deemed to have included the higher quantity or quality of Product or material, and/or more labor intensive or costly installation in the Bid.

D. Carefully review Drawings and Specifications. Contractor is responsible for the entire Work identified in the Contract Documents without regard to the specific location of the information within the Contract Documents.

E. In the case of a conflict or inconsistency in the Plans or Specifications that affects the Bid price, the Bidder shall include and/or shall be deemed to have included the higher quantity or quality of Product or material, and/or more labor intensive or costly installation in the Bid.

1.9 INQUIRIES AND ADDENDA

A. Direct questions in writing to Anthony Esson, at the office of the Architect/Engineer; Email tony@anthonyessonarchitect.com.

B. Verbal answers are not binding on any party.

C. Submit questions not less than 7 days before date set for receipt of Bids. Replies will be made by Addenda.

D. Addenda may be issued during bidding period. Addenda will be posted on the Construction Manager's website. Addenda become part of the Contract Documents. Include resultant costs in the Bid Price.

1.10 PRODUCT SUBSTITUTIONS

A. Where Bidding Documents stipulate particular Products, substitution requests will be considered by Architect/Engineer up to 5 days before receipt of Bids.

B. With each substitution request, provide sufficient information for Architect/Engineer to determine acceptability of proposed products.

C. When a request to substitute a Product is made, Architect/Engineer may approve the substitution. Approved substitutions will be identified by Addenda.

D. In submission of substitutions to Products specified, Bidders shall include in their Bid, changes required in the Work, changes to Contract Time and Contract Price to accommodate such approved substitutions. Later claims by the Bidder for an addition to the Contract Time or

Contract Price because of changes in Work necessitated by use of substitutions will not be considered.

E. Post bid substitutions will not be considered outside of extenuating circumstances.

1.11 SITE EXAMINATION

A. Examine Project site before submitting a Bid.

1.12 BIDDER QUALIFICATIONS

A. To demonstrate qualification for performing the Work of this Contract, Bidders may be requested to submit written evidence of financial position, previous experience, current commitments, and license to perform work in the State of Michigan.

1.13 SUBCONTRACTORS

A. The Owner reserves the right to reject a proposed Subcontractor for reasonable cause.

B. Refer to AIA Document A104-2017, Article 11 of the Standard Abbreviated Form of Agreement Between Owner and Contractor.

1.14 SUBMISSION PROCEDURE

A. Bidders shall be solely responsible for delivery of Bids in manner and time prescribed.

B. Submit one copy of executed offer on Bid Forms provided, signed, with required security deposit in a closed opaque envelope, clearly identified with Bidder’s name, Project name, and Owner's name on the outside.

C. An abstract summary of submitted Bids will be posted on the Architects website following bid opening.

1.15 BID INELIGIBILITY

A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may be declared unacceptable at Owner’s discretion.

B. Bid Forms, Appendices, and enclosures which are improperly prepared may be declared unacceptable at Owner’s discretion.

C. Failure to provide security deposit, bonds or insurance requirements will invalidate the Bid.

D. Bidders that are "Iran Linked Businesses" as the term is defined in PA 517 of 2012, Iran Economic Sanctions Act are ineligible to Bid. Eligible Bidders must submit certification in accordance with the Act. Refer to Section 00 45 02.

1.16 SECURITY DEPOSIT

A. Bids shall be accompanied by security deposit as follows:

1. Bid Bond in the amount of a sum no less than 5 percent of the Bid Price on AIA Document A310 - Bid Bond or on standard surety company form.
2. Certified check payable to Owner in the amount of five percent (5%) of the Bid Price.

B. Endorse Bid Bond in name of West Branch - Rose City Area Schools as obligee, signed and sealed by the principal (Contractor) and surety.

C. Endorse certified check in name of West Branch – Rose City Area Schools.

D. Security deposit of accepted Bidder will be returned after delivery to the Owner of the required Performance and Payment Bonds by the accepted Bidder.

E. After a Bid has been accepted, security deposits will be returned to the respective Bidders.

F. If no contract is awarded, security deposits will be returned.

1.17 PERFORMANCE ASSURANCE

A. Accepted Bidder: Provide a Performance and Payment bond as described in AIA Document A104-2017.

B. Include the cost of performance assurance bonds in the Bid Sum.

1.18 BID FORM REQUIREMENTS

A. Complete requested information in the Bid Form and Bid Form Supplements.

B. Refer to Document AIA Document A104 – 2017 Standard Abbreviated Form of Agreement Between Owner and Contractor for inclusion of taxes and permits.

1.19 FEES FOR CHANGES IN THE WORK

A. When the Architect/Engineer establishes that the method of valuation for Changes in the Work will be net cost plus a percentage fee in accordance with General Conditions, the percentage fee allowed for Overhead and Profit to the Contractor shall be Ten Percent (10%) on the net cost of work by performed directly by the General Contractor, and Five Percent (5%) on the gross cost of work by a Subcontractor. The percentage fee allowed for Overhead and Profit to any Subcontractor at any level shall be Ten Percent (10%) on the net cost of work by performed directly by the Subcontractor, and Five Percent (5%) on the gross cost of work by any lower tier Subcontractor.

1.20 BID FORM SIGNATURE

A. Sign Bid Form, as follows:
1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature. Affix seal.
2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" under each signature. Affix seal to each signature.
3. Corporation: Signature of a duly authorized signing officers in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix the corporate seal. If the Bid is signed by officials other than the president and secretary of the

company, or the president/secretary/treasurer of the company, submit a copy of the by-law resolution of their board of directors authorizing them to do so, with the Bid Form in the bid envelope.

4. Joint Venture: Signature of each party of the joint venture under their respective seals in a manner appropriate to such party as described above, similar to requirements for Partnerships.

1.21 ADDITIONAL BID INFORMATION

A. Familial Disclosure Statement
   1. Include Familial Disclosure Statement - 00 45 01 with the Bid.
   2. Complete all requested information in the affidavit.
   3. Signature of the affidavit shall be notarized.
   4. Failure of the Bidder to submit a fully executed affidavit will result in disqualification of the bidder.

B. Iran Economic Sanctions Act Compliance Affidavit.
   1. Include Iran Economic Sanctions Act Compliance Certificate - 00 45 02 with the Bid.
   2. Complete all requested information in the affidavit.
   3. Signature of the affidavit shall be notarized.
   4. Failure of the Bidder to submit a fully executed affidavit will result in disqualification of the bidder.

1.22 BID OPENING

A. Bids will be opened publicly and read aloud immediately following the closure of the bidding period in the Superintendent’s office located in Ogemaw Heights High Schools at 960 S. M33, West Branch, MI 48661.

B. Bidders may be present.

1.23 DURATION OF OFFER

A. Bids shall remain open to acceptance and shall be irrevocable for a period of 60 days after bid closing date.

1.24 ACCEPTANCE OF OFFER

A. The Owner reserves the right to accept or reject any or all offers.

B. After acceptance by the Owner, the Architect/Engineer on behalf of the Owner, will issue to the accepted Bidder, a written letter of Contract Award.

C. Notwithstanding delay in the preparation and execution of the Agreement, accepted Bidder shall be prepared, upon written Notice to Proceed, to commence work within seven days following receipt of official written order of the Owner to proceed, or on date stipulated in such order.

D. The accepted bidder shall assist and cooperate with the Owner to prepare the Agreement, and within 7 days following its presentation shall execute Agreement and return it to the Owner.

END OF DOCUMENT

DOCUMENT 00 41 13

BID FORM – STIPULATED PRICE

To: West Branch – Rose City Area Schools Central Office
c/o Gail Hughey, Superintendent
960 HWY M33
West Branch, Michigan 48661

Project: West Branch – Rose City Area Schools
2022 Bond Issue Bid Package No. 6
Ogemaw eights High School Water Supply Upgrade
Project No. 294-22

Date: _____

Submitted by: _____
(full name)

_____
(full address)

Estimator _____
(name)

_____
(telephone)

_____
(email address)

1. OFFER

Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by Anthony Esson, Architect dated September 26, 2024 for the above named project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the

Stipulated Sum of: $_____(numerical)

$_____dollars in lawful (written) money of the United States of America.

- We have included the required security deposit as required by the Instruction to Bidders.
- All applicable federal and/or State of Michigan taxes are included in the Bid Sum.
- We have included the costs of all required construction permits and inspections in the bid sum.
- We acknowledge that Damages may be assessed for our failure to achieve Completion prior to the dates indicated in the Contract Documents.

2. CONTRACT TIME

   a. If this Bid is accepted, we will:

      - Achieve Substantial Completion of the Work not later than _____ (date).

      - We acknowledge that the work must be completed and ready to be put into service during the 2025 Summer School Break (between mid-June and mid-August).

3. ACCEPTANCE

   This offer shall be open to acceptance and is irrevocable for sixty (60) days from the bid closing date. If this bid is accepted by the Owner within the time period stated above, we will:

   a. Execute the Agreement within five (7) days of receipt of Notice of Award.

   b. Commence work within three (3) days after written Notice to Proceed.

   If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to the Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.

   In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

4. ADDENDA

   The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.

   Addendum # _____ Dated _____

   Addendum # _____ Dated _____

5. BID FORM SIGNATURE(S)
The Corporate Seal of

_____
(Bidder - print the full name of firm)
was hereunto affixed in the presence of:

_____
(Authorized signing officer Title)

If the Bid is a joint venture or partnership, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

END OF BID FORM - STIPULATED PRICE

DOCUMENT 00 45 01

FAMILIAL DISCLOSURE STATEMENT

The undersigned, the owner or authorized officer of _____ (the "Bidder") pursuant to the familial disclosure requirement provided in the advertisement for construction bids, hereby represent and warrant, except as provided below, that no familial relationships exist between the owner(s) or any employee of the Bidder and any member of the Board of Education or the Superintendent of West Branch – Rose City Area Schools (the School), except as indicated below:

List any Familial Relationships:

BIDDER:

_____

By: _____

Its: _____

State of Michigan)
) SS
County of)

This instrument was acknowledged before me on the _____ day of _____, 20___, by

_____.

_____
, Notary Public

_____, County, Michigan

My Commission Expires: _____

Acting in the County of: _____

END OF FAMILIAL DISCLOSURE STATEMENT

DOCUMENT 00 45 02

IRAN ECONOMIC SANCTIONS ACT COMPLIANCE AFFIDAVIT

Effective April 1, 2013, all Bids and/or Proposals received by public entities in the State of Michigan must comply with the Iran Economic Sanctions Act, Act 517 of 2012. As a condition to compliance with the Act, the following certification must be submitted with the Bid.

The undersigned, the owner or authorized officer of _____ (the “Bidder”), pursuant to the requirements of the Iran Economic Sanctions Act, Act 517 of 2012, hereby certifies under civil penalty for false certification, that the Bidder is not an "Iran Linked Business", as defined in the Act, and is eligible to submit a Bid.

By: _____

Its: _____

State of Michigan)
) SS
County of)

This instrument was acknowledged before me on the _____ day of _____, 20__, by

_____.

_____
, Notary Public

_____, County, Michigan

My Commission Expires: _____

Acting in the County of: _____

END OF IRAN ECONOMIC SANCTIONS ACT COMPLIANCE AFFIDAVIT

DOCUMENT 00 52 14

AGREEMENT FORM - AIA STIPULATED SUM (SINGLE-PRIME CONTRACT)

1.1 SUMMARY

A. Document Includes:
   1. Agreement.

1.2 AGREEMENT

A. AIA Document A104-2017, Standard Abbreviated Form of Agreement Between Owner and Contractor as modified, forms the basis of Agreement Between the Owner and Contractor.

END OF DOCUMENT

AIA® Document A104® – 2017

Standard Abbreviated Form of Agreement Between Owner and Contractor

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

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

West Branch-Rose City Area Schools
960 South M-33
West Branch, Michigan 48661

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

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

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

West Branch-Rose City Area Schools
2022 Bond Issue – Bid Package No. 6
Ogemaw Heights High School Water Supply Upgrades
AEA Project No. 294-22

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

Anthony P. Esson, Architect
P.O. Box 479
Gaylord, Michigan 49734

The Owner and Contractor agree as follows.

TABLE OF ARTICLES

ARTICLE 1 THE WORK OF THIS CONTRACT

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

ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

[X] The date of this Agreement.

[ ] A date set forth in a notice to proceed issued by the Owner.

[ ] Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

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

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

§ 2.3 Substantial Completion

§ 2.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check the appropriate box and complete the necessary information.)

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

~~[ ] By the following date:~~

~~**§ 2.3.2** Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:~~[X] By the following date: to be inserted

Portion of Work	Substantial Completion Date

§ 2.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section ~~2.3, liquidated damages, if any, shall be assessed as set forth in Section 3.5.~~2.3 due to circumstances within the reasonable control of the Contractor, Owner may at their sole discretion hold Contractor responsible for costs that Owner would not have otherwise incurred. Such costs may be withheld from Progress payments or Final payment as applicable.

ARTICLE 3 CONTRACT SUM

§ 3.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:

(Check the appropriate box.)

[X] Stipulated Sum, in accordance with Section 3.2 below

~~[ ] Cost of the Work plus the Contractor's Fee, in accordance with Section 3.3 below~~

~~[ ] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 3.4 below~~

(Based on the selection above, complete Section 3.2, 3.3 or 3.4 below.)

§ 3.2 The Stipulated Sum shall be to be inserted ($), subject to additions and deductions as provided in the Contract Documents.

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

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

None

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

Item	Units and Limitations	Price per Unit ($0.00)
None		

§ 3.2.3 Allowances, if any, included in the stipulated sum:
(Identify each allowance.)

~~Item~~	~~Price~~

~~**§ 3.3 Cost of the Work Plus Contractor's Fee**~~
~~**§ 3.3.1** The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.~~

~~**§ 3.3.2** The Contractor's Fee:~~
~~*(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)*~~

~~**§ 3.4 Cost of the Work Plus Contractor's Fee With a Guaranteed Maximum Price**~~
~~**§ 3.4.1** The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.~~

~~**§ 3.4.2** The Contractor's Fee:~~
~~*(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)*~~

~~**§ 3.4.3 Guaranteed Maximum Price**~~
~~**§ 3.4.3.1** The sum of the Cost of the Work and the Contractor's Fee is guaranteed by the Contractor not to exceed ($), subject to additions and deductions by changes in the Work as provided in the Contract Documents. This maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.~~
~~*(Insert specific provisions if the Contractor is to participate in any savings.)*~~

~~**§ 3.4.3.2** The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:~~
~~*(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)*~~

~~**§ 3.4.3.3** Unit Prices, if any:~~
~~*(Identify the item and state the unit price and the quantity limitations, if any, to which the unit price will be applicable.)*~~

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

Item	Price
None	

~~§ 3.4.3.4 Allowances, if any, included in the Guaranteed Maximum Price:~~
~~*(Identify each allowance.)*~~

~~Item~~	~~Price~~

~~§ 3.4.3.5 Assumptions, if any, on which the Guaranteed Maximum Price is based:~~

~~§ 3.4.3.6 To the extent that the Contract Documents are anticipated to require further development, the Guaranteed Maximum Price includes the costs attributable to such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include changes in scope, systems, kinds and quality of materials, finishes or equipment, all of which, if required, shall be incorporated by Change Order.~~

~~§ 3.4.3.7 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in Section 3.4.3.5. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the agreed-upon assumptions contained in Section 3.4.3.5 and the revised Contract Documents.~~

~~§ 3.5 Liquidated damages, if any:~~
~~*(Insert terms and conditions for liquidated damages, if any.)*~~

ARTICLE 4 PAYMENT

§ 4.1 Progress Payments

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

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

§ 4.1.3 Provided that an Application for Payment is received by the Architect not later than the last day of a month, the Owner shall make payment of the ~~certified~~ Architect-certified amount to the Contractor not later than the ~~day of the month. If an~~ last day of the following month, unless and to the extent the Owner reasonably disputes the Application or Certification in good faith. If an Architect-certified Application for Payment is received by the ~~Architect~~ Owner after the date fixed above, ~~payment~~ undisputed payments shall be made by the Owner not later than thirty (30) days after the ~~Architect~~ Owner receives the certified Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 4.1.4 For each progress payment made prior to ~~Substantial~~ Final Completion of the Work, the Owner may withhold retainage from the payment ~~otherwise due as follows:~~in an amount not less than ten percent (10%).
(Insert a percentage or amount to be withheld as retainage from each Application for Payment and any terms for reduction of retainage during the course of the Work. The amount of retainage may be limited by governing law.)

§ 4.1.5 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located. *(Insert rate of interest agreed upon, if any.)*

5 % Per Annum (See MCL 438.31)

§ 4.2 Final Payment

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

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 18.2, and to satisfy other requirements, if any, which extend beyond final payment;

~~**.2** the Contractor has submitted a final accounting for the Cost of the Work, where payment is on the basis of the Cost of the Work with or without a Guaranteed Maximum Price; and~~

.3 a final Certificate for Payment has been issued by the Architect in accordance with Section 15.7.1.

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

§ 4.3 Form of Payment

§ 4.3.1 Payments to the Contractor will be made by paper check. The Owner will not consider requests for ACH or other forms of electronic payment.

ARTICLE 5 DISPUTE RESOLUTION

§ 5.1 Binding Dispute Resolution

For any claim subject to, but not resolved by, mediation pursuant to Section 21.5, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[ ] ~~Arbitration pursuant to Section 21.6 of this Agreement~~

[X] Litigation in a court of competent jurisdiction

[ ] ~~Other *(Specify)*~~

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

ARTICLE 6 ENUMERATION OF CONTRACT DOCUMENTS

§ 6.1 The Contract Documents are defined in Article 7 and, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 6.1.1 The Agreement is this executed AIA Document A104™–2017, Standard Abbreviated Form of Agreement Between Owner and Contractor.

~~**§ 6.1.2** Building information modeling exhibit, dated as indicated below:~~
~~(Insert the date of the building information modeling exhibit incorporated into this Agreement.)~~

§ 6.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

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

All Sections dated September 26, 2024 unless dated otherwise below

Section	Title	Date	Pages
01 10 00	Summary		2
01 20 00	Price and Payment Procedures		3
01 30 00	Administrative Requirements		3
01 33 00	Submittal Procedures		5
01 40 00	Quality Requirements		3
01 50 00	Temporary Facilities and Controls		3
01 60 00	Product Requirements		3
01 70 00	Execution and Closeout Requirements		6
03 30 00	Cast-in-Place Concrete		10
04 20 00	Unit Masonry		6
06 10 00	Rough Carpentry		3
06 17 53	Shop-Fabricated Wood Trusses		5
07 21 13	Board Insulation		2
07 21 16	Blanket Insulation		2
07 31 13	Asphalt Shingles		4
07 46 33	Plastic Siding		4
07 62 00	Sheet Metal Flashing and Trim		3
07 90 00	Joint Protection		4
08 12 13	Hollow Metal Frames		3
08 13 13	Hollow Metal Doors		3
08 71 00	Door Hardware		8
09 90 00	Painting and Coating		4
23 00 01	General Mechanical Requirements		9
23 31 00	HVAC Ducts and Casings		5
23 34 23	HVAC Power Ventilators		2
23 81 01	Terminal Heat Transfer Units		2
26 00 01	General Electrical Requirements		10
26 05 19	Low-Voltage Electrical Power Cables (600V and Less)		5
26 05 26	Grounding and Bonding for Electrical Systems		3
26 05 29	Hangers and Supports for Electrical Systems		2
26 05 34	Conduit		6
26 05 37	Boxes		3
26 05 53	Identification for		3

	Electrical Systems	
26 22 00	Low-Voltage Transformers	5
26 24 16	Panelboards	5
26 27 01	Electrical Service Entrance	2
26 27 17	Equipment Wiring	2
26 27 26	Wiring Devices	5
26 28 13	Fuses	2
26 51 00	Interior Lighting	4
26 56 00	Exterior Lighting	3
31 05 13	Soils for Earthwork	3
32 05 16	Aggregates for Earthwork	2
31 10 00	Site Clearing	2
31 22 13	Rough Grading	3
31 23 16	Excavating	2
31 23 17	Trenching	3
31 23 23	Fill	3
31 11 23	Aggregate Base Courses	2
32 13 13	Concrete Paving	4
32 91 19	Landscape Grading	2
32 92 19	Seeding	2

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

All sheets dated September 26, 2024 unless noted otherwise

Number	Title	Date
T	Title Sheet	
A1	Wellhouse Plan, Elevations & Sections	
C1	General Notes / Well Details	
C2	Proposed Site Plan	
C3	Pressure System Mechanical Plan	
C4	Pressure System Electrical Plan	
ET	Electrical Title Sheet	
EP	Electrical Plan	
MP	Mechanical Heat & Ventilation Plan	

§ 6.1.6 The Addenda, if any:

Number	Date	Pages
4	November 5, 2024	4

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are enumerated in this Article 6.

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

.1 Other Exhibits:
(Check all boxes that apply.)

[ ] ~~Exhibit A, Determination of the Cost of the Work.~~

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

_____

[ ] ~~The Sustainability Plan:~~

~~Title~~	~~Date~~	~~Pages~~

[ ] ~~Supplementary and other Conditions of the Contract:~~

~~Document~~	~~Title~~	~~Date~~	~~Pages~~

.2 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents.)

.1 Accepted portions of Contractor's Bid Response

The parties acknowledge that, due to the incorporation of several Contract Documents, the possibility exists (and is likely) that conflict or ambiguity may exist between or among the Contract Documents. In the event of any such conflict or ambiguity between or among the Contract Documents, the terms most beneficial to the Owner shall govern, as determined in the Owner's sole discretion.

ARTICLE 7 GENERAL PROVISIONS

§ 7.1 The Contract Documents

The Contract Documents are enumerated in Article 6 and consist of this Agreement (including, if applicable, Supplementary and other Conditions of the Contract), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. The 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 to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 7.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between any persons or entities other than the Owner and the Contractor.

§ 7.3 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.

§ 7.4 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.

§ 7.5 Ownership and use of Drawings, Specifications and Other Instruments of Service

§ 7.5.1 ~~The~~ Except as otherwise provided herein or in the Agreement between Owner and Architect, 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 in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and 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 the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 7.5.2 The Contractor, Subcontractors, Sub-subcontractors and suppliers are authorized to use and reproduce the Instruments of ~~Service provided to them,~~ Service, subject to the protocols established pursuant to Sections 7.6 and 7.7, 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 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.

~~**§ 7.6 Digital Data Use and Transmission**~~

~~The parties shall agree upon written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.~~

~~**§ 7.7 Building Information Models Use and Reliance**~~

~~Any use of, or reliance on, all or a portion of a building information model without agreement to written protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.~~

§ 7.5.3 The Drawings, Specifications, and other documents and all data used in compiling any tests, surveys, or inspections at the Project Site and the results therefrom, as well as all photographs, drawings, specifications, schedules, data processing output, computer-aided design/drafting (CADD) system disks/tapes, computations, studies, audits, reports, models and other items of like kind, and all intellectual property, prepared or created for or in connection with the Project and required by the Owner, the Contractor, or a third party, belong to the Owner. The Contractor may retain one record set. All copies of them, except Contractor's record set, shall be returned or suitably accounted for upon completion of the Work. They are for use solely with respect to the Project. The Contractor shall not, without the prior written consent of the Owner, use or permit anyone to use any Drawings, Specifications, or other documents prepared for or in connection with the Project, or any concepts or ideas developed in connection with the Project, for any purpose other than the Project. The Owner shall at all times have access to and control over the disposition of any Drawings, Specifications, and other documents pertaining to the Project.

§ 7.8 Severability

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

§ 7.9 Notice

§ 7.9.1 Except as otherwise provided in Section 7.9.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to ~~the designated~~ an appropriate representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission ~~in accordance with a building information modeling exhibit, if completed, or as otherwise set forth below:~~

~~(If other than in accordance with a building information modeling exhibit, insert requirements for delivering Notice in electronic format such as name, title and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)~~if an acknowledgement of receipt is received from the

recipient or proof of receipt is otherwise established. The parties acknowledge that an appropriate representative of the Owner shall have authority only to the extent provided by the Owner's Board of Education.

§ 7.9.2 Notice of Claims shall be provided in writing and shall be deemed to have been duly served only if delivered to ~~the designated~~ an appropriate representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery. The parties acknowledge that the Owner's administrators, employees, representatives, and agents have authority only to the extent expressly provided by the Owner's Board of Education and that, by law, all parties dealing with the Owner must ascertain such authority before relying on the actions or representations purported or implied to be on behalf of the Owner.

~~§ 7.10 Relationship of the Parties~~

~~Where the Contract is based on the Cost of the Work plus the Contractor's Fee, with or without a Guaranteed Maximum Price, the Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.~~

ARTICLE 8 OWNER

§ 8.1 Information and Services Required of the Owner

§ 8.1.1 ~~Prior to commencement of the Work, at the written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 8.1.1, the Contract Time shall be extended appropriately.~~

§ 8.1.2 The Owner shall furnish all necessary surveys and a legal description of the site.

§ 8.1.3 The Contractor shall be entitled to rely on the accuracy of information furnished by the ~~Owner but~~ Owner, subject to its experience, expertise, and judgement, and shall exercise proper precautions relating to the safe performance of the Work. The Contractor acknowledges and agrees that the Architect is responsible for design, that the Owner has no duty to discover any design errors or omissions in the Drawings, Plans, Specifications and other Construction Documents or to notify Contractor of same, and that the Owner does not warrant the accuracy and adequacy of any Contract Documents.

§ 8.1.4 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, ~~including~~ including, but not limited to, those required under Section 9.6.1, the Owner shall secure and pay for other necessary approvals, easements, assessments, and charges required for the construction, use, or occupancy of permanent structures or for permanent changes in existing facilities.

§ 8.2 Owner's Right to Stop the Work

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents, or ~~repeatedly~~ fails to carry out the 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 is eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity. This right shall be in addition to and not in limitation of the Owner's rights under any provision of the Contract Documents.

§ 8.3 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 period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to any other remedies the Owner may ~~have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to~~

~~prior approval of the Architect and the~~ have (including any claim against the Contractor's performance bond), correct such default or neglect. The Architect may, pursuant to Section 15.4.3, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including the Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 21.

ARTICLE 9 CONTRACTOR

§ 9.1 Review of Contract Documents and Field Conditions by Contractor

§ 9.1.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be ~~performed and correlated personal observations~~ performed, including but not limited to the location of utilities, and correlated personal observations and inspections with requirements of the Contract Documents.

§ 9.1.2 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 8.1.2, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies, or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.

§ 9.1.3 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.~~require, with a copy of same to be forwarded to the Owner.

§ 9.2 Supervision and Construction Procedures

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

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

§ 9.2.3 The Contractor shall immediately notify the Architect of delays of any other Contractors that could impact timely coordination and completion of the Work. The Contractor shall be deemed to have accepted prior work when it commences provision of subsequent Work and shall be responsible for the cost of repair, replacement, or reconstruction if the prior work is found to be improper.

§ 9.3 Labor and Materials

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

§ 9.3.2 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 skilled in tasks assigned to them.

§ 9.3.3 The Contractor may make a substitution only with the consent of the Owner, after evaluation by the Architect and in accordance with a Modification.

§ 9.3.4 Asbestos-Free Product Installation

§ 9.3.4.1 It is hereby understood and agreed that no product and/or material containing asbestos, including chrysolite, amosite, crocidolite, tremolite asbestos, anthorphyllite asbestos, actinolite asbestos and any combination of these materials that have been chemically treated and/or altered shall be installed or introduced into the Work by the Contractor or its employees, agents, Subcontractors, or other individuals or entities over whom the Contractor has control. The Contractor shall be required to provide a signed certification statement ensuring that all products or materials installed or introduced into the Work will be asbestos-free.

§ 9.3.4.2 The Contractor also shall be required to furnish certified statements from the manufacturers of supplied materials used during construction verifying their products to be asbestos-free in accordance with the requirements of Section 9.3.4.1.

§ 9.3.4.3 The Contractor shall complete and submit to the Owner a certification evidencing asbestos-free product installation prior to issuance of the final Certificate for Payment in a form acceptable to the Owner.

§ 9.3.5 The Contractor agrees that neither it nor its Subcontractors will discriminate against any employee or applicant for employment, to be employed in the performance of this Contract, with respect to hire, tenure conditions or privilege of employment, or any matter directly or indirectly related to employment, because of race, age, sex, color, religion, national origin, ancestry or physical disability. Breach of this covenant may be regarded as a material breach of this Contract.

§ 9.4 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 expressly 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 expressly 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 under normal usage.~~ Contractor warrants that the Owner will have good title to the Work and all materials and equipment incorporated into the Work. The Contractor warrants that all Work and materials and equipment incorporated into the Work shall be fit for the purposes for which they were intended. The Contractor warrants that all Work and materials and equipment incorporated into the Work shall be merchantable. All other warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 15.6.3.

Upon notice of the breach of any of the foregoing warranties or guarantees or any other warranties or guarantees under the Contract Documents, the Contractor, in addition to any other requirements in the Contract Documents, will commence to correct such breach within 72 hours after written notice thereof and thereafter will use its best efforts to correct such breach to the satisfaction of the Owner; provided that if such notice is given after final payment hereunder, such 72 hour period shall be extended to seven (7) days. The foregoing warranties and obligations of the Contractor shall survive the final payment and/or termination of the Contract.

The Contractor shall, at the time of final completion of the Work and as a condition precedent to final payment to the Contractor, assign to the Owner all manufacturers' warranties related to the materials and labor used in the Work. The Contractor further agrees to perform the Work in such manner as to preserve any and all such manufacturers' warranties and deliver to the Architect the warranties, project manuals, operating procedures, and other materials related to each of the building systems and materials included in the Contractor's Work and as required by the Specifications.

§ 9.5 Taxes

The Contractor shall pay sales, consumer, use, and other similar taxes that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. The Contractor shall pay all local, state and federal taxes levied on its business, income or property and shall make all contributions for social security and other wage or payroll taxes. The Contractor shall be solely responsible for such payments and shall indemnify the Owner and hold it harmless from same.

§ 9.6 Permits, Fees, Notices, and Compliance with Laws

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

§ 9.6.2 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. If the Contractor performs Work ~~knowing it to be~~ contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 9.7 Allowances

The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. The Owner shall select materials and equipment under allowances with reasonable promptness. Allowance amounts shall include the costs to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts. Contractor's costs for unloading and handling at the site, labor, installation, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowance.

§ 9.8 Contractor's Construction Schedules

§ 9.8.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised 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.

§ 9.8.2 The Contractor shall perform the Work in general accordance with the most recent schedule submitted to the Owner and Architect. The Contractor acknowledges and understands that the work schedule will be modified from time-to-time with the Owner's approval to coordinate with the work of others and that such schedule changes do not give rise to a claim for damages or additional compensation by the Contractor for delay or otherwise. The Contractor shall be required to conform to the most recent Owner-approved schedule and acknowledges that fact was taken into account when it agreed to the Contract Sum and entered into this Contract. The Contractor shall cooperate with the Architect and Owner in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other contractors or the construction or operations of the Owner's own forces.

§ 9.9 Submittals

§ 9.9.1 The Contractor shall review for compliance with the Contract Documents and submit to the Architect Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents in coordination with the Contractor's construction schedule and in such sequence as to allow the Architect reasonable time for review. 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. The Work shall be in accordance with approved submittals.

§ 9.9.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents.

§ 9.9.3 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 or unless the Contractor needs to provide such services in order to carry out the Contractor's own responsibilities. If professional design services or certifications by a design professional are specifically required, the Owner and the Architect will specify the performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional. If no criteria are specified, the design shall comply with applicable codes and ordinances. ~~Each~~ Subject to its professional skill, experience, and expertise (if applicable), and except as otherwise set forth in the Contract Documents, each Party shall be entitled to rely upon the information provided by the other Party. The Architect will review and approve or take other appropriate action on

submittals for the limited purpose of checking for conformance with information provided and the design concept expressed in the Contract Documents. The Architect's review of Shop Drawings, Product Data, Samples, and similar submittals shall be for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. In performing such review, the Architect will approve, or take other appropriate action upon, the Contractor's Shop Drawings, Product Data, Samples, and similar submittals.

§ 9.10 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. The Contractor will also consult with the Owner and Architect concerning necessary operations at the Project site to minimize construction impacts on the Owner, including but not limited to its educational operations.

§ 9.11 Cutting and Patching

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

§ 9.12 Cleaning Up

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

§ 9.13 Access to Work

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

§ 9.14 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 indemnify and hold harmless the Owner and Architect ~~harmless from~~ from any and all cost, damage, or loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 9.15 Indemnification

§ 9.15.1 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 claims, damages, losses and expenses, including but not limited to attorneys' ~~fees,~~ fees and the costs of correcting defective work, arising out of or resulting from performance of the Work, ~~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),~~ , but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, or the Contractor's breach of this Agreement, regardless of whether or not such claim, damage, loss, or expense 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 which would otherwise exist as to a party or person described in this Section 9.15.1.

§ 9.15.2 In claims against any person or entity indemnified under this Section 9.15 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 9.15.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 9.15.3 In addition to and not in limitation of the Contractor's other indemnity obligations, the Contractor hereby accepts and assumes exclusive liability for and shall indemnify, protect, and hold harmless the Owner and Architect from and against the payment of the following:

.1 all loss by fines, penalties or corrective measures resulting from acts of the Contractor or omissions by the Contractor, its Subcontractors, agents, employees or assigns, with respect to the violation of safety requirements of this Contract, including reasonable attorney fees

.2 all contributions, taxes, or premiums (including interest and penalties thereof) which may be payable under the unemployment insurance law of any state, the federal Social Security Act, federal, state, county, and/or municipal tax withholding laws, or any other law, measured upon the payroll of or required to be withheld from employees by whomsoever employed, engaged in the Work to be performed and furnished under this Contract;

.3 all sales, use, personal property and other taxes (including interest and penalties thereof) required by any federal, state, county, municipal, or other law to be paid or collected by the Contractor or any of its Subcontractors or vendors or any other person or persons acting for, through or under it or any of them, by reason of the performance of the Work or the acquisition, ownership, furnishing, or use of any materials, equipment, supplies, labor, services, or other items for or in connection with the Work; and

.4 all pension, welfare, vacation, annuity, and other benefit contributions payable under or in connection with respect to all persons by whomsoever employed, engaged in the Work to be performed and furnished under this Contract.

.5 any claim, damage, loss or expense, including, but not limited to, actual attorney fees, incurred by the Owner related to any hazardous material or waste, toxic substance, pollution, or contamination brought into the Project site or caused by the Contractor or used, handled, transported, stored, removed, remediated, disturbed, or dispersed of by Contractor.

§ 9.15.4 In the event that any claim is made or asserted, or lawsuit filed for damages or injury arising out of or resulting from the performance of the Work, whether or not the Owner or Architect is named as a party, the Contractor shall immediately advise the Owner and Architect, in writing, of such claim or lawsuit and shall provide a full and complete copy of any documents or pleadings thereto, as well as a full and accurate report of the facts involved.

ARTICLE 10 ARCHITECT

§ 10.1 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.~~ Payment and with the Owner's written concurrence during the correction period. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

§ 10.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the ~~Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.~~Owner and Architect.

§ 10.3 The Architect will visit the site at intervals appropriate to the stage of the construction ~~to become generally~~ or more frequently as required by law, to become familiar with the progress and quality of the portion of the Work completed, and to determine ~~in general, if the Work observed is being performed in a manner indicating that~~ the Work, when fully completed, will be in accordance with the Contract Documents. ~~However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The~~ Except as otherwise set forth in the Owner/Architect Agreement, the Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents. The Architect shall provide all services and duties that may be performed by an "Architect" or "Engineer" in 1937 PA 306 and 1980 PA 299, including but not limited to, construction supervision.

§ 10.4 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, will guard the Owner against defects and deficiencies in the Work, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. ~~The~~ Except as required by the Owner/Architect Agreement, 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~~ and, except as provided in the Owner/Architect Agreement, 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. The Architect shall provide all services and duties that may be performed by an "Architect" or "Engineer" in 1937 PA 306 and 1980 PA 299, including but not limited to, construction supervision.

§ 10.5 Based on the Architect's evaluations of the Work and 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.

§ 10.6 The Architect has authority to reject Work that does not conform to the Contract Documents and to require inspection or testing of the Work.

§ 10.7 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.

§ 10.8 The Architect will interpret ~~and decide~~ matters concerning performance under, and requirements of, the Contract Documents on written request of ~~either the Owner or Contractor.~~ the Owner. The Architect will make initial ~~decisions~~ interpretations on all claims, disputes, and other matters in question between the Owner and Contractor but will not be liable for results of any ~~interpretations or decisions~~ reasonable interpretations rendered in good faith.

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

ARTICLE 11 SUBCONTRACTORS

§ 11.1 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.

§ 11.2 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect in writing of the Subcontractors or suppliers proposed for each of the principal portions of the Work. The Contractor shall not contract with any Subcontractor or supplier to whom the Owner or Architect has made reasonable written objection within ten days after receipt of the Contractor's list of Subcontractors and suppliers. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, taking into consideration the Owner's or Architect's reasonable objection in good faith, 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. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 11.3 Contracts between the Contractor and Subcontractors shall (1) require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the 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 the Contract Documents, assumes toward the Owner and Architect, and (2) allow the Subcontractor the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Owner. The Contractor shall ensure that the Owner is made an express third-party beneficiary of any agreement between the Contractor and Subcontractor (or between a Subcontractor and any sub-subcontractor) related to the Work.

ARTICLE 12 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

§ 12.2 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 activities with theirs as required by the Contract Documents.

§ 12.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a Separate Contractor because of delays, improperly timed activities, or defective construction of the Contractor. ~~The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work, or defective construction of a Separate Contractor.~~

ARTICLE 13 CHANGES IN THE WORK

§ 13.1 By appropriate Modification, changes in the Work may be accomplished after execution of the Contract. The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, with the Contract Sum and Contract Time being adjusted accordingly. Such changes in the Work shall be authorized by written Contract amendment, written Change Order signed by the Owner, Contractor, and Architect, or by written Construction Change Directive signed by the Owner and Architect. Upon issuance of the Change Order or Construction Change Directive, the Contractor shall proceed promptly with such changes in the Work, unless otherwise provided in the Change Order or Construction Change Directive.

§ 13.2 Adjustments in the Contract Sum and Contract Time resulting from a change in the Work shall be determined by mutual agreement of the parties or, in the case of a Construction Change Directive signed only by the Owner and Architect, by the Contractor's cost of labor, material, equipment, and reasonable overhead and profit, unless the parties agree on another method for determining the cost or credit. Pending final determination of the total cost of a Construction Change Directive, the Contractor may request payment for Work completed pursuant to the Construction Change Directive. The ~~Architect~~ Architect, with the Owner's approval, will make an interim determination of the amount of payment due for purposes of certifying the Contractor's monthly Application for Payment. When the Owner and Contractor agree on adjustments to the Contract Sum and Contract Time arising from a Construction Change Directive, the Architect will prepare a Change Order. If the parties cannot agree on a final adjustment to the Contract Sum and/or Contract Time, the Contractor's sole remedy is to timely file a Claim in accordance with this Agreement.

§ 13.3 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall either: (i) timely file a Claim in accordance with this Agreement, or (ii) notify the Owner and the Architect in writing and shall not proceed to implement the change in the Work.

§ 13.4 If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the ~~Contract Sum and Contract Time shall be equitably~~ Contractor shall timely provide written notice to the Owner and Architect before conditions are disturbed, including such notice as required by 1998 PA 57, which is incorporated herein by reference. If appropriate, the Contract Sum and Contract Time may be adjusted as mutually agreed between the Owner and ~~Contractor; provided that the Contractor provides notice to the Owner and Architect promptly and before conditions are disturbed.~~Contractor.

ARTICLE 14 TIME

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

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

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

§ 14.4 The date of Substantial Completion is the date certified by the Architect in accordance with Section 15.6.3.

§ 14.5 ~~If~~ Provided the Contractor timely and properly submits a Claim as required by this Agreement, if the Contractor is delayed at any time in the commencement or progress of the Work by (1) changes ordered in the Work; (2) by ~~labor disputes, fire, unusual delay in deliveries,~~ fire, significant abnormal adverse weather conditions not reasonably

anticipatable, unavoidable casualties, or any causes beyond the Contractor's control; or (3) by other causes that the Contractor asserts, and the Owner and Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine, subject to the provisions of Article 21. In the event the Contractor is hindered in the commencement or progress of the Work by someone other than the Owner, and in the event the Contractor claims damages as a direct and proximate consequence thereof (including, but not limited to, extended general conditions, overhead, profit, overtime, interest, supervision or other costs or profits whatsoever), then the Contractor shall not assert such claims against the Owner, and as to the Owner, the Contractor's claims of delay damages are hereby waived. The Contractor's sole and exclusive remedy regarding such claims for such delay damages shall be to pursue such claims directly against the individual or entity which caused the delay.

For any delay claims raised against the Owner, the Contractor's sole and exclusive remedy is an extension of time to perform the Work not to exceed the time frame of any proven delay. Under no circumstances is the Contractor entitled to monetary delay damages from the Owner.

ARTICLE 15 PAYMENTS AND COMPLETION

§ 15.1 Schedule of Values

§ 15.1.1 ~~Where the Contract is based on a Stipulated Sum or the Cost of the Work with a Guaranteed Maximum Price pursuant to Section 3.2 or 3.4, the~~ The Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Stipulated Sum or Guaranteed Maximum Price to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy required by the Architect. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 15.1.2 The allocation of the Stipulated Sum or Guaranteed Maximum Price under this Section 15.1 shall not constitute a separate stipulated sum or guaranteed maximum price for each individual line item in the schedule of values.

~~**§ 15.2 Control Estimate**~~

~~**§ 15.2.1** Where the Contract Sum is the Cost of the Work, plus the Contractor's Fee without a Guaranteed Maximum Price pursuant to Section 3.3, the Contractor shall prepare and submit to the Owner a Control Estimate within 14 days of executing this Agreement. The Control Estimate shall include the estimated Cost of the Work plus the Contractor's Fee.~~

~~**§ 15.2.2** The Control Estimate shall include:~~

- ~~**.1** the documents enumerated in Article 6, including all Modifications thereto;~~
- ~~**.2** a list of the assumptions made by the Contractor in the preparation of the Control Estimate to supplement the information provided by the Owner and contained in the Contract Documents;~~
- ~~**.3** a statement of the estimated Cost of the Work organized by trade categories or systems and the Contractor's Fee;~~
- ~~**.4** a project schedule upon which the Control Estimate is based, indicating proposed Subcontractors, activity sequences and durations, milestone dates for receipt and approval of pertinent information, schedule of shop drawings and samples, procurement and delivery of materials or equipment the Owner's occupancy requirements, and the date of Substantial Completion; and~~
- ~~**.5** a list of any contingency amounts included in the Control Estimate for further development of design and construction.~~

~~**§ 15.2.3** When the Control Estimate is acceptable to the Owner and Architect, the Owner shall acknowledge it in writing. The Owner's acceptance of the Control Estimate does not imply that the Control Estimate constitutes a Guaranteed Maximum Price.~~

~~**§ 15.2.4** The Contractor shall develop and implement a detailed system of cost control that will provide the Owner and Architect with timely information as to the anticipated total Cost of the Work. The cost control system shall compare the Control Estimate with the actual cost for activities in progress and estimates for uncompleted tasks and proposed changes. This information shall be reported to the Owner, in writing, no later than the Contractor's first Application for Payment and shall be revised and submitted with each Application for Payment.~~

~~§ 15.2.5 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in the Control Estimate. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the Control Estimate and the revised Contract Documents.~~

§ 15.3 Applications for Payment

§ 15.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of ~~values, if required under Section 15.1,~~ values for completed portions of the Work. The application shall be notarized, if required; be supported by all data substantiating the Contractor's right to payment that the Owner or Architect require; shall reflect retainage if provided for in the Contract ~~Documents; and include any revised cost control information required by Section 15.2.4.~~ Documents. Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 15.3.2 ~~With each Application for Payment where the Contract Sum is based upon the Cost of the Work, or the Cost of the Work with a Guaranteed Maximum Price, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor plus payrolls for the period covered by the present Application for Payment, less that portion of the progress payments attributable to the Contractor's Fee.~~

§ 15.3.3 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 stored, and protected from damage, off the site at a location agreed upon in writing. Off-site storage by the Contractor is discouraged.

§ 15.3.4 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 other encumbrances adverse to the Owner's interests.

§ 15.3.4.1 Each Contractor Application for Payment shall be accompanied by (1) an Affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which previous Applications for Payment have been submitted and for which the Owner might in any way be responsible have been paid or otherwise satisfied, and (2) a release or waiver of liens from the Contractor and each of its Subcontractors, materialman, suppliers and laborers addressing all previous Applications for Payment submitted for the Project.

§ 15.4 Certificates for Payment

§ 15.4.1 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 of the Architect's reasons for withholding certification in whole or in part as provided in Section 15.4.3.

§ 15.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluations of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the ~~Architect. However,~~ Architect, in writing, together with the certification to which it pertains. However, unless otherwise required by the Owner/Architect Agreement, 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 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.

§ 15.4.3 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 15.4.2 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 15.4.1. If the Contractor and the 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 9.2.2, because of

.1 defective Work not ~~remedied;~~remedied, or the Contractor is in default on the Agreement;
.2 third-party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
.3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
.5 damage to 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.~~Documents
.8 the Work not having progressed to the extent set forth in the Application for Payment;
.9 representations of the Contractor are untrue;
.10 failing to conform to Project Schedule;
.11 default in the performance of any obligation to the Owner under another contract; or
.12 failure to provide sufficiently skilled workers.

§ 15.4.4 When ~~either party~~ the Contractor disputes the Architect's decision regarding a Certificate for Payment under Section 15.4.3, in whole or in part, ~~that party~~ the Contractor may submit a Claim in accordance with Article 21.

§ 15.4.5 If the Contractor disputes any determination by the Owner or Architect with regard to any Certificate for Payment, the Contractor shall nevertheless continue to expeditiously perform the Work and such dispute shall provide no basis for any manner of suspension of the Contractor's performance of the Work.

§ 15.4.6 Notwithstanding anything herein to the contrary, the Owner has no obligation to pay the Contractor absent receipt of a Certificate for Payment for the requested amount, and neither the Architect's failure to issue a Certificate for Payment nor the Architect's failure to notify the Contractor and/or Owner of a withheld Certificate for Payment creates an obligation on the Owner to pay the Contractor. The foregoing sentence shall not operate to limit the right of the Owner to dispute amounts requested by the Contractor or to withhold payments from the Contractor as provided in the Contract Documents.

§ 15.5 Progress Payments

§ 15.5.1 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.

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

§ 15.5.3 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.

§ 15.5.4 ~~Provided the Owner has fulfilled its payment obligations under the Contract Documents, the~~ The Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If

approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 15.6 Substantial Completion

§ 15.6.1 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 and when all required occupancy permits, if any, have been issued, so that the Owner can occupy or utilize the Work for its intended use.

§ 15.6.2 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.~~ payment (a "punch list"). 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.

§ 15.6.3 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. The Contractor shall respond immediately to correct Work deficiencies and/or punch list items. Should the Contractor fail to make corrections in a timely fashion, but not later than fifteen (15) calendar days from the date of Substantial Completion or notification of the required corrections, whichever is earlier, such Work may be corrected by the Owner at the Contractor's sole expense, and any remaining payments due the Contractor shall be withheld by the Owner. The Contractor shall promptly notify the Architect, in writing, when the Work deficiencies and/or punch list items are completed. Upon the review of the Work by the Architect after such notification by the Contractor, if Work deficiencies and/or punch list items shall continue to exist, the Contractor shall reimburse the Owner its cost plus ten percent (10%) overhead and profit on any cost incurred by the Owner, including the Architect's fees for re-inspection of the Work. Failure to pay such costs within ten (10) days of receipt of a demand regarding the same shall permit the Owner to pay such costs out of retainage held by the Owner on the Contractor's contract. When the Architect determines that the Work or designated portion thereof is substantially complete, the Architect will issue a Certificate of Substantial Completion which shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 15.6.4 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 15.7 Final Completion and Final Payment

§ 15.7.1 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 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 stated in Section 15.7.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 15.7.2 Final payment shall not become due until the Contractor has delivered to the Owner ~~a complete release of all liens arising out of this Contract or receipts in full covering all labor, materials and equipment for which a lien could be filed, or 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 costs and reasonable attorneys' fees.~~(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, (1) consent of surety, if any, to final payment, (2) an affidavit that states the Work is fully completed and performed in accordance with the Contract Documents, (3) in the event of Contractor bankruptcy, at the Owner's option, an order entered by the

court having jurisdiction of the Contractor's insolvency proceeding authorizing such payment, (4) a general release executed by the Contractor on a form provided by the Architect, (5) all close-out documents, (6) all warranties collected and provided in an acceptable manner, and (7) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner.

§ 15.7.3 The making of final payment shall not 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;~~

~~.3 terms of special warranties required by the Contract Documents; or~~

~~.4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.~~Owner.

§ 15.7.4 Acceptance of final payment by the Contractor, a Subcontractor or supplier shall constitute a waiver of claims by ~~that payee~~ the Contractor except those previously made in writing and identified by ~~that payee~~ the Contractor as unsettled at the time of the final Application for ~~Payment.~~Payment and specifically referenced as being an exception to the waiver contained in this Section 15.7.4.

ARTICLE 16 PROTECTION OF PERSONS AND PROPERTY

§ 16.1 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. The Contractor shall take ~~reasonable precautions~~ every reasonable precaution for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and

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

The Contractor shall take all reasonable safety precautions with respect to the Work, shall comply with all industry standard safety measures, shall comply with all applicable laws, including but not limited to compliance 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 and property and their protection from damage, injury, or loss. The Contractor shall promptly remedy damage and loss to property 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~~ responsible, including but not limited to, under Sections 16.1.2 and 16.1.3. The Contractor may make a timely claim as permitted by this Agreement for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of ~~the Owner or Architect or by anyone for whose acts either of them may be liable,~~ others, 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 9.15.

§ 16.2 ~~Hazardous Materials and Substances~~If the Contractor or any Subcontractor chooses to use any systems, equipment, facilities, or services which have been incorporated in the Project as a permanent part thereof by any other, the Contractor shall assume full responsibility for damages caused to said systems, equipment, facilities or services, and have damages repaired as required, so that in no case will the performance of the used systems, equipment, facilities or services be diminished from the specified criteria as a result of such use.

§ 16.3 The Contractor acknowledges that the safety of the Owner's students, employees and guests is of the utmost importance. The Contractor will take no action which would jeopardize the safety of the Owner's students, employees and guests and, without the Owner's written approval, shall take no action which would interfere with the Owner's activities. Without limiting the foregoing sentence, the Contractor shall comply with all laws applicable to student and/or school safety.

§ 16.4 Notification of Utility Companies

§ 16.4.1 At least five (5) working days prior to the start of work in areas which may involve existing utility lines, the Contractor shall notify the MISS DIG notification system, as legally required and, if applicable, any Registered Utility

Protection Service of the utility company possibly affected by the planned work by certified mail with return receipt requested.

§ 16.4.2 The utility company should, upon receipt of notice, stake, mark or otherwise designate the location (and depth) of their lines, or temporarily move the line(s).

§ 16.4.3 The Contractor shall immediately report to the respective utility company any break or leak in its lines, or any dent, gouge, groove or other damage to the utility line or to its coating or cathodic protection made or discovered in the course of the Work.

§ 16.4.4 The Contractor shall immediately alert the Owner, Architect and occupants of nearby premises of any and all emergencies caused or discovered in the utility line(s) in the course of the Work.

§ 16.5 Security

§ 16.5.1 All construction participants, including the Contractor, Architect, Subcontractors, etc., shall cooperate with the Owner's security personnel and shall comply with all of the Owner's security requirements. Such requirements shall include, without limitation, if requested by the Owner, delivering to the Owner's security personnel, prior to the commencement of the Work on each day, a list of all personnel who will be permitted access to the Work. The foregoing, however, shall not relieve the Contractor of any obligation to provide a safe and secure workplace for all parties entering the Project Site. The Contractor shall be responsible to implement commercially reasonable data security protection measures to protect the Owner's networks and data when performing technology-related Work.

§ 16.6 Fire Protection

§ 16.6.1 The Contractor shall maintain free access to the building areas for firefighting equipment and shall at no time block off main roadways or fire aisles without providing adequate auxiliary roadways and means of entrance for firefighting equipment, including heavy fire department trucks, where applicable.

§ 16.6.2 The Contractor shall at all times cooperate with the Owner and kept the municipal fire department informed of the means of entrance and changes to the roadways or fire aisles as needed to provide fire department access to or around the Project Site.

§ 16.6.3 The Contractor shall, during the entire construction period and until the completion of the Work, provide and maintain all material, equipment, and services necessary for an adequate fire protection system, which shall meet the approval of the Owner and/or the Architect. The system shall, at a minimum, meet the requirements set forth in the Contract Documents and of applicable laws. These requirements shall be augmented and/or the installations relocated, as may be necessary to meet, at all time, the demands of adequate protection in all areas and shall not be reduced prior to the completion of the Work with the written approval of the Owner and/or the Architect.

§ 16.2 Hazardous Materials and Substances

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

§ 16.2.2 ~~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 16.2.1 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.~~

~~§ 16.2.3 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.~~

ARTICLE 17 INSURANCE AND BONDS

§ 17.1 Contractor's Insurance

§ 17.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as required by law and as otherwise described in this Section 17.1 or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the insurance required by this Agreement from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 18.4, unless a different duration is stated below:

§ 17.1.2 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than one million dollars ($ 1,000,000.00) each occurrence, two million dollars ($ 2,000,000.00) general aggregate, and two million dollars ($ 2,000,000.00) aggregate for products-completed operations hazard, providing coverage for claims including

- **.1** damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- **.2** personal and advertising injury;
- **.3** damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- **.4** bodily injury or property damage arising out of completed operations; and
- **.5** the Contractor's indemnity obligations under Section 9.15.

§ 17.1.3 Automobile Liability covering vehicles owned by the Contractor and non-owned vehicles used by the Contractor, with policy limits of not less than one million dollars ($ 1,000,000.00) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance, and use of those motor vehicles along with any other statutorily required automobile coverage.

§ 17.1.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as those required under Section 17.1.2 and 17.1.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ 17.1.5 Workers' Compensation at statutory limits.

§ 17.1.6 Employers' Liability with policy limits not less than one million dollars ($ 1,000,000.00) each accident, one million dollars ($ 1,000,000.00) each employee, and one million dollars ($ 1,000,000.00) policy limit.

~~**§ 17.1.7** If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than ($) per claim and ($) in the aggregate.~~

~~**§ 17.1.8** If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than ($) per claim and ($) in the aggregate.~~

~~**§ 17.1.9** Coverage under Sections 17.1.7 and 17.1.8 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than ($) per claim and ($) in the aggregate.~~

§ 17.1.10 The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Section 17.1 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the period required by Section 17.1.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability ~~policy.~~policy and that the Contractor's insurance shall be primary.

§ 17.1.11 The Contractor shall disclose to the Owner any deductible or self- insured retentions applicable to any insurance required to be provided by the Contractor.

§ 17.1.12 To the fullest extent permitted by law, the Contractor shall cause the commercial liability coverage required by this Section 17.1 to include (1) the Owner, the Architect, and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. ~~To the extent commercially available, the~~ The additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's Consultants, CG 20 32 07 04. The Contractor shall require such insurance company to add to the policy the following clause: "The insurance afforded to the Additional Insured is primary insurance. If the Additional Insureds have other insurance which is applicable to the loss on an excess or contingent basis, the amount of the insurance company's liability under this policy shall not be reduced by the existence of such other insurance."

§ 17.1.13 ~~Within three (3) business days of the date~~ Immediately after the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by this Section 17.1, but in no event less than three days after becoming aware or the coverage actually lapsing, the Contractor shall provide notice to the Owner of such impending or actual cancellation or ~~expiration. Upon~~ expiration, including the Contractor's plan to immediately procure replacement insurance as required by the Contract Documents to avoid any lapse in coverage. Contractor's failure to do so is a material breach of this Agreement, shall entitle the Owner to purchase replacement insurance at Contractor's sole cost, and shall subject the Contractor to any and all damages related to its failure to comply with its required insurance obligations. Further, upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right (but not the obligation) to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 17.1.14 Other Insurance Provided by the Contractor

(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits

§ 17.2 Owner's Insurance

§ 17.2.1 Owner's Liability Insurance

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

§ 17.2.2 Property Insurance

§ 17.2.2.1 The Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed or materials or equipment supplied by others. The property insurance shall be maintained until Substantial ~~Completion and thereafter as provided in Section 17.2.2.2,~~ Completion, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and

Sub-subcontractors in the Project as insureds. This ~~insurance shall include the interests of mortgagees as loss payees.~~ policy will exclude any tools, equipment, scaffolding, glass breakage, etc., owned or rented by the Contractor or Subcontractors and materials stored on the site, but not incorporated into the Project. The Contractor shall be responsible for protecting all product until the Date of Final Completion is established by the Architect. The Contractor shall replace any Work if damaged before Final Completion. The Contractor may assume the risk itself or obtain insurance in amounts it deems sufficient.

§ 17.2.2.2 ~~Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section 17.2.2.1 or, if necessary, replace the insurance policy required under Section 17.2.2.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 18.4.~~

§ 17.2.2.3 If the insurance required by this Section 17.2.2 is subject to deductibles or self-insured retentions, the ~~Owner~~ party causing the insurable event shall be responsible for all loss not covered because of such deductibles or retentions.

§ 17.2.2.4 If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 18.4, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage, notwithstanding the undertaking of the Work. ~~The Owner shall be responsible for all co-insurance penalties.~~

§ 17.2.2.5 Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Section 17.2.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by this Section 17.2.2. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ 17.2.2.6 Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any insurance required by this Section 17.2.2, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; and (2) the Contract Time and Contract Sum shall be ~~equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled.~~ negotiated . If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 17.2.2.7 Waiver of Subrogation

§ 17.2.2.7.1 ~~The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by this Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 17.2.2.7 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.~~ Superior to any other provision herein or elsewhere in the Contract Documents, any references to "waiver of subrogation" or such similar provisions are hereby deleted and shall be declared to have no effect.

§ 17.2.2.7.2 ~~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, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 17.2.2.7.1 for damages caused by fire or other causes of loss covered by this separate property insurance.~~

§ 17.2.2.8 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. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements, written where legally required for validity, the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 17.2.3 Other Insurance Provided by the Owner

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	Limits
Not Applicable	

§ 17.3 Performance Bond and Payment Bond

§ 17.3.1 The ~~Owner shall have the right to require the Contractor~~ Contractor shall be required to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in the Contract Documents on the date of execution of the Contract. The bonds shall each be in the amount of 100% of the Contract Sum and otherwise comply with the terms of MCL 129.201, et seq.

§ 17.3.2 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.

ARTICLE 18 CORRECTION OF WORK

§ 18.1 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 work of other Contractors or Subcontractors, compensation of consultants, any delay or related damages, attorneys' fees incurred by the Owner, 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, unless compensable under Section A.1.7.3 in Exhibit A, Determination of the Cost of the Work.~~expense. The Owner shall have the right to charge the Contractor for any such costs and expenses and to deduct such amounts from any future payments due the Contractor.

§ 18.2 In addition to the Contractor's obligations under Section 9.4, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 15.6.3, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of 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.~~

§ 18.3 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 8.3.

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

§ 18.5 The one-year period for correction of Work shall ~~not~~ be extended by corrective Work performed by the Contractor pursuant to this Article ~~18.~~18 for a period of one-year beyond completion of the corrective Work.

ARTICLE 19 MISCELLANEOUS PROVISIONS

§ 19.1 Assignment of Contract

Neither party to the Contract shall assign the Contract without written consent of the other, except that 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.

§ 19.2 Governing Law

The Contract shall be governed by the law of the ~~place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 21.6.~~State of Michigan in all respects, except that Claims and causes of action brought by the Owner shall not be deemed untimely if filed within six (6) years of Substantial Completion of the entire Project.

§ 19.3 Tests and Inspections

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

§ 19.4 The Owner's representative:
(Name, address, email address and other information)

To be determined

§ 19.5 The Contractor's representative:
(Name, address, email address and other information)

To be determined

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

§ 19.7 The Owner, being a governmental unit, is protected by the Michigan Void Construction Contracts Act, MCL 691.991.

§ 19.8 Notwithstanding any provisions within the Contract Documents, nothing shall be deemed a waiver of any immunity granted to Owner by law or statute, including but not necessarily limited to, governmental immunity under MCL 691.1407.

§ 19.9 All Contractor employees assigned to work under this Agreement may, at Owner's discretion, be subject to a background check and clearance by the Owner. Failure to obtain such clearance from the Owner may result in mandatory dismissal from the Owner's property and/or termination of the Agreement.

ARTICLE 20 TERMINATION OF THE CONTRACT

§ 20.1 Termination by the Contractor

If ~~the Architect fails to certify payment as provided in Section 15.4.1 for a period of 30 days through no fault of the Contractor, or~~ if the Owner fails to make an undisputed payment as provided in Section 4.1.3 for a period of 30 ~~days,~~ days beyond the due date, the Contractor may, upon seven additional days' notice to the Owner and the 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.~~timely and properly executed

§ 20.2 Termination by the Owner for Cause

§ 20.2.1 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.~~Documents; or
- **.5** the Contractor fails to prosecute the Work or any part thereof with promptness and diligence or fails to perform any provisions of the Contract, or goes into bankruptcy, liquidation, makes an assignment for the benefit of creditors, enters into a composition with its creditors, or becomes insolvent..

§ 20.2.2 When any of the reasons described in Section 20.2.1 exists, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any other remedy the Owner may have and after giving the Contractor ~~seven days'~~ three (3)days' notice, terminate the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever reasonable method the Owner may deem expedient. Upon 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.

§ 20.2.2.1 In the event the Contractor's surety bond requires notice of intent to declare a default of the Contractor and if such bond notice is provided by the Owner, such notice shall be adequate to satisfy the three (3) day written notice described above in this Section.

§ 20.2.2.2 The three (3) day notice period identified in this Section does not give rise to an opportunity for the Contractor to cure the cause for termination. Further, the Owner's failure to properly follow the termination procedure shall not be a substantial or material breach of the Contract or the Owner's obligations.

§ 20.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 20.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

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

§ 20.3 Termination by the Owner for Convenience

The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. The Owner shall pay the Contractor for Work ~~executed;~~ timely and properly executed and costs incurred by reason of such ~~termination, including costs attributable to termination of Subcontracts; and a termination fee, if any, as follows:~~termination.

(Insert the amount of or method for determining the fee payable to the Contractor by the Owner following a termination for the Owner's convenience, if any.)

ARTICLE 21 CLAIMS AND DISPUTES

§ 21.1 Claims, disputes, and other matters in question arising out of or relating to this Contract, including those alleging an error or omission by the ~~Architect but excluding those arising under Section 16.2,~~ Architect, shall be referred initially to the Architect for ~~decision.~~ an interpretation. Such matters, except those waived as provided for in Section 21.11 and Sections 15.7.3 and 15.7.4, shall, after initial ~~decision~~ interpretation by the Architect or 30 days after submission of the matter to the Architect, be subject to mediation as a condition precedent to binding dispute resolution.

§ 21.2 Notice of Claims

§ 21.2.1 Claims by ~~either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 18.2,~~ the Contractor shall be initiated by notice to the Owner and Architect within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the ~~claimant~~ Contractor first recognizes the condition giving rise to the Claim, whichever is later. The Contractor's failure to timely and property initiate a Claim shall be an absolute and irrevocable waiver of such Claim and any cause of action. Claims and causes of action by the Owner shall be governed by the applicable statute of limitations period, except when a provision of the Contract Documents provides a longer period. The parties acknowledge, understand, and agree that the Contractor's required prompt filing of a Claim is critical to the Project, as Contractor Claims often affect the Project schedule and/or Project budget, and that the deadline and waiver applicable to Contractor Claims is a material inducement to the Owner entering into an agreement with the Contractor. The Contractor's timely submission of a Claim shall be a condition precedent to pursuing a Cause of Action, in accordance with Section 21.3.

§ 21.2.2 ~~Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 18.2, shall be initiated by notice to the other party.~~

§ 21.3 Time Limits on Claims and Causes of Action

The Owner ~~and Contractor~~ shall commence all claims and causes of action against ~~the other and~~ the Contractor in accordance with the statutes of limitation applicable under Michigan law, except that no claim or cause of action shall be untimely if filed within six (6) years of substantial completion of the entire Project. The Contractor shall commence all causes of action arising out of or related to the Contract ~~in accordance with the requirements of the final dispute resolution method selected in this Agreement whether in contract, tort, breach of warranty, or otherwise, within the 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~~ by first complying with the Claims procedure set forth above in Section 21.2 and, if a Claim is timely and properly filed and resolved, by filing in accordance with the statute of limitations applicable under Michigan law. The Contractor waives all claims and causes of action not commenced in accordance with this Section 21.3.

§ 21.4 ~~If a claim, dispute or other matter in question relates to or is the subject of a mechanic's lien, the party asserting such matter may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.~~

§ 21.5 The parties shall endeavor to resolve their disputes by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with their Construction Industry Mediation Procedures in effect on the date of this Agreement. A request for mediation shall be made in writing, delivered to the other party to this Agreement, and filed with the person or entity administering the mediation. The request may be made concurrently with the binding dispute resolution 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, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.~~

§ 21.6 ~~If the parties have selected arbitration as the method for binding dispute resolution in this 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 the Construction Industry Arbitration Rules in effect on the date of this Agreement. 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 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.~~

§ 21.7 ~~Subject to the rules of the American Arbitration Association or other applicable arbitration rules, 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).~~

§ 21.8 ~~Subject to the rules of the American Arbitration Association or other applicable arbitration rules, any party to an arbitration 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 a Claim not described in the written Consent.~~

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

§ 21.10 Continuing Contract Performance

Pending final resolution of a ~~Claim,~~ Claim or cause of action, except as otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 21.11 Waiver of Claims for Consequential Damages

The Contractor ~~and Owner waive claims against each other~~ waives claims against the Owner 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 20. Nothing contained in this Section 21.11 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

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

WEST BRANCH ROSE CITY AREA SCHOOLS

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
Gail Hughey, Superintendent	
(Printed name and title)	*(Printed name and title)*

DOCUMENT 00 65 19

CONTRACTOR'S GENERAL RELEASE OF CLAIMS

The undersigned, the owner or authorized officer of _____ (the "Contractor") hereby releases any and all claims against West Branch – Rose City Area Schools (the "Owner"), their agents, their employees, and against any related entity under the contract. This general release of claims shall take effect upon acceptance of final payment.

CONTRACTOR:

_____

By: _____

Its: _____

State of Michigan)
) SS
County of)

This instrument was acknowledged before me on the _____ day of _____, 20___, by

_____.

_____
, Notary Public

_____, County, Michigan

My Commission Expires: _____

Acting in the County of: _____

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Contract description.

B. Work by Owner.

C. Contractor's use of site and premises.

D. Owner occupancy.

E. Specification Conventions.

1.2 CONTRACT DESCRIPTION

A. Work of the Project comprises upgrades to the existing domestic water supply at Ogemaw Heights High Schools and includes a new well house, well controls, and well service piping as depicted in the drawings and specifications.

B. Perform Work of the Contract under stipulated price contract with Owner in accordance with Conditions of Contract.

1.3 WORK BY OWNER

A. Items noted NIC (Not in Contract), movable cabinets, and furnishings will be furnished and installed by Owner after Substantial Completion.

B. This project is being completed in conjunction with other improvements at Ogemaw Heights High School. Contractor shall coordinate the work schedule of this project with the Owner’s Construction Manager.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

A. Limit use of site and premises to allow:
   1. Owner occupancy.
   2. Work by Others and Work by Owner.
   3. Use of site and premises by the public.

B. Vehicular access to the site is limited to existing access drives and parking areas. Vehicular access with not be permitted across lawns or concrete sidewalks or other site improvements except where required to access the work area upon approval of the Owner.

C. Coordinate site and building access routes with Owner.

D. Coordinate disruption of any utility service or system which may affect the Owners use of the premises for normal operations.

1.5 OWNER OCCUPANCY

A. The Owner will occupy areas of the site and premises during the entire period of construction for the conduct of normal summer operations and other ongoing building construction. Avoid disruption of the existing water service until the work is completed and ready for a scheduled switch-over during the 2025 Summer School Break (mid-June to mid-August).

B. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.

1.6 SPECIFICATION CONVENTIONS

A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words “shall be” are included by inference where a colon (:) is used within sentences or phrases.

B. Contractor is responsible for the entire Work identified in the Contract Documents without regard to the specific location of the information within the Contract Documents.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Contingency allowances.

B. Schedule of values.

C. Applications for payment.

D. Change procedures.

E. Defect assessment.

F. Alternates

1.2 CONTINGENCY ALLOWANCES

A. A Contingency Allowance has been established by the Owner.

1.3 SCHEDULE OF VALUES

A. Submit printed schedule on AIA Form G703 - Continuation Sheet for G702. Contractor's standard form or electronic media printout following format of specified AIA form will be considered.

B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

C. Format: Utilize Table of Contents of this Project Manual. Identify each line item with number and title of major specification Section. Identify site mobilization, bonds and insurance, and General Requirements as separate line items.

D. Include within each line item, direct proportional amount of Contractor's overhead and profit.

E. Revise schedule to list approved Change Orders, with each Application for Payment.

1.4 APPLICATIONS FOR PAYMENT

A. Submit one copy of each application on AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702 or approved Contractor's electronic media driven form.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Payment Period: Submit at intervals stipulated in the Agreement.

D. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question.

1.5 CHANGE PROCEDURES

A. The Architect/Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions in writing to the Contractor.

B. The Architect/Engineer may issue a Proposal Request or Bulletin including a detailed description of proposed change with supplementary or revised Drawings and specifications. Contractor will prepare and submit estimate of cost and any required change in Contract Time within 14 days.

C. Contractor may propose changes by submitting a request for change to Architect/Engineer, describing proposed change and its full effect on the Work. Include a statement describing reason for the change, and effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on Work by separate or other Contractors.

D. Stipulated Sum/Price Change Order: Based on Proposal Request (Bulletins) and Contractor's fixed price quotation or Contractor's request for Change Order as approved by Architect/Engineer.

E. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.

F. Construction Change Directive: Architect/Engineer may issue directive, on AIA Form G713 Construction Change Directive signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.

G. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Architect/Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.

H. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

I. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation.

J. Change Order Forms: AIA G701 Change Order.

K. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

L. Correlation of Contractor Submittals:
   1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.

2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
3. Promptly enter changes in Project Record Documents.

1.6 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the Work, the Architect/Engineer will direct appropriate remedy or adjust payment.
1. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Owner.
2. Defective Work will be partially repaired to instructions of Architect/Engineer, and unit sum/price will be adjusted to new sum/price at discretion of Owner.

C. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.

D. Authority of Architect/Engineer to assess defects is final.

E. Non-Payment for Rejected Products: Payment will not be made for rejected products 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 transporting vehicle.
4. Products placed beyond lines and levels of required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected products.

1.7 ALTERNATES – Not Used

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.

B. Preconstruction meeting.

C. Progress meetings.

D. Periodic construction visits.

E. Pre-installation meetings.

F. Project Record Documents.

G. Acceptance of Preceding Work.

H. Cutting and patching.

I. Special procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.

C. 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.

1.3 PRECONSTRUCTION MEETING

A. Architect/Engineer will schedule meeting after Notice of Award.

B. Attendance Required: Owner, Architect/Engineer, and Contractor.

C. Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.

4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
5. Designation of personnel representing parties in Contract, and Architect/Engineer.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.
8. Scheduling activities of testing agency.

D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect/Engineer, Owner, and those affected by decisions made.

1.4 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Architect/Engineer, 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 impeding 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. Coordination of work by Owner’s Contractor with work of the General Contract.
15. Project Record Documents.

E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect/Engineer, Owner, and those affected by decisions made.

1.5 PERIODIC CONSTRUCTION VISITS

A. The Architect and Owner will visit the project site periodically. The purpose of the visits will be to monitor the progress and quality of the work.

B. The Contractor’s Site Superintendent shall be available for meetings with the Architect and Owner.

C. Agenda:

1. Review of Work in progress.
2. Field observations, problems, and decisions.
3. Identification of problems which impede planned progress.
4. Maintenance of progress schedule.
5. Corrective measures to regain projected schedules.
6. Planned progress during succeeding work period.
7. Maintenance of quality and work standards.
8. Other business relating to Work.

1.6 PRE-INSTALLATION MEETINGS – Not used

1.7 PROJECT RECORD DOCUMENTS

A. Contractor shall maintain and update Project Record Drawings (As-Built Drawings) on site during construction. Contractor and each Subcontractor shall be responsible to update the as built drawings on a weekly basis.

B. Project Record Documents shall be available for review by the Architect.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 ACCEPTANCE OF PRECEDING WORK

A. Before starting any operation, each Contractor(s) shall examine work performed by others to which their work adjoins or is applied and shall report to the Architect any conditions that will prevent satisfactory accomplishment of their work.

B. Failure to notify the Architect of deficiencies or faults in preceding work will constitute acceptance thereof and waive of any claims to its usability.

3.2 CUTTING AND PATCHING – Not used

3.3 SPECIAL PROCEDURES – Not used

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed products list.

D. Product data.

E. Shop drawings.

F. Samples.

G. Design data.

H. Test reports.

I. Certificates.

J. Manufacturer's instructions.

K. Manufacturer's field reports.

1.2 SUBMITTAL PROCEDURES

A. Electronic Submittals: Prepare and transmit submittals of Product Data, Shop Drawings, Design Data, Test Reports, Certificates, Manufacturers Instructions, and Erection Drawings to Architect in electronic (.pdf) format.

B. Samples: Where specifications require the submittal of samples for verification or selection, submit physical samples and/or physical color charts to the Architect. Electronic reproductions of color charts will not be accepted. Include Contractor’s transmittal form identifying Project, Contractor, subcontractor and supplier; product designated by name indicated in specifications.

C. Transmit electronic submittals with Contractor’s transmittal form:
   1. Sequentially number submittals. Include the specification section in the submittal numbering system. Mark revised submittals with original number and sequential alphabetic suffix.
   2. Identify Project, Contractor, subcontractor and supplier; product designated by name indicated in specifications.

D. Include Contractor's certification (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 requirements of the Work and Contract Documents.

E. Schedule submittals to expedite Project. Coordinate submission of related items.

F. For each submittal for review, allow 15 days excluding delivery time to and from Contractor. Submittals for long lead time items shall be expedited by the Contractor in order to allow for the Owner's completion schedule. Notify Architect/Engineer of long lead time items requiring expedited review.

G. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.

H. Architect will return files electronically following review. Contractor shall distribute copies of reviewed submittals to appropriate parties.

I. Contractor shall produce and provide a paper copy of approved submittals to the Architect, and to governing authorities upon request.

J. Where specified in specific Submittals Articles, Contractor shall provide a paper copy of approved submittals to the Owner at closeout.

K. When revised for resubmission, identify changes made since previous submission.

L. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedules within 7 days after Notice to Proceed. After review, resubmit required revised data within ten days.

B. Submit revised Progress Schedules with each Application for Payment.

C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.

D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

E. Utilize Contractor's standard computer generated schedule format.

F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.

G. Indicate estimated percentage of completion for each item of Work at each submission.

H. Revisions To Schedules:
   1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
   2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect [including effect of changes on schedules of separate contractors].

1.4 PROPOSED PRODUCTS LIST

A. Within 7 days after Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

A. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Mark submittal to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.6 SHOP DRAWINGS

A. Shop Drawings: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.
   1. Include signed and sealed calculations to support design.
   2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
   3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.7 SAMPLES

A. Samples: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Samples For Selection as Specified in Product Sections:
   1. Submit to Architect/Engineer for aesthetic, color, or finish selection.
   2. Submit samples of finishes from full range of manufacturers' standard colors, including premium and/or custom colors where specified, textures, and patterns for Architect/Engineer selection.

C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Include identification on each sample, with full Project information.

E. Submit number of samples specified in individual specification sections; Architect/Engineer will retain samples.

F. Samples will not be used for testing purposes unless specifically stated in specification section.

G. Architect will issue a schedule indicating colors selected.

1.8 DESIGN DATA

A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 TEST REPORTS

A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.10 CERTIFICATES

A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.11 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, [start-up,] adjusting, and finishing, to Architect/Engineer for delivery to Owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.12 MANUFACTURER'S FIELD REPORTS

A. Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.

B. Submit report [in duplicate] within 5 days of observation to Architect/Engineer for information.

C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality control and control of installation.

B. Tolerances.

C. References.

D. Labeling.

E. Manufacturers' field services.

F. Examination.

G. Preparation.

1.2 QUALITY CONTROL AND 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. When manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer 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. Perform Work by persons qualified to produce required and specified quality.

F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 LABELING

A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
   1. Model number.
   2. Serial number.
   3. Performance characteristics.

1.6 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/Engineer 30 days in advance of required observations.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Refer to Section 01 33 00 - Submittal Procedures, MANUFACTURERS' FIELD REPORTS article.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of correct characteristics, and in correct locations.

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 new material or substance in contact or bond.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities:
1. Temporary electricity.
2. Temporary lighting for construction purposes.
3. Temporary heating.
4. Telephone service.
5. Email service.
6. Temporary water service.
7. Temporary sanitary facilities.

B. Construction Facilities:
1. Progress cleaning and waste removal.
2. Fire prevention facilities.

C. Temporary Controls:
1. Barriers.
2. Erosion and sediment control.

D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

A. Owner will pay cost of energy used. Exercise measures to conserve energy. Utilize Owner’s existing power service.

B. Provide temporary electric feeder from existing building electrical service at. Do not disrupt Owner's use of service.

C. Complement existing power service capacity and characteristics as required for construction operations.

D. Provide power outlets, with branch wiring and distribution boxes located as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.

E. Provide feeder switch at source distribution equipment.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain lighting for construction operations to achieve minimum lighting level of 2 watt/sq ft.

B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.

C. Maintain lighting and provide routine repairs.

1.4 TEMPORARY HEATING

A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.

B. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in product sections.

1.5 TELEPHONE SERVICE

A. Provide, maintain, and pay for telephone service to field office at time of project mobilization.

1.6 EMAIL SERVICE

A. Provide, maintain and pay for email service to site Superintendent and Project Manager at time of project mobilization

1.7 TEMPORARY WATER SERVICE

A. Owner will pay cost of temporary water. Exercise measures to conserve energy. Utilize Owner's existing water system, extend and supplement with temporary devices as needed to maintain specified conditions for construction operations.

B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

1.8 TEMPORARY SANITARY FACILITIES

A. Existing designated facilities may be used during construction operations. Maintain daily in clean and sanitary condition.

1.9 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in 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 spaces.

C. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

1.10 FIRE PREVENTION FACILITIES

A. Portable Fire Extinguishers: NFPA 10; 10 pound capacity, 4A-60B: C UL rating.
   1. Provide one fire extinguisher on each floor of buildings under construction and demolition.
   2. Provide minimum one fire extinguisher in every construction trailer and storage shed.

3. Provide minimum one fire extinguisher on roof during roofing operations using heat producing equipment.

1.11 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.12 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize surface area of bare soil exposed at one time.

C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Remove underground installations to minimum depth of 2 feet. Grade site as indicated on Drawings.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Product substitution procedures.

F. Equipment electrical characteristics and components.

1.2 PRODUCTS

A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

C. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

D. For exterior storage of fabricated products, place on sloped supports above ground.

E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with an “Or Equal” provision: Any Product meeting the quality standards or description. Pre-bid requests for approval of Products specified with an “or equal” provision will not be acknowledged. Acceptability of “or equal” Products will be determined by the Architect during the submittal process based upon the quality or suitability of the Product proposed.

D. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during bidding period to requirements specified in this section.

B. Post-Bid Substitutions will only be considered when a product becomes unavailable through no fault of Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that Bidder:
   1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
   2. Will provide same warranty for Substitution as for 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/or Architect/Engineer for review or redesign services associated with re-approval by authorities having jurisdiction.

E. 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 Contract Documents.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Starting of systems.

D. Demonstration and instructions.

E. Project record documents.

F. Operation and maintenance data.

G. Manual for materials and finishes.

H. Manual for equipment and systems.

I. Product warranties and product bonds.

1.2 CLOSEOUT PROCEDURES

A. Submit certification that the work is Substantially Complete and approved for occupancy by the Authority Having Jurisdiction, and Contractor’s list of items to be completed to the Architect.

B. Architect will inspect the work and will prepare a Punch List of items to be corrected or completed for final acceptance of the work.

C. Upon completion of all work and correction of items included on the Punch List prepared by the Architect, submit written certification that Contract Documents have been reviewed, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's final review. Architect will visit the site and will verify that all items have been properly completed and/or corrected.

D. Contractor shall reimburse the Owner for all re-inspection costs incurred as a result of Contractor’s failure to complete and/or correct all items identified by the Architect. Charges to the Contractor shall be made at such times and in such amounts as the Architect invoices the Owner under the rate schedule in effect at the time of service. Such charges to the Contractor will be deducted from the Contractor’s progress payment or final payment as applicable.

E. Provide submittals to Architect/Engineer required by authorities having jurisdiction.

F. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.

C. Replace filters of operating equipment.

D. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect/Engineer seven days prior to start-up of each item.

C. Verify 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 equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative and Contractors' personnel in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer 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 in accordance with Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection.

B. Demonstrate Project equipment instructed by qualified manufacturer's representative who is knowledgeable about the Project.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. 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.

E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled and agreed time and location.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

G. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. 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 Addenda and modifications.

F. 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. Details not on original Contract drawings.

G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, 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.
      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.

1.8 MANUAL FOR MATERIALS AND FINISHES

A. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy will be reviewed and returned, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

B. Submit two sets of revised final volumes in final form with claim for Final Application for Payment.

C. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.

D. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

E. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

F. Additional Requirements: As specified in individual product specification sections.

G. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.9 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy will be reviewed and returned, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

B. Submit two sets of revised final volumes in final form with claim for Final Application for Payment.

C. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

D. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

E. Include color coded wiring diagrams as installed.

F. 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 special operating instructions.

G. 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.

H. Include servicing and lubrication schedule, and list of lubricants required.

I. Include manufacturer's printed operation and maintenance instructions.

J. Include sequence of operation by controls manufacturer.

K. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

L. Include control diagrams by controls manufacturer as installed.

M. Include Contractor's coordination drawings, with color coded piping diagrams as installed.

N. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

O. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

P. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements.

Q. Additional Requirements:As specified in individual product specification sections.

R. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.10 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time Of Submittals:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, provide extended warranty for the full length of the warranty period beyond the Date of Substantial Completion.
   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 date of acceptance as beginning of warranty or bond period.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete for the following:
   1. Building footings and slabs on grade.
   2. Site Concrete.

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 305 - Hot Weather Concreting.
   3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
   4. ACI 318 - Building Code Requirements for Structural Concrete.

B. ASTM International:
   1. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   2. ASTM C33 - Standard Specification for Concrete Aggregates.
   3. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   4. ASTM C42/C42M - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
   5. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
   6. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
   7. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
   8. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
   9. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
   10. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
   11. ASTM C595 – Standard Specifications for Blended Hydraulic Cements.
   12. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
   13. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
   14. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
   15. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
   16. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
   17. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
   18. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.3 SUBMITTALS

A. Design Data:
1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
a. Hot and cold weather concrete work.
b. Air entrained concrete work.
2. Identify mix ingredients and proportions, including admixtures.

B. Shop Drawings: Submit reinforcing steel Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and welded wire fabric, bending and cutting schedules, and supporting and spacing devices.

C. Product Data: Submit data on concrete admixtures, accessories.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 318.

B. Conform to ACI 305 when concreting during hot weather.

C. Conform to ACI 306.1 when concreting during cold weather.

D. Acquire cement and aggregate from one source for Work.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days.

1.7 COORDINATION

A. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 FORM MATERIALS

A. Form Materials: At discretion of Contractor.

2.2 FORMWORK ACCESSORIES

A. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

2.3 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, deformed billet bars, uncoated finish.

B. Welded Plain Wire Fabric: ASTM A185/A185M; in flat sheets; unfinished.

2.4 ACCESSORY REINFORCEMENT MATERIALS

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom.

2.5 REINFORCMENT FABRICATION

A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice.

B. Form reinforcement bends with minimum diameters in accordance with ACI 318.

C. Form ties and stirrups from the following:
1. For bars No. 10 and Smaller: No. 3 deformed bars.
2. For bars No. 11 and Larger: No. 4 deformed bars.

D. Weld reinforcement in accordance with AWS D1.4.

E. Locate reinforcement splices not indicated on Drawings, at point of minimum stress.

2.6 CONCRETE MATERIALS

A. Cement: ASTM C595, Type IL.

B. Normal Weight Aggregates: ASTM C33.
1. Fine aggregate: size 2NS; clean, sharp, natural sand free from loam, clay lumps, or other deleterious substances.
2. Coarse Aggregate Maximum Size: In accordance with ACI 318.
3. Aggregate shall be clean, uncoated, crushed stone, processed from natural rock or stone containing no clay, mud, loam, of foreign matter.

C. Water: ACI 318; potable.

2.7 ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Chemical: ASTM C494/C494M.

C. Fly Ash and Calcined Pozzolan: ASTM C618 Class F.

D. Plasticizing: ASTM C1017/C1017M.

2.8 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/2 inch thick x full depth of slab.

2.9 CONCRETE MIX

A. Select proportions for concrete in accordance with ACI 318 trial mixtures, field experience, or both.

B. Concrete TYPE A:

Material and Property	Measurement
Compressive Strength (28 day)	3,500 psi
Cement Content (minimum)	517 pounds/cu yd
Aggregate Type	Normal weight
Water-Cement Ratio (maximum)	.45 by weight
Air Content	4 to 7 percent where exposed to freeze-thaw or de-icing chemicals per ACI 318 based upon maximum aggregate size.
Fly Ash Content:	20 percent of cementitious materials by weight, maximum
Slump	4 inches plus or minus 1 inch.

C. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Architect.

1. Use accelerating admixtures in cold weather. Use of admixtures will not relax cold weather placement requirements.
2. Do not use calcium chloride nor admixtures containing calcium chloride.
3. Use set retarding admixtures during hot weather.
4. Add air entrainment admixture to concrete mix for work exposed to freezing and thawing or deicing chemicals.
5. For concrete exposed to deicing chemicals, limit fly ash, pozzolans, silica fume, and slag content as required by applicable code.

D. Average Compressive Strength Reduction: Not permitted.

E. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M.

2.10 COMPOUNDS - HARDENERS AND SEALERS

A. Chemical Hardener: liquid type.
1. Manufacturers:

a. Curecrete Chemical Company Model Ashford Formula.
b. Substitutions: Not permitted.

PART 3 EXECUTION

3.1 EXAMINATION – FORMWORK

A. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.

B. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

3.2 INSTALLATION – FORMWORK

A. Earth Forms:
1. Earth forms are not permitted.

B. Formwork - General:
1. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
2. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Do not reuse wood formwork for concrete surfaces to be exposed to view after surface defects begin to appear. Do not patch formwork.

3.3 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Locate and set in place items required to be cast directly into concrete.

B. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

C. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.

D. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

E. Embedded Items:
1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
2. Do not embed wood or uncoated aluminum in concrete.
3. Obtain installation and setting information for embedded items furnished under other Specification sections.
4. Securely anchor embedded items in correct location and alignment prior to placing concrete.

5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.

F. Screeds:
1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
2. Slope slabs to drain where required or as shown on Drawings.
3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.

3.4 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Architect/Engineer.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Leave forms in place for minimum number of days as specified in ACI 347.

3.5 REINFORCEMENT PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
1. Do not weld crossing reinforcement bars for assembly except as permitted by Architect/Engineer.

B. Accommodate placement of formed openings.

C. Space reinforcement bars with minimum clear spacing in accordance with ACI 318.
1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.

D. Maintain concrete cover around reinforcement in accordance with ACI 318 as follows:
1. Concrete cast against earth: 3 inches.
2. Formed concreter surfaces exposed to earth, weather or water: 2 inches.
3. Formed concrete surfaces of walls, beams and columns not exposed to earth, weather or water: 1-1/2 inches.
4. Slabs exposed to earth, weather or water: 1-1/2 inches.
5. Slabs not exposed to earth, weather or water: 1 inch.

E. Splice reinforcing at points of minimum stress. Splicing of bars shall be in accordance with ACI 318.

F. Bond and ground reinforcement.

3.6 EXAMINATION – CONCRETE PLACEMENT

A. Verify requirements for concrete cover over reinforcement.

B. Verify reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.7 PREPARATION – CONCRETE PLACEMENT

A. Remove debris from reinforcement, and concrete substrates.

B. Remove water from areas receiving concrete before concrete is placed.

3.8 PLACING CONCRETE

A. Place concrete in accordance with ACI 318.

B. Notify testing laboratory minimum three (3) business days prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

D. Separate slabs on grade from vertical surfaces with joint filler as scheduled. Do not separate slabs from cold joints in existing concrete to be doweled together.

E. Deposit concrete at final position. Prevent segregation of mix.

F. Place concrete in continuous operation for each panel or section determined by predetermined joints.

G. Consolidate concrete.

H. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

I. Place concrete continuously between predetermined joints.

J. Do not interrupt successive placement; do not permit cold joints to occur.

K. Saw cut pattern indicated. Where patching existing slabs, extend existing control joints through new concrete.

L. Saw cut joints within 12 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.

M. Screed floors and slabs on grade level, maintaining surface flatness of Ff of 20.

3.9 CONCRETE FINISHING

A. Provide formed concrete surfaces to be left exposed with smooth rubbed finish.

B. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1.

C. Lightly hand or machine tool edges. Assure that edges are not depressed or chattered along bulkheads, formed edges, columns, and penetrations.

3.10 FLOOR TOLERANCES

A. Measure for FF and FL tolerances for floors in accordance with ASTM E1155, within 48 hours after slab installation.

B. Finish concrete to achieve the following tolerances:
   1. Exposed to view and foot traffic in public areas: F(F) 35 and F(L) 25.

3.11 FLOOR SURFACE TREATMENT

A. Apply liquid hardener on concrete floor surfaces.

3.12 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
   1. Protect concrete footings from freezing for minimum 7 days.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.13 FIELD QUALITY CONTROL - CONCRETE

A. Field inspection and testing will be performed by Owner's testing laboratory in accordance with ACI 318.

B. Provide free access to Work and cooperate with appointed firm.

C. Reinforcement Inspection:
   1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances.

D. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

E. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.

F. Strength Test Samples:
   1. Sampling Procedures: ASTM C172.
   2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.
   3. Sample concrete and make one set of three cylinders for every 50 cu yds or less of each class of concrete placed. At a minimum, provide one set of cylinders for concrete footings, one set of cylinders for concrete pier foundations, and one set of cylinders for concrete sidewalks and paving.
   4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
   5. Make one additional cylinder during cold weather concreting, and field cure.

G. Field Testing:
   1. Slump Test Method: ASTM C143/C143M.
   2. Air Content Test Method: ASTM C231.
   3. Temperature Test Method: ASTM C1064/C1064M.
   4. Measure slump, and temperature for each concrete load at point of delivery.
   5. Measure air content in air entrained concrete for each concrete load at point of delivery.

H. Cylinder Compressive Strength Testing:
   1. Test Method: ASTM C39/C39M.
   2. Test Acceptance: In accordance with ACI 318.
   3. Test one cylinder at 7 days.
   4. Test two cylinders at 28 days.

I. Core Compressive Strength Testing:
   1. Sampling and Testing Procedures: ASTM C42/C42M.
   2. Test Acceptance: In accordance with ACI 318.
   3. Drill three cores for each failed strength test from concrete represented by failed strength test.

J. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.14 PATCHING

A. Allow Architect to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect upon discovery.

C. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, but only when acceptable to Architect.
   1. Cut out honeycomb, rock pockets, voids over 1/2 inch diameter, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Before placing cement mortar, thoroughly clean, dampen with water, and brush-coat the area to be patched with neat cement grout. Proprietary patching compounds may be used when acceptable to the Architect.
   2. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color of surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surfaces.

D. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, and holes left by tie rods and bolts; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning.
   1. Repair concealed formed surfaces, where possible, that contain defects that adversely affect the durability of the concrete. If defects cannot be repaired, remove and replace the concrete.

E. Repair of unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and to verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.
   1. Repair finished unformed surfaces that contain defects which adversely affect durability of concrete. Surface defects, as such, include crazing, cracks, in excess of 0.01 inch wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
   2. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
   3. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.
   4. Repair defective areas, except random cracks and single holes not exceeding one inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance. Dampen concrete surfaces in contact with patching concrete and brush with a neat cement grout coating or concrete bonding agent. Place patching concrete before grout takes its initial set. Mix patching concrete of same materials to provide concrete of the same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
   5. Repair isolated random cracks and single holes not over one inch in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt and loose particles. Dampen cleaned concrete surfaces and brush with neat cement grout coating. Place dry-pack before cement grout takes its initial set. Mix dry-pack before cement grout takes its initial set. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate using a No. 16 mesh sieve, using only enough water as required for handling and placing. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched areas continuously moist for not less than 72 hours.

3.15 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by Architect.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.16 SCHEDULE - CONCRETE TYPES AND FINISHES

A. Concrete for Building Foundations: Type A, non-air entrained.

B. Concrete for floor slabs-on-grade: TYPE A, non-air entrained; chemical hardener after finishing.

C. Concrete for concrete paving: TYPE A, air entrained.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 1 GENERAL

1.1 SUMMARY

A. Section includes concrete masonry units, reinforcing, masonry mortar and grout.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 530 - Building Code Requirements for Masonry Structures.
2. ACI 530.1 - Specifications for Masonry Structures.

B. ASTM International:
1. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
3. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
4. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
5. ASTM A580/A580M - Standard Specification for Stainless Steel Wire.
6. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
7. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement.
9. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
10. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
11. ASTM C27 - Standard Classification of Fireclay and High-Alumina Refractory Brick.
12. ASTM C34 - Standard Specification for Structural Clay Load-Bearing Wall Tile.
13. ASTM C55 - Standard Specification for Concrete Brick.
14. ASTM C56 - Standard Specification for Structural Clay Non-Load-Bearing Tile.
15. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale).
16. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
17. ASTM C73 - Standard Specification for Calcium Silicate Face Brick (Sand-Lime Brick).
18. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
19. ASTM C126 - Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.
20. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units.
21. ASTM C140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.

22. ASTM C212 - Standard Specification for Structural Clay Facing Tile.
23. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).
24. ASTM C315 - Standard Specification for Clay Flue Linings.
25. ASTM C530 - Standard Specification for Structural Clay Non-Loadbearing Screen Tile.
26. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
27. ASTM C652 - Standard Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale).
28. ASTM C744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.
29. ASTM C1261 - Standard Specification for Firebox Brick for Residential Fireplaces.
30. ASTM C1283 - Standard Practice for Installing Clay Flue Lining.
31. ASTM C1405 - Standard Specification for Glazed Brick (Single Fired, Brick Units).
32. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
33. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
34. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 PERFORMANCE REQUIREMENTS

A. Concrete Masonry Compressive Strength (f'm): 2,000 psi; determined by unit strength method.
   1. Concrete Masonry Units: 2,800 psi minimum net area compressive strength.

1.4 SUBMITTALS

A. Product Data:
   1. Submit data for masonry units.
   2. Submit data for premix mortar and grout.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 Building Code Requirements for Masonry Structures and ACI 530.1 Specification for Masonry Structures.

1.6 QUALIFICATIONS

A. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept units on site. Inspect for damage.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.

B. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Hollow Concrete Masonry Units (CMU) for Below Grade Applications: ASTM C90; normal weight.
   1. Concrete Masonry Unit Size and Shape: Nominal modular size of 8 x 8 x 16 inches. Furnish special units for 90 degree corners.

2.2 ACCESSORIES

A. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, deformed billet bars, uncoated finish.

2.3 MORTAR AND GROUT

A. Pre-packaged Mortar and Grout Mixes: ASTM C387/387M; as manufactured by Spec Mix or equal. Mix and install pre-packaged mortar and grout mixes in accordance with manufactures instructions.

B. Mortar Mixes:
   1. Mortar For Structural Masonry and Masonry in contact with earth: ASTM C270, Type M using Property specification.

C. Mortar Mixing:
   1. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.
   2. Achieve uniformly damp sand immediately before mixing process.
   3. Re-temper only within two hours of mixing.

D. Grout Mixes:
   1. Grout for Filled Masonry:
      a. 2,000 psi minimum strength at 28 days; 8-11 inches slump; mixed in accordance with ASTM C476 for Fine and Coarse grout.
   2. Application:
      a. Coarse Grout: For grouting spaces with minimum 4 inches dimension in every direction.
      b. Fine Grout: For grouting other spaces.

E. Grout Mixing:
   1. Transit mix grout in accordance with ASTM C94/C94M, modified to use ingredients complying with ASTM C476.
   2. Site Mixed Grout: Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify field conditions are acceptable and are ready to receive work.

B. Verify items provided by other sections of work are properly sized and located.

C. Verify built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied to other sections.

B. Furnish temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent support.

3.3 INSTALLATION

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form bed and head joints of uniform thickness.

C. Coursing of Concrete Masonry Units:
1. Bond: Running.
2. Coursing: One unit and one mortar joint to equal 8 inches.
3. Mortar Joints: Concave.

D. Placing And Bonding:
1. Lay hollow masonry units with face shell bedding on head and bed joints.
2. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
3. Remove excess mortar as work progresses.
4. Interlock external corners.
5. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment is required, remove mortar and replace.
6. Perform job site cutting of masonry units with proper tools to assure straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

E. Grouted Components:
1. Support and secure reinforcing bars from displacement.
2. Place and consolidate grout fill without displacing reinforcing.
    a. Grout masonry foundations solid.

F. Reinforced Masonry:
1. Lay masonry units with core vertically aligned and clear of mortar and unobstructed.
2. Place reinforcement bars as indicated on Drawings.
3. Support and secure reinforcement from displacement.
4. Place and consolidate grout fill without displacing reinforcing.
5. Place grout in accordance with ACI 530.1 Specification for Masonry Structures.

G. Cutting And Fitting:
   1. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape, and location.
   2. Obtain Architect/Engineer's approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.4 ERECTION TOLERANCES

A. Maximum Variation From Alignment of Columns or Pilasters: 1/4 inch.

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.

H. Maximum Variation for Steel Reinforcement:
   1. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.
   2. Plus or minus 1/2 inch when distance from centerline of steel to opposite face of masonry is 8 inches or less.
   3. Plus or minus 1 inch when distance is between 8 and 24 inches.
   4. Plus or minus 1-1/4 inch when distance is greater than 24 inches.
   5. Plus or minus 2 inches from location along face of wall.

3.5 CLEANING

A. Remove excess mortar and mortar smears as work progresses.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.6 PROTECTION OF FINISHED WORK

A. Protect exposed external corners subject to damage.

B. Protect base of walls from mud and mortar splatter.

C. Protect masonry and other items built into masonry walls from mortar droppings and staining caused by mortar.

D. Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Section includes structural framing; wall, and roof sheathing; preservative treatment of wood; and miscellaneous framing.

B. Related Sections:
1. Section 06 17 53: Shop Fabricated Wood Trusses.

1.2 REFERENCES

A. American Wood-Preservers' Association:
1. AWPA M4 - Standard for the Care of Preservative-Treated Wood Products.
2. AWPA U1 - Use Category System: User Specification for Treated Wood.

B. ASTM International:
1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
2. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
4. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
5. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

C. National Lumber Grades Authority:
1. NLGA - Standard Grading Rules for Canadian Lumber.

D. Northeastern Lumber Manufacturers Association:
1. NELMA - Standard Grading Rules for Northeastern Lumber.

E. Southern Pine Inspection Bureau:
1. SPIB - Standard Grading Rules for Southern Pine Lumber.

F. U.S. Department of Commerce National Institute of Standards and Technology:
1. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
2. DOC PS 20 - American Softwood Lumber Standard.

G. West Coast Lumber Inspection Bureau:
1. WCLIB - Standard Grading Rules for West Coast Lumber.

H. Western Wood Products Association:
1. WWPA G-5 - Western Lumber Grading Rules.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with the following:

1. Lumber Grading Agency: Certified by DOC PS 20.
2. Wood Structural Panel Grading Agency: Certified by EWA - The Engineered Wood Association.
3. Lumber: DOC PS 20.
4. Wood Structural Panels: DOC PS 2.

B. Apply label from agency approved by authority having jurisdiction to identify each preservative treated material.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

A. Lumber Grading Rules: NLGA.

B. Stud Framing: SPF species, #2 grade or better, 19 percent maximum moisture content.

C. Wall Plates in contact with concrete or masonry: SYP species; #2 grade or better, 19 percent maximum moisture content, pressure preservative treated.

D. Miscellaneous Framing: SPF species, #2 grade or better, 19 percent maximum moisture content.

2.2 SHEATHING MATERIALS

A. Wood Structural Panel Roof Sheathing: EWA Rated Sheathing; Oriented Strand Board; Exposure Durability 1; unsanded.
1. Thickness: 19/32 inches.
2. Span Rating: 40/20.
3. Edges: Square.

B. Wood Structural Panel Wall Sheathing: EWA Rated Sheathing, Oriented Strand Board; Exposure Durability 1; unsanded; preservative treated when installed within 8 inches of exposed exterior grade.
1. Thickness: 15/32 inches.
2. Span Rating: 32/16.
3. Edges: Square.

2.3 ACCESSORIES

A. Fasteners and Anchors:
1. Fasteners: ASTM A153/A153M, hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.

B. Structural Framing Connectors: Hot dipped galvanized steel, sized to suit framing conditions.

C. Sill Gasket on top of foundation wall: ¼ inch thick, plate width, closed cell polyethylene foam from continuous rolls.

D. Anchor Bolts: ASTM A307; Grade A threaded rod, epoxy anchored into predrilled holes.

E. Anchoring Adhesive: Hilti HIT-RE 100 epoxy Anchor, or equal.

2.4 FACTORY WOOD TREATMENT

A. Wood Preservative (Pressure Treatment): AWPA U1, Commodity Specification A-Sawn Products or F-Wood Composites using water-borne preservative.

B. Moisture Content After Treatment: Redried.
   1. Lumber: Maximum 19 percent.
   2. Structural Panels: Maximum 15 percent.

PART 3 EXECUTION

3.1 FRAMING

A. Set structural members level and plumb, in correct position.

B. Fasten framing in accordance with applicable code.

C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.

D. Place horizontal members, crown side up.

E. Construct load bearing framing members full length without splices.

F. Double members at openings over 16 inches wide. Space short studs over and under opening to stud spacing.

G. Place sill gasket directly on cementitious foundation at perimeter exterior walls.

H. Coordinate installation of shop-fabricated wood trusses.

3.2 SHEATHING

A. Fasten sheathing in accordance with applicable code.

B. Secure roof sheathing with longer edge (strength axis) perpendicular to framing members and with ends staggered and sheet ends over bearing. Maintain 1/8” gap between panels joints.

C. Secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered. Maintain 1/8” gap between panels joints.

3.3 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Framing Members: 1/4 inch from indicated position, maximum.

END OF SECTION

SECTION 06 17 53

SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes shop fabricated wood trusses for roof framing, bridging, bracing, and anchorage.

B. Related Sections:
   1. Section 06 10 00 - Rough Carpentry.

1.2 REFERENCES

A. ASTM International:
   1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   2. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
   3. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
   4. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
   5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   6. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
   7. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

B. National Lumber Grades Authority:
   1. NLGA - Standard Grading Rules for Canadian Lumber.

C. The Redwood Inspection Service:
   1. RIS - Standard Specifications for Grades of California Redwood Lumber.

D. Southern Pine Inspection Bureau:
   1. SPIB - Standard Grading Rules for Southern Pine Lumber.

E. Truss Plate Institute:
   1. TPI 1 - National Design Standard for Metal Plate Connected Wood Truss Construction.

F. U. S Department of Commerce National Institute of Standards and Technology:
   1. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
   2. DOC PS 20 - American Softwood Lumber Standard.

G. West Coast Lumber Inspection Bureau:
   1. WCLIB - Standard Grading Rules for West Coast Lumber.

H. Western Wood Products Association:
   1. WWPA G-5 - Western Lumber Grading Rules.

1.3 DESIGN REQUIREMENTS

A. Design for roof Live and Dead Loads indicated on Drawings with a deflection limit of 1/240 of span.

B. Design trusses for maximum bearing pressure of 425 psi.

C. Design trusses under supervision of a Professional Structural Engineer licensed in the State of Michigan.

1.4 SUBMITTALS

A. Shop Drawings: Indicate sizes and spacing of trusses and associated components, web and chord sizes, plate sizes, structural connectors, bearing surface area requirements, loads and truss cambers, framed openings, locations for temporary and permanent bridging and bracing.

B. Submit design calculations bearing the seal of the Supervising Professional Structural Engineer.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with the following:
   1. Lumber Grading Agency: Certified by DOC PS 20.
   2. Lumber: DOC PS 20.

B. Truss Design, Fabrication, and Installation: In accordance with TPI 1.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store truss depth in vertical position resting on intermittent bearing pads.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide trusses fabricated with metal connector plates of one of the following:
   1. Letherer Truss and Wall Systems.
   2. Michigan Timber and Truss.
   3. Mid Michigan Truss & Components.
   4. Bear Truss.
   5. Truss Technologies.
   6. Midwest Manufacturing.
   7. Wendricks Truss
   8. Substitutions, or Equal.

2.2 MATERIALS

A. Lumber Grading Rules: NLGA, SPIB, WCLIB, or WWPA G-5 as applicable.

B. Wood Members: Any species graded under NLGA, SPIB, WWPA or WWPA; grade specified by Truss Designer; 19 percent maximum and 7 percent minimum moisture content.

C. Steel Plate Connectors: TPI 1, Section 6; hot dip galvanized; die stamped with integral teeth; minimum coated metal thickness indicated, but not less than 0.036 inch thick.

D. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

2.3 ACCESSORIES

A. Wood Blocking and Framing for Openings: In accordance with Section 06 10 00.

B. Fasteners and Anchors:
1. Fasteners: ASTM A153/A153M, hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
2. Nails: ASTM F1667.

2.4 FABRICATION

A. Wood truss fabrication shall comply with TPI-1 “National Design Standard for Metal Plate Connected Wood Truss Construction”.

B. Fabricate trusses to achieve structural requirements specified.

C. Cut wood members to accurate length, angles, and sizes to produce close fitting joints with wood to wood bearing in assembled units.

D. Fabricate metal connector plates to size, configuration, thickness and anchorage details required for types of joint truss designs indicate.

E. Assemble truss members in design configuration indicated using jigs or other means to ensure uniformity and accuracy of assembly with close fitting joints. Position members to produce design camber indicated.

F. Connect members by metal connector plates accurately located and securely fastened to each side of wood members.

G. Fabricate bottom and top chord extensions as indicated on Drawings.

H. Frame special sized openings in web framing as indicated on Drawings.

2.5 SOURCE QUALITY CONTROL

A. Inspect Work performed at fabricator's facility to verify conformance to Contract Documents.

B. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.

1. Specified shop inspections are not required for Work performed by approved fabricator.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify supports and openings are ready to receive trusses.

3.2 PREPARATION

A. Coordinate placement of bearing and support items.

3.3 ERECTION

A. Do not install damaged trusses, or trusses with damaged web or chord members, or with loose metal connecting plates.

B. Erect trusses in accordance with manufacturer's instructions and TPI recommendations.

C. Set members level and plumb, in correct position.

D. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in alignment until completion of erection and installation of permanent bracing.

E. During entire construction period, Contractors shall provide means of adequate distribution of concentrated loads so that the safe loading capacity of any single truss is not exceeded.

F. Do not field cut or alter truss members without approval of the Truss Designer and Architect/Engineer of Record. Trusses that are cut, notched or otherwise altered shall be repaired as directed by the Truss Designer at the Contractor's expense.

G. Exercise care during erection to minimize out-of-plane bending.

H. Anchor trusses at each bearing location using connectors indicated in Drawings or as specified by Truss Designer.

I. Do not anchor trusses directly to top plate of non-bearing partitions. Install designated slip connector between non-bearing partitions and trusses.

J. Frame openings between trusses with lumber in accordance with Section 06 10 00.

K. Install permanent bracing to enable trusses to maintain design spacing and position, withstand specified live and dead loads including lateral loads, and to comply with other indicated requirements.
   1. Roof Trusses: At a minimum, install pairs of 2x4 chevron bracing at maximum 20 foot intervals at all truss compression webs requiring permanent lateral bracing. Chevron bracing shall be installed in the plane of the webs and nailed to each web member with two sixteen penny nails minimum. Chevron bracing angle shall be approximately 45 degrees in the plane of the web and shall be in addition to continuous lateral bracing. Alternatively, Contractor

may install T or L bracing in lieu of continuous lateral and chevron bracing on any member requiring bracing. T or L bracing shall be installed in accordance with BCSI recommendation.

L. Coordinate installation of sheathing with work of this Section.

3.4 ERECTION TOLERANCES

A. Framing Members: 1/2 inch maximum, from indicated position.

B. Trusses: 1/4 inch maximum from true position, 1/4 inch maximum from plumb.

END OF SECTION

SECTION 07 21 13

BOARD INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes rigid board insulation below floor slab.

1.2 REFERENCES

A. ASTM International:
1. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
2. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics.
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

A. Product Data: Submit data on product characteristics, performance criteria, and limitations.

1.4 QUALITY ASSURANCE

A. Insulation Installed in Concealed Locations Surface Burning Characteristics:
1. Foam Plastic Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

B. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Extruded Polystyrene Insulation:
1. Dow Chemical
2. UC Industries/Owens Corning
3. Or equal.

2.2 COMPONENTS

A. Extruded Polystyrene Insulation: ASTM C578 Type IV; conforming to the following:
1. Board Size: 48 x 96 inch.
2. Board Thickness: As indicated on Drawings.
3. Thermal Resistance: R of 5.0 per inch of thickness.
4. Water Absorption: In accordance with ASTM D2842; 0.3 percent by volume maximum.
5. Compressive Strength: Minimum 25 psi.
6. Board Edges: Square edges.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.

B. Verify substrate surface is compacted, flat, free or irregularities, materials or debris preventing full contact with base.

3.2 INSTALLATION - UNDERSLAB

A. Install boards on grade horizontally.
   1. Place boards in method to maximize contact bedding.
   2. Butt edges and ends tight to adjacent board and to protrusions.

B. Cut and fit insulation tight to protrusions or interruptions to insulation plane.

3.3 PROTECTION OF INSTALLED CONSTRUCTION

A. Do not permit damage to insulation prior to covering.

END OF SECTION

SECTION 07 21 16

BLANKET INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes batt insulation and vapor retarder in exterior wall and roof construction, and batt insulation for filling perimeter window and door shim spaces.

1.2 REFERENCES

A. ASTM International:
1. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
4. ASTM E970 - Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source.

1.3 PERFORMANCE REQUIREMENTS

A. Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96/E96M.

1.4 SUBMITTALS

A. Product Data: Submit data on product characteristics, performance criteria, and limitations.

1.5 QUALITY ASSURANCE

A. Insulation Installed in Concealed Locations Surface Burning Characteristics:
1. Batt Insulation: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

PART 2 PRODUCTS

2.1 BATT INSULATION

A. Manufacturers:
1. Owens Corning Fiberglas
2. Or equal.

2.2 COMPONENTS

A. Batt Insulation: ASTM C665; preformed glass fiber roll; conforming to the following:
1. Thermal Resistance: R of 3.75 per inch of thickness.
2. Facing: Faced on one side with asphalt treated mesh reinforced Kraft paper.

B. Staples: Steel wire; type and size to suit application.

C. Tape: Polyethylene self-adhering type, 2 inch wide.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

A. Install in exterior walls and roof spaces without gaps or voids. Do not compress insulation.

B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

C. Insulate miscellaneous gaps and voids around door and window frames with cut pieces and cover with vapor retarder.

D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of 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 oc.

G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

3.3 SCHEDULES

A. Ceiling Insulation: R19, faced.

B. Wall Insulation: R19, faced.

END OF SECTION

SECTION 07 31 13

ASPHALT SHINGLES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Asphalt shingles.
   2. Underlayment

B. Related Sections:
   1. Section 07 62 00 – Sheet Metal Flashing and Trim.

1.2 REFERENCE STANDARDS

A. ASTM International:
   1. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
   2. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
   3. ASTM D2178 - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
   4. ASTM D3018 - Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules.
   5. ASTM D3462 - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
   6. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
   7. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings.
   8. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

B. National Roofing Contractors Association:
   1. NRCA - The NRCA Steep Roofing Manual.

C. Underwriters Laboratories Inc.:
   1. UL 790 - Tests for Fire Resistance of Roof Covering Materials.

1.3 SUBMITTALS

A. Samples: Submit samples of each shingle color indicating color range and finish texture/pattern; for color and texture selection.

1.4 WARRANTY

A. Furnish fifty year manufacturer warranty period for asphalt shingles.

B. Warranty Supplement: Provide manufacturer’s supplemental warranty to cover labor and materials in the event of a material defect in the first ten years after completion of installation of shingles.

PART 2 PRODUCTS

2.1 ASPHALT SHINGLES

A. Manufacturer:
   1. Certain Teed Corporation; Model Landmark Pro AR
   2. Or equal.

B. Description: ASTM D3018 Type 1 – Self-Sealing; ASTM D3462; ASTM D3161 Class F Wind Resistance; ASTM D7158 Class H Wind Resistance; ASTM E108 / UL 790 Class A Fire Resistance; glass fiber mat base, ceramically colored / UV resistant mineral surface granules across entire face of shingle; algae-resistant 240 lb/100 sq ft weight; self-sealing; laminated overlay type; color as selected.

2.2 SHEET MATERIALS

A. Underlayment: Synthetic polymer-based scrim-reinforced underlayment complying with physical property requirements of ASTM D226 and ASTM D486, including resistance to liquid water transmission; Diamond Deck as manufactured by Certainteed, or shingle manufacturer approved equivalent

2.3 RIDGE VENTS

A. Ridge Vents: Plastic, nominal 11 inches wide with vent openings that do not permit direct water or weather entry; to receive cap shingles; minimum 12 sq inches/foot net free area:
   1. Ridge Vent: 11” Ridge Master Plus manufactured by Mid-America Building Products, Tapco International.

2.4 ACCESSORIES

A. Flashing and Drip Edge Materials:
   1. As specified in Section 07 62 00.

B. Nails: ASTM F1667; standard round wire roofing nails hot dipped galvanized steel type, minimum 0.105 inch diameter shank, minimum 0.375 inch diameter head; of sufficient length to penetrate through roof sheathing.

C. Plastic Cement: ASTM D4586, Asphalt type with mineral fiber components, free of toxic solvents, capable of setting within 24 hours at temperatures of 75 degrees F and 50 percent RH.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify roof penetrations and plumbing stacks are flashed to deck surface.

B. Verify deck surfaces are dry, free of ridges, warps, or voids.

3.2 PREPARATION

A. Fill knot holes and surface cracks with latex filler at areas of bonded underlayment and/or membrane flashing.

B. Broom clean deck surfaces under underlayment.

3.3 INSTALLATION

A. Installation shall be in strict accordance with the manufacturer's installation instructions for the materials specified.

B. Underlayment Installation:
   1. Weather lap edges and ends minimum 2 inches. Nail underlayment in place.
   2. Cut underlayment to allow ventilation at ridges.

C. Asphalt Shingles Installation:
   1. Install shingles following manufacturer's recommendation for steep slopes using 4 nails per shingle.
   2. Install color matching starter strip at eaves.
   3. Place shingles in straight coursing pattern with weather exposure recommended by manufacturer to produce double thickness over full roof area.
   4. Cap ridges with individual shingles and/or ridge vent, maintaining manufacturer's recommended weather exposure. Place to avoid exposed nails.
   5. Coordinate installation of roof mounted components or items projecting through roof with weather tight placement of flashings.
   6. Complete installation to provide weather tight service.

D. Ridge Vent:
   1. Maintain ventilation slot at ridge clear of underlayment or shingles.
   2. Install ridge vent over shingles in accordance with manufacturer's instructions.
   3. Install ridge vent continuous, centered over ridge/hip line. Hold ridge and hip vent back 2 feet from hip and ridge ends.
   4. Secure in place with nails spaced as recommended by manufacturer.
   5. Finish ridge vent with shingles in accordance with 3.3.C.4.

3.4 DEFECT ASSESSMENT AND REPAIR

A. Inspect completed roof for the presence of nail-pops. Where encountered, remove penetrated shingle and replace with new. Carefully remove fasteners to allow removal of overlying shingle and fill holes where fasteners are removed from shingles to remain with sealant. Remove under-driven or otherwise improperly driven fasteners and fill fastener hole with sealant. Install new fasteners as recommended by manufacturer adjacent to previous holes.

B. Inspect completed roof for the presence of exposed fasteners. Where fasteners (nail heads) are not concealed by the overlying shingles, underlying shingle is to be removed and replaced with new. Carefully remove fasteners to allow removal of underlying shingle and fill holes where fasteners are removed from shingles to remain with sealant. Install new fasteners as recommended by manufacturer adjacent to previous holes.

C. Repair of nail pops and/or exposed fasteners by coating with sealant will not be accepted.

3.5 PROTECTION

A. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 07 46 33

PLASTIC SIDING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Preformed vinyl siding for walls, and accessory components.
2. Secondary moisture barrier over substrate.

B. Related Sections:
1. Section 07 60 00 – Sheet Metal Flashing and Trim: Flashings used in connection with plastic siding.
2. Section 07 90 00 – Joint Protection: Sealants used in conjunction with plastic siding.

1.2 REFERENCES

A. ASTM International:
1. ASTM D226 – Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
2. ASTM D 2244 – Standard Calculation for Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
3. ASTM D3679 - Standard Specification for Rigid Polyvinyl Chloride (PVC) Siding.

1.3 SYSTEM DESCRIPTION

A. System: Preformed vinyl siding of profiles and accessory trim as indicated on the drawings.

1.4 DESIGN REQUIREMENTS

A. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.

B. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

1.5 SUBMITTALS

A. Product Data: Product Data: For each type of product specified. Include identification of materials, dimensions of individual components, installation instructions and available profiles, textures and colors.

B. Samples: Submit samples of siding, illustrating finish color, sheen, and texture for selection.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three (3) years documented experience.

B. Installer: Company specializing in performing the work of this section with minimum three (3) years documented experience and/or as approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store siding material off ground protected from weather, to prevent twisting, bending, or abrasion.

B. Prevent contact with materials which may cause discoloration or staining.

1.8 COORDINATION

A. Coordinate the Work for installation of surrounding materials, soffits and sub-fascia components or materials.

B. Coordinate the Work with installation of flashing components or materials.

1.9 WARRANTY

A. Provide Manufacturer Warranty to correct defective Work for degradation of panel finish including color fading caused by exposure to weather as defined and measured according to ASTM D 2244.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Provide siding and trim products by Certainteed Saint-Gobain.

2.2 SIDING MATERAILS

A. Provide solid vinyl siding and accessories complying with ASTM D3679.

B. Horizontal Vinyl Siding; Restoration Classic by Certainteed.
1. Pattern: Horizontal double 5” select cedar clapboard.
2. Texture: Wood grain.
3. Thickness: 0.044 inch.
4. Projection: 5/8 inch.
5. Warranty: Limited Lifetime.
6. Color: As selected.

2.3 COMPONENTS

A. Internal Corners: Same material, thickness, and finish as siding; profile to siding.

B. External Corner Posts:
1. For Vinyl Siding: Same material and finish as siding, profile to suit siding.

C. Door and Window Trim: “J” channel; same material, and finish as siding.

2.4 ACCESSORIES

A. Secondary Moisture Barrier: Secondary moisture barrier consisting of Spun bonded polyolefin sheeting, CertaWrap by Certainteed.

B. Sealants: Specified in Section 079000. Manufacturer's standard type suitable for use with installation of system, color to match panel system.

C. Fasteners: Screws appropriate for installation to ICF fastening fins. Exposed fasteners same finish as panel system.

D. Flashings at openings or interruptions in siding: As specified in Section 07 62 00.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install secondary moisture barrier in such a manner as to provide a continuous water resistive barrier behind the exterior wall veneer. Comply with manufacturers installation instructions.

B. Install flashings over openings or interruptions in water resistive barrier to direct water behind the exterior wall veneer out of the wall assembly.

C. Install vinyl siding system on walls in accordance with manufacturer's instructions.

D. Fasten siding to structural support; aligned, level, and plumb.

E. Use concealed fasteners unless otherwise approved by Architect.

F. Seal to prevent weather penetration. Maintain neat appearance.

3.2 TOLERANCES

A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.

B. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.

3.3 CLEANING

A. Remove site cuttings from finish surfaces.

B. Clean and wash surfaces with mild soap and water; rinse with clean water.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

A. Section includes flashings and fabricated sheet metal items.

B. Related Sections:
1. Section 07 31 13 - Asphalt Shingles: Fabricated sheet metal items associated with shingle roofing.
2. Section 07 46 33 – Plastic Siding: Fabricated sheet metal items associated with plastic siding.

1.2 REFERENCES

A. American Architectural Manufacturers Association:
1. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

B. ASTM International:
1. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
2. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
3. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
4. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
5. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.

C. Sheet Metal and Air Conditioning Contractors:
1. SMACNA - Architectural Sheet Metal Manual.

1.3 SUBMITTALS

A. Product Data: Submit data on manufactured components metal types, finishes, and characteristics.

B. Samples:
1. Submit samples illustrating metal finish color.

1.4 QUALIFICATIONS

A. Fabricator and Installer: Company specializing in sheet metal work with minimum three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials causing discoloration or staining.

1.6 COORDINATION

A. Coordinate with Work of 07 31 13 and 07 46 33.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Manufacturer's
   1. Alcoa Aluminum
   2. Substitutions: Or equal.

B. Drip edge: Standard weight; 1/2 inch hem x 1-1/2 inch drop; fabricated from 0.019 inch pre-finished aluminum sheet, color to match existing.

C. Soffit - perforated: Triple 4 inch Full Lanced U-groove Soffit; fabricated from 0.019 inch pre-finished aluminum sheet, color to match existing. Soffit shall provide a minimum net free area of 13.2 inches per square foot.

D. Fascia: 6 inch ribbed; fabricated from 0.024 inch pre-finished aluminum sheet, color to match existing.

E. J-channel: 1 inch face, offset, for use with specified soffit; fabricated from 0.019 inch pre-finished aluminum sheet, color to match soffit.

F. Miscellaneous Flashing: Fabricated from 0.019 inch pre-finished aluminum sheet, color as selected from manufacturers standard options.

2.2 ACCESSORIES

A. Fasteners: Same material and finish as flashing metal.

B. Bituthane Membrane: Self adhering bituthane membrane detail strip.

2.3 FABRICATION

A. Form sections shape indicated on Drawings, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

2.4 FACTORY FINISHING

A. Silicone polyester coating: Baked enamel system conforming to AAMA 2603.

B. Washcoat: Finish concealed side of metal sheets with washcoat compatible with finish system, as recommended by finish system manufacturer.

PART 3 EXECUTION

3.1 INSTALLATION

A. Secure components in place using concealed fasteners. Use exposed fasteners only where permitted.

B. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

C. Install flashing with hemmed drip over openings in exterior rain screen (veneer). Install bituthane membrane over flashing to secondary moisture barrier create a continuous watertight membrane.

END OF SECTION

SECTION 07 90 00

JOINT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes sealants, joint backing and accessories.

1.2 REFERENCES

A. ASTM International:
1. ASTM C834 - Standard Specification for Latex Sealants.
2. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
3. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
4. ASTM C1193 - Standard Guide for Use of Joint Sealants.
5. ASTM D1056 - Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
6. ASTM D1667 - Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
7. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.

1.3 SUBMITTALS

A. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

B. Samples: Submit two samples illustrating sealant colors for selection.

C. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.

D. Warranty: Include coverage for installed sealants and accessories failing to achieve watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with specified Reference Standards.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.7 COORDINATION

A. Coordinate Work with sections referencing this section.

PART 2 PRODUCTS

2.1 JOINT SEALERS

A. Manufacturers:
   1. Dow Corning Corp.
   2. Pecora Corp..
   3. Sika Corp..
   4. Tremco Sealants & Waterproofing.
   5. Substitutions: Or equal.

2.2 SEALANT PRODUCTS:

A. Sealant S1 - High Performance General Purpose Exterior Sealant: Polyurethane; ASTM C920, Type S, Grade NS, Class 50, Uses NT, T, M, A, O, and I; single-component.
   1. Acceptable Products:
      a. Dymonic 100 manufactured by Tremco.
      b. Sikaflex-150 LM manufactured by Sika Corp.
      c. Dynatrol 1-XL Hybrid by Pecora Corporation.
   2. Color: Standard colors matching finished surfaces.
   3. Applications: Exterior joints between door frames and wall surfaces, and other Exterior joints for which no other type of sealant is indicated.

B. Sealant S2 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, single component, paintable.
   1. Acceptable Products:
      a. TremFlex 834 manufactured by Tremco.
      b. Pecora AC-20 + Silcone manufactured by Pecora Corp.
   2. Color: Standard colors matching finished surfaces.
   3. Applications: Interior joints between door frames and wall surfaces, and other interior joints for which no other type of sealant is indicated.

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 D1056, sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.
   1. Type: Everlastic manufactured by Williams Products, Inc. or equal.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate surfaces and joint openings are ready to receive work.

B. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter impairing adhesion of sealant.

B. Clean and prime joints.

C. Perform preparation in accordance with ASTM C1193 and Manufacturer’s instructions.

D. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

A. Perform installation in accordance with ASTM C1193 and Manufacturer’s instructions.

B. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
   1. Width/depth ratio of 2: 1.
   2. Neck dimension no greater than 1/3 of joint width.
   3. Surface bond area on each side not less than 75 percent of joint width.

C. Install bond breaker where joint backing is not used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Tool joints concave.

3.4 CLEANING

A. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Protect sealants until cured.

3.6 SCHEDULE

A. Exterior Joints: Type S1.

B. Interior Joints: Type S2.

END OF SECTION

SECTION 08 12 13

HOLLOW METAL FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes fire rated and non-rated steel frames.

B. Related Sections:
1. Section 07 90 00 – Joint Protection: Joint sealers.
2. Section 08 13 13 – Hollow Metal Doors.
3. Section 08 71 00 - Door Hardware: Hardware.
4. Section 09 90 00 – Painting: Field painting of frames.

1.2 REFERENCES

A. American National Standards Institute:
1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.

B. ASTM International:
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. National Fire Protection Association:
1. NFPA 80 - Standard for Fire Doors, Fire Windows.
2. NFPA 105 - Standard for the Installation of Smoke Door Assemblies and other Opening Protectives.
3. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.

D. Underwriters Laboratories Inc.:
1. UL 10B - Fire Tests of Door Assemblies.
2. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
3. UL 1784 - Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Shop Drawings: Indicate frame elevations, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finish.

B. Product Data: Submit frame configuration and finishes.

C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Conform to requirements of ANSI A250.8.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept frames on site in manufacturer's packaging. Inspect for damage.

B. Break seal on-site to permit ventilation.

1.7 COORDINATION

A. Coordinate Work with frame opening construction, door, and hardware installation.

PART 2 PRODUCTS

2.1 STANDARD STEEL FRAMES

A. Manufacturers:
1. Amweld Building Products, Inc.
2. Ceco Door Products
3. [unbarton Corp.
4. Kewanee Corp.
5. Republic Builders Products
6. Steelcraft
7. Or equal

B. Product Description: Standard shop fabricated steel frames, fire rated and non-rated types.
1. Exterior Frames:
a. 16 gage/0.053 inch thick material, base metal thickness, galvanized.

2.2 ACCESSORIES

A. Primer: ANSI A250.10 rust inhibitive type.

B. Silencers: Resilient rubber fitted into drilled hole.

C. Weatherstripping: Specified in Section 08 71 00.

2.3 FABRICATION

A. Fabricate frames as welded unit.

B. Fabricate frames with hardware reinforcement plates welded in place.

C. Prepare frames for silencers. Provide three single silencers for single doors on strike side.

D. Fabricate frames to match frame elevations depicted in plans.

2.4 SHOP FINISHING

A. Steel Sheet: Galvanized to ASTM A653/A653M G60.

B. Primer: Baked.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install frames in accordance with ANSI A250.8.

B. Anchor frames to surrounding construction using three anchors each jamb.

C. Coordinate installation of frames with installation of hardware specified in Section 08 71 00 and doors in Section 08 13 13.

3.3 ERECTION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

END OF SECTION

SECTION 08 13 13

HOLLOW METAL DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes non-rated, thermally insulated, steel doors.

B. Related Sections:
1. Section 08 12 13 - Hollow Metal Frames.
2. Section 08 71 00 - Door Hardware.
3. Section 09 90 00 - Painting and Coating: Field painting of doors.

1.2 REFERENCES

A. American National Standards Institute:
1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.

B. ASTM International:
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM C518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. Hollow Metal Manufacturers Association:
1. HMMA 810 - Hollow Metal Doors.

D. Steel Door Institute:
1. SDI 108 - Recommended Selection and Usage Guide for Standard Steel Doors.

1.3 SUBMITTALS

A. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, and cut-outs for glazing, and finishes.

B. Product Data: Submit door configurations, location of cut-outs for hardware reinforcement.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ANSI A250.8.

B. Surface Burning Characteristics:
1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

C. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept doors on site in manufacturer's packaging. Inspect for damage.

B. Break seal on site to permit ventilation.

1.7 COORDINATION

A. Coordinate Work with door opening construction, door frame, and door hardware installation.

B. Coordinate installation to accommodate door hardware electric wire connections.

PART 2 PRODUCTS

2.1 HOLLOW METAL DOORS

A. Manufacturers:
1. Amweld Building Products, Inc.
2. Ceco Door Products.
3. Kewanee Corp.
4. Pioneer Industries.
5. Republic Builders Products.
6. Steelcraft.
7. Or equal.

B. Product Description:
1. Exterior Doors (Insulated): ANSI A250.8, SDI 108, 1-3/4 inch thick.
a. Level 3 - Extra heavy Duty, Model 1, full flush design.

2.2 COMPONENTS

A. Face: Steel sheet in accordance with ANSI A250.

B. End Closure: Channel, 0.04 inches thick, flush.

C. Core: Polyurethane foam for insulated doors.

D. Thermal Insulated Door: Total insulation R-Value of 11 calculated in accordance with ASTMC518.

2.3 ACCESSORIES

A. Primer: ANSI A250.10 rust inhibitive type.

2.4 FABRICATION

A. Fabricate doors with hardware reinforcement welded in place.

2.5 SHOP FINISHING

A. Steel Sheet: Galvanized to ASTM A653/A653M A60.

B. Primer: Baked.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install doors in accordance with ANSI A250.8.

B. Coordinate installation of glass and glazing specified in Section 08 80 00.

C. Coordinate installation of doors with installation of frames specified in Section 08 12 13 and hardware specified in Section 08 71 00.

D. Touch-up damaged shop finishes.

3.3 ERECTION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.4 ADJUSTING

A. Adjust door for smooth and balanced door movement and positive latching of locking hardware.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:
1. Furnish hardware required to complete the work as shown on the drawings and as specified herein;
2. Furnish trim attachments and fastenings, specified or otherwise required, for proper and complete installation.
3. Furnish all items of Finish Hardware specified, scheduled, shown or required herein except those items specifically excluded from this section of the specification.

B. Related Sections:
1. Section 08 12 13 – Hollow Metal Frames.
2. Section 08 13 13 – Hollow Metal Doors.

1.2 DEFINITIONS

A. "Finish Hardware": Items required for swinging doors, except special types of unique and non-matching hardware specified under door and frame Sections of these Specifications.

1.3 DESIGN REQUIREMENTS

A. Thoroughly review finish hardware schedule, comparing it with the floor plan, door schedule, and door details to verify hardware requirements, quantities, door swings, finishes, and sizes.

B. If an inconsistency or error in the proposed construction documents is suspected, the hardware supplier is to bring it immediately to the attention of the Architect. If the quantity of items is questioned, for bidding purposes, assume the higher quantity is required and price accordingly.

C. Architect’s review of Submittals is for design concept only, and does not relieve the Contractor of the responsibility to furnish sufficient material and functions required for a complete, and code-worthy installation. Determination of all quantities is the responsibility of the Contractor.

1.4 PERFORMANCE REQUIREMENTS

A. Furnish finish hardware complying with the requirements of laws, codes, ordinances and guidelines of governmental authorities having jurisdiction:

B. Michigan Building Code - 2015 Edition

C. ANSI A117.1-2003 Accessible and Usable Buildings and Facilities

1.5 SUBMITTALS

A. Hardware Schedule:
1. Submit "Finish Hardware Schedule" in the following format:

a. Vertically-typed, double-spaced;
b. Organized into "hardware sets", indicating complete designations of every item required for each door or opening. Include the following information for each item of finish hardware:
    1) Manufacturer
    2) Type
    3) Style
    4) Function
    5) Size
    6) Degree and direction of opening swing (“hand”)
    7) Finish
    8) Fasteners
    9) Location of hardware set cross-referenced to indications on floor plans, door, schedule, and frame schedule.
    10) Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
    11) Mounting heights and locations for hardware.
    12) Door and frame sizes and materials.
    13) Keying information.
c. Electrified Hardware system operation description.

B. Product Data:
    1. Submit, in booklet form Manufacturers Catalog cut sheets of scheduled hardware.
    2. Submit product data with hardware schedule.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with the following requirements:
    1. ANSI A156 series.
    2. NFPA 80.
    3. UL 305.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Source limitations: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually with necessary fasteners, instructions, and installation templates, when necessary; label and identify each package with door opening code to match hardware schedule.
    1. Include instructions, templates, and fasteners needed for installation.

1.9 COORDINATION

A. Coordinate Owner's keying requirements during course of Work.

PART 2 PRODUCTS

2.1 GENERAL

A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each finish hardware item is indicated in the Drawings.

B. Product designations:
1. Provide the product designated or the comparable product by the Manufacturers listed under this Section.

C. ANSI/BHMA designations:
1. Used to describe hardware items, or to define quality or function. Provide products complying with these standards in addition to additional requirements of this Section.

D. Hand of door: Drawings show direction of slide, swing (“hand”) of door leafs.

E. Hardware: Use hardware manufactured to conform to published templates and, generally, prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

2.2 MATERIALS

A. Base metals:
1. Manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially-recognized) quality than that specified for applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated.
2. Do not furnish "optional" materials for those indicated, except as otherwise specified.

B. Fasteners:
1. Furnish Phillips flat-head screws with each hardware item, unless otherwise indicated.
2. Exposed screws: Match finish of hardware (even where noted to be "prepared for paint").
3. Use concealed fasteners for hardware units which are exposed when door is closed, except where no standard units of type specified are available with concealed fasteners.
4. Do not use thru-bolts where bolt head or nut on opposite face would be exposed.
5. Where adequate reinforcement is not feasible, thru-bolting would only be acceptable if through sleeves, or if sex-screw fasteners are used.

C. Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

2.3 MANUFACTURED UNITS

A. Reference standards:
1. Comply with BHMA/ANSI A156 current series for each product type.

B. Hardware finishes:
1. Materials and Finishes Standard: Comply with ANSI A156.18 (BHMA 1301). Finish designations used in schedules are listed, therein.
2. Provide matching finishes for hardware units at each door, unless otherwise indicated.

3. Match the color and texture of hardware items to manufacturer's standard finish for the latchset, lockset, or push-pull unit.
4. Provide quality of finish, including thickness of plating or coating, composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than that specified or described by referenced standards.

C. Hardware for fire-rated openings:
1. Comply with NFPA 80.
2. Tested and listed by Underwriters Laboratory (UL), or Factory Mutual (FM) for type, size and use of door, and complying with requirements of door and door frame label.
3. Provide UL or FM label on door indicating "Fire door to be equipped with fire-exit hardware".
4. Provide UL or FM label on exit device indicating "Fire Exit Hardware".

2.4 PRODUCTS

A. Hinges:
1. Continuous Hinges:
a. Continuous shall be Heavy Duty Geared type hinges with 400lb rating.
b. ANSI/BHMA A156.26 -Grade 1.
c. Fire-rating: "WHI-listed" or "UL-listed" as necessary.
d. Placement of fire label will be on top of the door at cont. hinge locations.
e. Provide hinge filler plates to fill existing hinge preps.
f. Undersize doors according to hinge clearance requirements.
g. Furnish power transfers as specified.
h. Acceptable manufacturer's: PBB, IDC, Select, Zero.

B. Lock Cylinders and Keying:
1. General:
a. Supplier shall meet with Owner and Architect to finalize keying direction and furnish a complete key schedule. The key schedule shall include keysets, marks and key schedule corresponding to each opening.
2. Cylinders:
a. Type: Mortise or rim-type as required by function of locking device.
b. Provide screw on cams or tail piece as required.
c. Construct lock cylinder parts from brass/bronze, stainless steel or nickel silver.
d. Provide solid machined cylinder rings with tension spring to resist wrenching of cylinder. Length, finish and size as required.
e. Provide cylinder(s) and core(s) as required by function for each locking device.
3. System:
a. Unless otherwise indicated, provide combinated final cylinders keyed to owners existing key system.
4. Keying:
a. Deliver keys and final cores to the hardware installation Contractor for final installation, when directed by the Owner.
b. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
c. Key material: Nickel silver
d. Key quantity:
1) Two (2) change keys for each lock.

C. Locksets:
1. Mortise Locks as required to match existing preps:

a. Comply with ANSI A156.13 - 1987, Grade 1 criteria for mortise locks
b. Provide functions as listed in the hardware schedule.
c. Lockset case shall to be non-handed.
d. Provide sized lip of strike based on frame conditions.
e. Provide appropriate fasteners for lock and strike.
f. Provide cylinders with proper collar and cam based on lock function.
g. Trim: Dallas lever-type equal to PDQ.
h. Acceptable products: PDQ MR series, Sargent 8200, MBS RE

D. Exit Devices:
1. General:
a. Comply with ANSI A156.3, Grade 1.
b. At fire doors:
1) Provide UL or FM label on exit device indicating "Fire Exit Hardware", where appropriate.
2) Mount exit device using sex-bolts on labeled wood doors.
2. Description:
a. Type: Flat, push-bar type with aluminum body.
b. Provide functions as specified in hardware sets.
c. Trim: DAL Design, Extra-heavy-duty lever matching lockset style.
d. Provide dead-locking latch bolts.
e. Acceptable products: PDQ 6000, SDCS6000, VD99

E. Closers:
1. General:
a. ANSI A156.4 - 1986 Grade 1 criteria.
b. All closers shall be the products of one manufacturer.
2. Description:
a. Full rack-and-pinion type with double heat-treated spindle.
b. Cast Iron Body.
c. Hydraulic fluid: Non-gumming and non-freezing.
d. Closer body: Non-handed, multi-size spring power.
e. With three non-critical V valves and hex key adjustment to independently regulate sweep latch speed and backcheck.
f. Provide mounting brackets necessary to clear sound seals and weatherstrip.
g. Enclose in a full, molded cover.
h. Provide drop plates and / or special brackets for proper mounting.
i. Pressure Relief Valves will NOT be accepted on Door Closers.
j. Provide Barrier Free power setting as required by ANSI A117.1
3. Acceptable products: International PDQ 7000, 44CI Series, MBS QDC 40 Cast Iron Body.

F. Kick plates, mop plates and armor plates:
1. General: ANSI A156.16 - 1989 criteria.
2. Description:
a. Minimum .050" thick
b. Dimensions:
1) Width: 2" less than door width to which they are to be applied.
2) Kick plate height: 10"
c. Mounting:
1) Install kick plates and armor plates flush to bottom edge of door.
3. Acceptable manufacturers: Hiawatha, PDQ and IDC

G. Thresholds:

1. General:
   a. ANSI A156.21 - 1989, Grade 1 criteria.
   b. Comply with A.D.A. requirements, unless otherwise scheduled.
2. Description:
   a. Flat profile
   b. Installation locations are scheduled.
   c. Provide templates for thresholds to related door suppliers to coordinate proper undercut.
3. Acceptable products: Reese, IDC, KN Crowder

H. Miscellaneous Hardware Equipment and Material:
1. General:
   a. Provide items and types as specified.

2.5 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.6 HARDWARE FINISHES

A. General:
1. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible and except as otherwise indicated.
2. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening.
3. In general, match items to the manufacturer's standard finish for the latch and lock set (or push/pull units if no latch/lock sets) for color and texture.
4. Provide finishes matching those established by BHMA or, if none established, match the Architect's sample.
5. 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 that specified for the applicable units of hardware by referenced standards.
6. Finish designations used in schedules and elsewhere listed in ANSI A156.18 "Materials and Finishes Standard", including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

B. Provide the following hardware finishes, unless otherwise scheduled: Dull Chrome, Stainless Steel, and Aluminum color pallet.

C. Base material: Manufacturer’s standard high-carbon steel, brass, or bronze.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings.

B. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. General:
1. Install each item in its proper location firmly anchored into position, level and plumb, and in accordance with the manufacturer's recommendations.
2. Handing, hardware heights, locations, and degree of opening swing are indicated in the Drawings and Finish Hardware Schedule.
3. Mount finish hardware units:
   a. At recommended heights and locations as shown in approved finish hardware schedule, complying with requirements of the A.D.A., and pertinent provisions of the Building Code.
   b. To function at proper degree of opening of doors as indicated on approved finish hardware schedule.
   c. By manufacturer's template.
   d. Prior to final finishing of the door. Remove hardware to allow finishing of door, and permanently reinstall hardware upon completion of finishing operation.
4. Reinforce, where necessary, the substrate to assure proper attachment.
5. Drill and countersink units which are not factory-prepared for anchorage fasteners.
6. Space fasteners and anchors in accordance with industry standards.

C. Installing closers:
1. Mount closers per manufacturer's template and secure the Architect’s approval of the closer installation.
2. The Contractor will be required to replace doors onto which closers are improperly mounted at no additional cost to the Owner. Repair or patching of such doors will not be acceptable.

D. Installing Stops: Install all wall stops into reinforced wall or stud. Projection type wall stops (115) should be mounted 80” from finish floor, with sloped portion of the stop facing up / flat side down. Install floor stops out of the way foot traffic at a height high enough to accommodate any ramp or uneven floor condition.

E. Installing thresholds at exterior doors: Set in full bed of butyl-rubber, or polyisobutylene mastic sealant.

F. Installing weatherstrip: Install weatherstrip prior to installing closers, OH Stops or panic hardware. Template closers and panic devices from weatherstrip and install all closer / OH Stop shoe brackets and panic device strikes onto the weatherstrip without notching or cutting the weatherstrip.

G. Installing Sweeps: Install all sweeps on exterior side of opening.

3.3 ADJUSTING AND CLEANING

A. Check and adjust each item of hardware and each door upon completion of final installation. Verify proper function and replace units which cannot be made to operate freely and smoothly, as intended for the application.

B. Clean adjacent surfaces soiled by hardware installation.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

A. Do not permit adjacent work to damage hardware or hardware finish.

HARDWARE SETS

Hardware Set 1 – Storeroom Lock [Always Locked] + Closer

1	ea.	Continuous Hinge CH51	32D
1	ea.	Storeroom Lockset MR 115 DJEW	32D
1	ea.	Combinated Mortise Cylinder by Owner	26D
1	ea.	Door Closer 7101 BC SCS	689
1	ea.	Kickplate 98 10 x 2” LDW B4E	32D
1	ea.	Threshold S205A	Reese
1	ea.	Sweep 354C – Mount Pull Side	Reese
1	set	Weatherstrip by 855C (mount prior to closer shoe)	Reese
1	ea.	Rain Drip 201C	Reece

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes surface preparation and field application of paints, and other coatings.

1.2 REFERENCES

A. ASTM International:
1. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. Painting and Decorating Contractors of America:
1. PDCA - Architectural Painting Specification Manual.

C. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.

1.3 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

1.4 SUBMITTALS

A. Product Data: Submit data on finishing products.

B. Samples:
1. Submit paper chip samples illustrating range of colors available for each surface finishing product scheduled.

C. Manufacturer's Installation Instructions: Submit special surface preparation procedures, and substrate conditions requiring special attention.

1.5 QUALITY ASSURANCE

A. Surface Burning Characteristics:
1. Fire Retardant Finishes: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

B. Applicator: Company specializing in performing work of this section with minimum three years documented experience and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

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 maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.

B. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by 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 candle measured mid-height at substrate surface.

1.9 SEQUENCING

A. Sequence application to the following:
   1. Do not apply finish coats until paintable sealant is applied.

PART 2 PRODUCTS

2.1 PAINTS AND COATINGS

A. Manufacturers: Paint
   1. Glidden Coatings and Resins
   2. Benjamin Moore and Company
   3. Sherwin Williams Company
   4. Valspar Corporation
   5. Devoe Paint Co.
   6. Fuller-O’Brien.
   7. PPG Architectural Finishes.

2.2 COMPONENTS

A. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:
   1. To soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
   2. For good flow and brushing properties.
   3. Capable of drying or curing free of streaks or sags.

2.3 FINISHES

A. Exterior Paint System EPS-2:
   1. Semi-Gloss Enamel:
      a. 1st Coat: Shop Primed Metal: Enamel Undercoater.
      b. 2nd Coat: Odorless Alkyd Enamel, Semi-Gloss.

PART 3 ECUTION

3.1 EXAMINATION

A. Verify surfaces and substrate conditions are ready to receive Work as instructed by product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report conditions capable of affecting proper application.

C. Test shop applied primer for compatibility with subsequent cover materials.

3.2 PREPARATION

A. Surface Appurtenances: Remove hardware and fittings prior to preparing surfaces or finishing.

B. Surfaces: Correct defects and clean surfaces capable of affecting work of this section. Remove or repair existing coatings exhibiting surface defects.

C. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Touch-up Prime bare steel surfaces.

3.3 APPLICATION

A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.

C. Sand metal surfaces lightly between coats to achieve required finish.

D. Use tack cloth to remove dust and particles just prior to applying next coat.

3.4 CLEANING

A. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

3.5 SCHEDULE

A. Hollow metal doors and frames: EPS-1.

END OF SECTION

SECTION 23 0001

GENERAL MECHANICAL REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This Division includes all labor, materials, equipment, tools, supervision, start-up services, Owner training, etc., including all incidental and related items, necessary to complete installation and successfully test and start up and operate the mechanical systems indicated on the drawings, AND as described in each Section of Division 230000 Specifications.

B. All drawings and General Provisions of the Contract, including the General Conditions, Supplementary General Conditions, and Division 1 specification sections, apply to work of all Division 230000 sections. The items in this section are not intended to supersede, but are supplementary to, the requirements set forth in other Divisions of the specifications.

C. The Contractor, and his Subcontractors and Suppliers, shall include in their bid all materials, labor, and equipment involved, in accordance with all local customs, codes, rules, regulations; and secure compliance of all parts of the Specifications and Drawings regardless of Sectional inclusion in these Specifications.

D. The Contractor shall be held responsible for the complete and satisfactory accomplishment of all Work inclusive of whatever miscellaneous material and/or appurtenances are required to perfect the installation, and demonstrate that all mechanical systems will operate satisfactorily under normal operating conditions.

1.02 DRAWINGS & SPECIFICATIONS

A. The drawings are diagrammatic and show the general location and arrangement of equipment, piping, ductwork and related items. They shall be followed as closely as elements of the construction will permit. The Contractor shall provide/install all mechanical systems, and associated equipment, complete and include all necessary offsets, fittings, and other components required due to interferences, space constraints, code requirements, etc. as required to provide a complete/functional system.

B. The general mechanical requirements are intended to augment the drawings and specifications. Should conflicts occur between the drawings and the specifications, the strictest provision shall govern. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the Architect and/or Engineer for resolution prior to rough-in.

C. The Contractor shall examine the drawings of all other trades in order to verify the conditions governing the work on the job site. Arrange work accordingly, providing all ductwork, piping, fittings, traps, valves and accessories as may be required to meet such conditions.

D. Deviations from the drawings, with the exception of minor changes in routing and other such incidental changes that do not affect the functioning or serviceability of the systems, shall not be made without the written approval of the Architect and/or Engineer prior to rough-in.

E. The architectural and structural drawings take precedence in all matters pertaining to the building structure; plumbing drawings in all matters pertaining to plumbing trades; Mechanical drawings in all matters pertaining to mechanical trades; and electrical drawings in all matters pertaining to electrical trades. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the ARCHITECT and/or ENGINEER for resolution prior to rough-in.

1.03 COORDINATION OF WORK

A. The Contractor shall verify clearance requirements of all electrical and mechanical

equipment/systems prior to the installation of any new work. Mechanical equipment, piping, ductwork, systems, etc. shall not interfere with mechanical equipment spaces or electrical clearances. The Contractor shall coordinate his work to obtain symmetry in ceiling layouts, so that sprinkler heads, lights, diffusers, etc. are coordinated and are installed per the Architectural reflected ceiling plan.

B. The Contractor and his Subcontractors shall be responsible for all tasks applicable to their work in accordance with the Specifications, Drawings, and code requirements, and shall be responsible for coordinating locations and arrangements of their work to give best results with all other relevant trades.

1. Coordinate all wall, roof, floor penetrations, equipment pads, equipment locations, system routings, etc. with architectural and structural trades.
2. Verify requirements of all equipment with shop drawing submittals prior to installation - notify Architect/Engineer of any conflicts between shop drawings and plans prior to rough-in.
3. Coordinate rough-in locations of mechanical control devices (i.e. thermostats, sensors, etc.) with electrical trades. T-stats shall be located @ 48" AFF unless noted otherwise.
4. Coordinate locations of mechanical items that require access (i.e. isolation valves, balance valves, balance dampers, damper actuators, valve actuators, exhaust fans, filters, etc.) with reflected ceiling plan. Items located above hard non-accessible ceilings shall be provided with access doors as required.
5. Verify clearance requirements of all mechanical, electrical, plumbing equipment/systems prior to the installation of any new work. Mechanical equipment, piping, ductwork, systems, etc. shall not interfere with electrical equipment spaces. Electrical conduit and equipment clearances shall not interfere with mechanical/plumbing equipment spaces.

1.04 INSPECTION OF SITE AND PROJECT DOCUMENTATION

A. The Contractor shall visit the site and examine/verify the conditions under which the work must be conducted before submitting proposal. The Contractor shall examine the drawings and specifications of all other trades including Mechanical, Architectural, Structural and Electrical.

B. The submitting of a proposal implies that the Contractor has visited the site, examined all contract documents, and understands the conditions under which the work must be conducted.

C. The Contractor shall notify the Architect and/or Engineer, prior to submitting his bid via Request For Information (RFI), of any potential problems that he has identified during his inspection of the site or from the review of plans/specifications. RFIs must be submitted at least 5 working days prior to bid opening.

1.05 GENERAL SUPPORT REQUIREMENTS

A. Provide all necessary angle/brackets, hangers, or supplementary supporting steel as required for adequate support for all piping, ductwork, and equipment. Secure approval form Architect and/or Structural Engineer, in writing, before welding or bolting to steel framing or anchoring to concrete structure, or cutting/coring thru structural systems.

B. Where piping, ductwork, or equipment is supported or suspended from concrete construction, provide approved concrete inserts in formwork to receive hanger rods, such as Unistrut or Powerstrut, and where installed in metal deck, use Ramset or Welds as required.

C. Install mechanical piping systems with adequate anchors, guides, expansion loops, etc. as required to provide for piping expansion/contraction.

1.06 GUARANTEE

A. Contractor shall guarantee that all labor, materials, and equipment are free from defects and agrees to replace or repair any part of this installation which becomes defective within a period of one year from the date of substantial completion following final acceptance. Acceptance date of substantial completion shall be as determined by the Architect and/or Engineer.

B. The Contractor shall file with the Owner any and all guarantees from the equipment manufacturers including the operating conditions and performance capacities they are based on.

1.07 CODES, PERMITS AND FEES

A. Refer to Division 1, General Conditions and Supplementary Conditions.

B. Unless otherwise indicated, all required permits, plan reviews, licenses, inspections, approvals and fees for mechanical work shall be secured and paid for by the Contractor.

C. All work shall be executed in accordance with the most current rules and regulations set forth in local and state codes.

1. Mechanical and Plumbing systems shall be installed per current jurisdictional codes (Michigan Mechanical Code, Michigan Plumbing Code, International Fuel Gas Code, Michigan Building Code, etc.), current NFPA codes (NFPA 101, NPFA 90, etc.), and applicable sections of the Michigan Building Code.

D. In the event that the plans and specifications conflict with any rules, regulations, or codes applying, said rules, regulations and codes shall govern.

E. Where the drawings and/or specifications indicate materials or construction in excess of code requirements, the drawings and/or specifications shall govern.

1.08 SUBSTITUTION ITEMS REQUIRING PRIOR APPROVAL

A. All items that the Contractor proposed to use in the work that are not specifically named in the contract documents must be submitted for review. Such items must be submitted in .pdf format to the Architect and/or Engineer for approval a minimum of seven (7) days prior to bid opening. Requests for prior approval must be accompanied by complete catalog information, including but not limited to, model, size, accessories, complete electrical information and performance data in the form given in the equipment schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations. The Contractor shall call out/illustrate to the Engineer any/all differences between the basis of design and the Contractor’s proposed substitution items.

1.09 MATERIAL AND EQUIPMENT MANUFACTURERS

A. All items of equipment shall be furnished complete with all accessories normally supplied with the catalog items listed and all other accessories necessary for a complete and satisfactory operating system. All equipment and materials shall be new and shall be standard products of manufacturers regularly engaged in the production of plumbing, heating, ventilating and air conditioning equipment and shall be the manufacturer's latest design.

B. If an approved manufacturer is other than the manufacturer used as the basis for design, the equipment of product provided shall be equal in quality, durability, appearance, capacity and efficiency through all ranges of operation, shall conform with arrangements and space limitations of the equipment shown on the plans and/or specified, shall be compatible with the other components of the system and shall comply with the requirements for Substitution Items Requiring Prior Approval specified in this Section of the Specifications. All costs to make these items of equipment comply with these requirements including, but not limited to, piping, sheet metal, electrical work, and building alterations shall be included in the original bid.

C. All package unit skid mounted equipment that are factory assembled shall meet, in detail, the products named and specified within each section of the detailed mechanical and electrical Specifications.

1.10 SHOP DRAWINGS/SUBMITTALS

A. Refer to General Conditions and Supplementary General Conditions.

B. All shop drawings shall be submitted in groupings of similar and/or related items. Incomplete submittal groupings will be returned unchecked.

C. Unless noted otherwise, submit digital (.pdf format) copies of complete manufacturer's shop drawings for all equipment, valves, plumbing and heating specialties, refrigeration specialties, pipe hangers, wiring diagrams and control diagrams including, but not limited to the items listed below. Where items are referred to by symbolic designation on the drawings and specifications, all submittals shall bear the same designation. Refer to other Sections of the mechanical specifications for additional requirements.

1) 23 3413 Axial Fans

2) 23 8101 Terminal Heat Transfer Units

1.11 OPERATION AND MAINTENANCE INSTRUCTIONAL MANUALS

A. Refer to Division 1, General Requirements.

B. Provide compete maintenance and operating instructional manuals covering all mechanical equipment as specified herein, Division 1 requirements, and individual equipment specification sections.

C. The O&M data shall be bound in a suitable number of 3" or 4", 3-ring, hard cover binders. Permanently imprinted on the cover shall be the words, "Manufacturer's Operation and Maintenance Data", project title, location of project, and the date. A table of contents shall be provided in the front of each binder.

D. Maintenance and operating instructional manuals shall be job specific to this project. Generic manuals are not acceptable. Each piece of equipment in the O&M manual shall be identified as identified on the project drawings (i.e. Air Handling Unit AHU-1, Pump P-1, etc.).

E. Internally subdivide the binder contents with permanent page dividers, organized by specification section and/or major equipment/systems (i.e. 230593_TESTING, ADJUSTING, AND BALANCING FOR HVAC, 233300_AIR DUCT ACCESSORIES, etc.)

F. Contents: Each volume of O&M manual shall have three parts:

1. Part 1: A directory listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: O&M data, arranged and subdivided by major equipment/systems. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers:

   a. List of equipment.

   b. Copies of Shop drawings and product data, approved by Architect/Engineer.

   c. Installation and operational procedures.

   d. Routine maintenance procedures.

   e. Trouble shooting procedures.

   f. Complete parts lists by nomenclature, manufacturer's part number and use.

   g. Recommended spare parts lists.

   h. Lubrication chart listing all types of lubricants to be used for each piece of equipment and the recommended frequency of lubrication.

   i. Complete wiring and schematic diagrams.

   j. Elevations and/or sections cut through all of the major equipment and sub-assemblies.

   k. At the end of each section, a maintenance schedule shall be provided for each piece of equipment. The schedule shall display the daily, weekly, monthly, semi-annual, and annual lubrication and preventative maintenance required in order to meet warranty

conditions and the manufacturer's recommendations for optimal performance and life of the equipment. Photos or reproduction of the manufacturer's literature will not be accepted.

3. Part 3: Project documents and certificates, including the following:
   a. Testing, Adjusting, and Balance Reports (approved by Engineer).
   b. Warranty Certificates.
   c. Copies of approved construction permits.

G. Maintenance and Operating manuals shall be provided, in digital .pdf format, to the Architect and/or Engineer for review when construction is 75% complete.

H. A minimum of two (2) hard copies, as well as digital .pdf format, of all approved Operation and Maintenance literature shall be furnished to the Owner within 10 days after final inspection. O&M manuals must be completed prior to start of Owner training as the manuals shall be used as the basis of the training.

1.12 INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection the Contractor shall instruct Owner's designated personnel in operation, adjustment and maintenance of mechanical equipment and systems at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.

C. Use Operation and Maintenance Manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

E. Training shall be provided by factory authorized/trained representatives familiar with the startup and training on the equipment.

1.13 RECORD DRAWINGS

A. Contractor shall submit to the Architect and/or Engineer, record drawings which have been neatly marked to represent as-built conditions for all new mechanical work.

B. The Contractor shall keep accurate note of all deviations from the construction documents and discrepancies in the concealed conditions and other items of construction on field drawings as they occur. The marked up field documents shall be available for review by the Architect and/or Engineer, and Owner at their request.

PART 2 PRODUCTS

2.01 MATERIALS

A. All material and equipment furnished and installed by the Contractor for the permanent Work shall be new, unused, of the best quality of make specified, shall be free from defects of any character, and shall be listed as approved by the UL and/or FM.

PART 3 EXECUTION

3.01 INSTALLATION OF EQUIPMENT

A. Install equipment in strict accordance with all directions and recommendations furnished by the manufacturer. Where such directions are in conflict with the drawings and specifications, report such conflicts to the Architect and/or Engineer for resolution.

3.02 WORK INVOLVING OTHER TRADES

A. Certain items of equipment or materials specified in the Mechanical Division may have to be

installed by other trades due to code requirements or union jurisdictional requirements. In such instances, the Contractor shall complete the work through an approved, qualified subcontractor and shall include the full cost for same in his bid.

3.03 COORDINATION

A. Install work to avoid interference with work of other trades including, but not limited to, architectural and electrical trades. Remove and relocate any work that causes an interference at Contractor's expense. Disputes regarding the cause of an interference shall be resolved by the Architect and/or Engineer.

3.04 SLEEVES

A. Provide and install Schedule 40 black steel pipe sleeves, cut to length, wherever pipes pass through above grade walls and floors. Provide and install galvanized steel pipe sleeves, cut to length, wherever pipes pass through below grade foundation walls and slab on grade floors. Sleeves shall terminate flush with walls in finished areas. All sleeves through the floor are to extend two (2) inches above finish floor.

B. Provide escutcheons at each penetration through walls, floors, and ceilings in exposed areas.

C. Patch sleeves to match building material.

3.05 SEALING OF MECHANICAL OPENINGS

A. Seal the space around pipes in sleeves and around duct openings through walls, floors and ceilings.

B. Refer to specification 078400-Firestopping.

C. Provide adequate clearance to allow for proper duct/pipe movement and sealing.

D. Provide/install fireproof wall and floor sleeves as required by applicable building codes at all applicable wall, ceiling, and floor penetrations. Refer to Architectural plans for wall assembly ratings.

E. Sleeves placed in floors shall be flush with the underside of the floor construction and shall have planed, square ends, extending 2 inches above the finished floor, unless otherwise noted or detailed.

F. Where sleeves pass through reinforced concrete floors, they shall be properly set in position prior to concrete pouring in such a way that they will be maintained in position until the concrete is set.

G. Ducts and pipes passing through below grade perimeter walls or slabs on grade shall have the space between the duct/pipe and sleeve sealed watertight with a mechanically expandable elastomer seal device.

H. Penetrations through fire rated floors and walls shall be fire-stopped in accordance with applicable building code requirements with UL and FMRC approved materials and shall have a fire rating equal to or greater than the fire partition rating. Refer to architectural plans for locations and assembly ratings.

1. Packing: Refractory fiber or ceramic fiber.
    a. Manufacturers:
        1) Carborundum Fiberfrax.
        2) Johns-Manville - Cerafelt.
        3) Eagle Picher Epitherm 1200.
        4) Babcock and Wilcox Kaowool.
2. Fire stop sealant.

a. Manufacturers:

1) Hilti

2) Tremco

3) Mameco

4) Pecora

3. Where combustible pipes, tubes, vents, etc. penetrate a fire rated assembly, such penetrations shall be protected by an approved through-penetration fire stop collar/sealant system per the building code.

a. Through -penetration firestop systems shall be tested in accordance with ASTM E814 with a minimum positive pressure differential of 0.01 inch WG. Through penetration firestop systems shall have a "F" rating and a "T" rating of not less than 1 hour but not less than the required rating of the assembly penetrated.

b. Hilti CP 642 Firestop Collar.

c. Hilti FS-ONE High Performance Intumescent Firestop Sealant.

d. 3M Fire Barrier PPD Plastic Pipe Device.

e. 3M Fire Barrier Intumescent Firestop Sealant.

3.06 CUTTING, CORING AND PATCHING

A. Refer to General Conditions.

B. Unless specifically noted otherwise, the Contractor shall perform all cutting, coring, and patching that may be necessary for the installation of their Work. All cutting, coring, patching and repair work shall be performed by the Contractor through qualified Subcontractors. Contractor shall include full cost of same in his bid.

C. Secure approval form Architect and/or Structural Engineer, in writing, before cutting, welding/bolting to, or anchoring from any structural building components (i.e. structural steel, load bearing walls, footings/foundations, concrete floors/ceilings, etc.).

3.07 EQUIPMENT FOUNDATIONS AND SUPPORTS

A. For equipment suspended form ceiling or walls, furnish and install all inserts, rods, structural steel frames, brackets and platforms required. Obtain approval of Architect and/or Structural Engineer for same including loads, locations, and methods of attachment.

3.08 EQUIPMENT CONNECTIONS

A. Make connections to equipment, fixtures and other items included in the work in accordance with the approved shop drawings and rough-in measurements furnished by the manufactures of the particular equipment furnished.

B. All piping connections to equipment shall be flanged or shall be made with unions to facilitate equipment removal.

C. All piping connections to pumps, coils, and other equipment shall be installed without strain at the pipe connection of this equipment.

D. Brass unions for connections of 2 inch and less and flanged union with dielectric gasket and bolt sleeves for 2-1/2 inch and greater shall be used for equipment connections of dissimilar metals.

E. All ductwork connections to air handling equipment shall be made with flexible duct connectors.

3.10 ACCESSIBILITY

A. All equipment shall be installed so as to be readily accessible for operation, maintenance, and repair, as required by the equipment manufacturer and as subject to the approval of the

Engineer.

3.11 CLEANING

A. Each trade shall be responsible for removing all debris daily as required to maintain the work area in a neat, orderly condition.

B. After equipment, ductwork, piping systems have been completed and tested, each entire system shall be cleaned and flushed.

C. Prior to connection of new piping to existing piping systems, all new piping shall be subject to initial flushing, cleaning and final flushing. Provide temporary bypass piping and fittings, temporary valves and strainers, temporary water make-up piping with approved means of backflow prevention, and temporary pumps as needed to perform specified flushing and cleaning requirements.

3.12 PROTECTION AND HANDLING OF EQUIPMENT AND MATERIALS

A. Electrical equipment furnished by Mechanical Trades and installed by Electrical Trades shall be turned over to Electrical Trades in good condition.

B. Equipment and materials shall be protected from theft, injury or damage.

C. Materials with enamel or glaze surface, shall be protected from damage by covering and/or coating as recommended in bulletin, "Handling and Care of Enameled Cast Iron Plumbing Fixtures," issued by the Plumbing Fixtures Manufacturers Association, and as approved.

D. Coat polished or plated metal parts with white petroleum jelly immediately after installation.

E. Protect equipment outlets, pipe and duct openings with temporary plugs or caps.

F. Provide adequate storage for all equipment and materials delivered to the job site. Equipment set in place in unprotected areas must be provided with temporary protection.

3.13 GENERAL SUPPORT REQUIREMENTS

A. Each mechanical trade shall provide all required supporting components to properly support their work. Supporting components/systems shall be in accordance with Code and as specified.

B. Provide all necessary angle/brackets or supplementary steel as required for adequate support for all piping, ductwork, specialties, and equipment. Secure approval form Architect and/or Engineer, in writing, before welding or bolting to steel framing or anchoring to concrete structure.

C. Where piping, ductwork, specialties, or equipment is supported or suspended from concrete construction, provide approved concrete inserts in formwork to receive hanger rods, such as Unistrut or Powerstrut, and where installed in metal deck, use Ramset or Welds as required.

D. Hangers for ductwork 48 inches and wider located in Mechanical Rooms shall be sized to also support fire protection system branch piping.

3.14 DRAWINGS AND MEASUREMENTS

A. These specifications and accompanying drawings are intended to describe and provide for finished work. They are intended to be cooperative, and what is called for by either the drawings or specifications shall be as binding as if call for by both. The work herein described shall be complete in every detail.

B. The Drawings are not intended to be scaled for rough-in measurements, nor to serve as Shop Drawings. Field measurements necessary for ordering materials and fitting the installation to the building construction and arrangement shall be taken by the Contractor. The Contractor shall check latest architectural drawings to locate equipment/fixtures/etc., check latest structural drawings for interferences, etc..

3.15 EXTRA WORK

A. For any extra work which may be proposed, the Contractor shall furnish to the General Contractor/Construction Manager, an itemized breakdown of the estimated cost of all materials and labor required to complete this work. The estimate cost breakdown shall include unit prices (same prices for increase/decrease of work) for all materials (i.e. duct, piping, valves, equipment, equipment rental, etc.) and all labor (i.e. manhours, overtime, etc.) which may be required for any proposed extra work. The Contractor shall not proceed until receiving a written order from the General Contractor establishing the agreed price and describing the work to be done.

3.16 WORK IN EXISTING BUILDINGS

A. The Owner will provide access to existing buildings as required. Access requirements to occupied buildings shall be identified on the project schedule. The Contractor, once work is started in the existing building, shall complete same without interruption so as to return work areas as soon as possible to Owner.

B. Adequately protect and preserve all existing and newly installed work. Promptly repair any damage to same at Contractor's expense.

C. Consult with the Architect and/or Engineer as to the methods of carrying on the work so as not to interfere with the Owner’s operation any more than absolutely necessary. Accordingly, all service lines shall be kept in operation as long as possible and the services shall only be interrupted at such time as will be designated by the Architect and/or Owner's Representative.

END OF SECTION

SECTION 23 3100

HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal ductwork.

1.02 REFERENCE STANDARDS

A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.

D. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems; National Fire Protection Association.

E. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association.

F. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; Sheet Metal and Air Conditioning Contractors' National Association.

G. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum 10 years of documented experience.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 10 years of documented experience.

1.04 REGULATORY REQUIREMENTS

A. Construct ductwork to NFPA 90A, NFPA 90B, and NFPA 96 standards.

1.05 FIELD CONDITIONS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

1.06 COORDINATION REQUIREMENTS

A. Sheet metal trades shall coordinate all design, construction, and installation with all other trades.

B. Sheet metal trades shall cooperate with the Test and Balance Contractor and provide all miscellaneous caps and any other materials required for structural integrity and leakage testing of the complete ductwork system. Refer to Test and Balance specification section.

C. Coordinate painting requirements of exposed ductwork in finished areas with specification section 09900 and color with Architect.

1.07 DESIGN REQUIREMENTS

A. Duct sizes shown on drawings are inside clear dimensions. For lined ducts, maintain sizes inside lining.

B. Variation of duct configuration or sizes is permitted, so long as the interior area is not reduced. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

C. Use material, weight, thickness, gauge, construction and installation methods as outlined in the latest addition of the following SMACNA publications, unless noted otherwise:

1. HVAC Duct Construction Standards, Metal and Flexible
2. HVAC Air Duct Leakage Test Manual
3. HVAC Systems - Duct Design
4. Rectangular Industrial Duct Construction
5. Round Industrial Duct Construction

D. Use products which conform to NFPA 90A, possessing a flame spread rating of less than 25 and a smoke developed rating of less than 50.

1.08 PRESSURE DEFINITIONS

A. Low Pressure Ductwork: Up to 2 inches WG and velocities less than 1,500 fpm. Construct for 2 inch WG positive and negative or positive static pressures.

B. Medium Pressure Ductwork: Greater than 2 inches WG up to 6 inches WG and velocities greater than 2,500 fpm. Construct for 6 inch WG positive and negative or positive static pressures.

C. High Pressure Ductwork: Greater than 6 inches WG to 12 inches WG and velocities greater than 2,500 fpm. Construct for 12 inch WG positive and negative or positive static pressures.

PART 2 PRODUCTS

2.01 DUCT ASSEMBLIES

A. All Ducts: Galvanized steel, unless otherwise indicated.

B. Low Pressure Supply (Heating Systems): 2 inch w.g. pressure class, galvanized steel.

C. Low Pressure Supply (System with Cooling Coils): 2 inch w.g. pressure class, galvanized steel.

D. Return and Relief: 2 inch w.g. pressure class, galvanized steel.

E. General Exhaust: 1 inch w.g. pressure class, galvanized steel.

F. Outside Air Intake: 1 inch w.g. pressure class, galvanized steel.

G. Transfer Air and Sound Boots: 1/2 inch w.g. pressure class, galvanized steel with acoustical duct liner.

2.02 MATERIALS

A. General: Non-combustible ducts, conforming to Class 1 air duct materials, or UL 181.

B. Galvanized Steel Ducts: ASTM A 653/A 653M galvanized steel sheet, Forming Steel (FS) designation, with G90/Z275 zinc coating.

1. Gaskets: Chloroprene elastomer, 40 Durometer, 1/8 inch thick, full face, one piece vulcanized or dovetail at joints.
2. All reinforcement for ducts having a side dimension 48" or less shall be external. Internal reinforcement shall be acceptable only for ducts having a side dimension greater than 48 inches. Reinforcement shall be provided per SMACNA standards.

C. Steel Ducts - Galvanized Round and Flat Oval Spiral: Galvanized sheet steel duct and fittings, lock forming quality per ASTM A527, Coating Designation G-90, factory fabricated, lock seam or welded design in accordance with SMACNA HVAC Duct Construction Standards or SMACNA

Industrial Duct Construction Standards as required based on pressure class. Flat oval and round fittings shall be factory fabricated welded design. Use of field fabricated fittings (welded design) shall only be permitted when factory fabricated fittings are unavailable.

1. Manufacturers:
   a. Dixi-Bilt.
   b. Semco.
   c. LaPine Metal Products.
   d. United-McGill.
   e. Univarsal Spiral Air.

D. Caulk: Elastomer caulk, UL listed and per NFPA 90A.

E. Heat Shrinkable Sealant: Heat shrinkable polyethylene bands with heat softening epoxy for round slip fit duct joints.

F. Sealant: Indoor/outdoor water based duct sealant. UL listed, non-toxic, water resistant, 0 smoke/flame spread, compatible with mating materials, for use on all SMACNA seal Class A, B, and C joints, for use on 1/2 - 10" wg SMACNA pressure classes.

1. Manufacturers:
   a. Hardcast "Duct-Seal #321" or Equal.

G. Reinforcing and Supports:

1. Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim, and angles for support of ductwork.
2. Welded reinforcement and supports shall be structural steel black iron painted with zinc rich paint.
3. Screwed type and supports shall be structural steel per ASTM A36; Mill galvanized steel per ASTM A123. Fabricated sheet steel per ASTM A527, coating designation G-90.
4. Flanges in contact with the airstream shall be of the same material as the ductwork.
5. Bolts and fasteners for galvanized steel duct work shall be carbon steel, zinc coated per ASTM A153. Bolts and fasteners for stainless steel and PVC coated steel duct shall be stainless steel.
6. All nonmetal ductwork shall be adequately supported by means of a fiberglass or PVC-coated hanger, straps, or steel rods.
7. All hangers shall provide a means of vertical adjustment after erection.

H. Hanger Rod: ASTM A 36/A 36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.03 DUCTWORK FABRICATION

A. Low Pressure Ductwork (+/- 2 " W.G. Static Pressure Class)

1. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
2. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
3. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.
4. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA

HVAC Duct Construction Standards - Metal and Flexible.

5. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

B. Install in accordance with manufacturer's instructions.

C. Flexible Ducts: Connect to metal ducts with liquid adhesive plus tape.

D. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

E. Install and seal metal and flexible ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

F. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

G. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

H. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.

I. Use double nuts and lock washers on threaded rod supports.

J. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.

K. Provide flexible duct connections where ductwork connects to fans, air handling equipment, and other rotating equipment and/or where indicated on the drawings.

L. Provide straight runs of ductwork at fans, coils, air terminal units, and other equipment per manufacturer’s recommendations.

M. Where ducts pass through fire rated walls or floor dividing conditioned spaces from unconditioned spaces, provide a flanged duct-segment for installation during the time of construction to provide a tight seal.

N. Where ducts pass through walls and floors, finish wall openings with metal trim strips and curb floor openings. Wood frames are not permitted.

3.02 DUCTWORK FABRICATION

A. Verify dimensions at the site, making field measurements and drawings necessary for fabrication and erection. Check plans showing work of other trades and consult with Architect and/or Engineer in the event of any interferences.

B. Fabricate necessary offsets and transitions to avoid interference with building construction, piping, equipment, etc. Make changes, offsets, etc. for duct obstructions per SMACNA HVAC Duct Construction Standards or SMACNA Industrial Duct Construction Standards as required based upon pressure class. However, do not reduce duct to less than 6 inches in any dimension and do not exceed an 8:1 aspect ratio. Where it is necessary to take pipes, beams, or other similar obstructions through ducts, construct easement as indicated in SMACNA HVAC Duct Construction Standards or SMACNA Industrial Duct Construction Standards. In all cases, seal to prevent air leakage.

C. Fabricate ductwork to prevent failure under pressure or vacuum created by fast closure of ductwork devices. Provide leaktight automatic relief devices where required.

D. Ducts or plenums of masonry construction are not acceptable.

E. Repair galvanized surfaces damaged by the application of zinc rich paint per manufacturer's instructions.

3.03 DUCT LEAKAGE

A. The maximum allowable total leakage rate for duct systems shall be 5% of their associated fan and/or air handling unit CFM.

3.04 CLEANING

A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment that could be harmed by excessive dirt with temporary filters, or bypass during cleaning.

3.05 PAINTING

A. All ductwork exposed in finished areas (insulated and/or uninsulated) shall be painted to match the surrounding finishes. Refer to specification section 09900 - Coordinate color with Architect.

END OF SECTION

SECTION 23 3423

HVAC POWER VENTILATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall exhausters.

1.02 REFERENCE STANDARDS

A. AMCA 99 - Standards Handbook; Air Movement and Control Association International, Inc..

B. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating; Air Movement and Control Association International, Inc. (ANSI/AMCA 210, same as ANSI/ASHRAE 51).

C. AMCA (DIR) - Products Licensed Under AMCA International Certified Ratings Program; Air Movement and Control Association International, Inc..

D. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; Air Movement and Control Association International, Inc..

E. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; Air Movement and Control Association International, Inc..

F. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association.

G. UL 705 - Power Ventilators; Underwriters Laboratories Inc..

1.03 SUBMITTALS

A. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.

B. Manufacturer's Instructions: Indicate installation instructions.

C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum 10 years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Greenheck: www.greenheck.com.

B. Loren Cook Company: www.lorencook.com.

C. S&P.

D. ACME Engineering and Manufacturing Corporation: www.acmefan.com.

E. Carnes Company HVAC: www.carnes.com.

2.02 WALL EXHAUSTERS

A. Fan Unit: Direct driven with spun aluminum housing; resiliently mounted motor; 1/2 inch mesh, 0.062 inch thick aluminum wire bird screen.

B. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor.

C. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure wall exhausters with stainless steel lag screws to structure.

C. Extend ducts to wall exhausters into structure. Counterflash duct to wall opening.

D. Install backdraft dampers on inlet to roof and wall exhausters.

END OF SECTION

SECTION 23 8101

TERMINAL HEAT TRANSFER UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Unit heaters.

1.02 SUBMITTALS

A. Product Data: Provide typical catalog of information including arrangements.

B. Shop Drawings:

1. Indicate cross sections of cabinets, grilles, bracing and reinforcing, and typical elevations.
2. Submit schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output provided.
3. Indicate mechanical and electrical service locations and requirements.,

C. Manufacturer's Instructions: Indicate installation instructions and recommendations.

D. Operation and Maintenance Data: Include manufacturer’s descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 10 years documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 UNIT HEATERS

A. Manufacturers:

1. Trane Inc.: www.trane.com.
2. Markel.

B. Fan: Direct drive propeller type, statically and dynamically balanced, with fan guard; horizontal models with permanently lubricated sleeve bearings; vertical models with grease lubricated ball bearings.

C. Air Outlet: Adjustable pattern diffuser on projection models and four way louvers on horizontal throw models.

D. Motor: Permanently lubricated sleeve bearings on horizontal models, grease lubricated ball bearings on vertical models.

E. Electrical Characteristics:

1. Provide unit mounted disconnect. Provide resettable thermal overload protection for motor.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install equipment exposed to finished areas after walls and ceiling are finished and painted. Do not damage equipment or finishes.

C. Unit Heaters: Hang from building structure, with pipe hangers anchored to building, not from piping. Mount as high as possible to maintain greatest headroom unless otherwise indicated.

END OF SECTION

SECTION 26 0001

GENERAL ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This Division includes all labor, materials, equipment, tools, supervision, start-up services, Owner's Instructions, including all incidental and related items necessary to complete installation and successfully test and start up and operate the Electrical Systems indicated on Drawings and described in each Section of Division 26 Specifications, and conforming with ALL other Contract Documents.

B. The Drawings and General Provisions of the Contract, including the General Conditions, Supplementary General Conditions, and Division 1 specification sections, apply to work of Division 26 sections. The items in this section are not intended to supersede, but are supplementary to, the requirements set forth in other Divisions of the specifications.

C. The Contractor, and his Subcontractors and Suppliers, shall include in their bid all materials, labor, and equipment involved, in accordance with all local customs, codes, rules, regulations; and secure compliance of all parts of the Specifications and Drawings regardless of Sectional inclusion in these Specifications.

D. The Contractor shall be held responsible for the complete and satisfactory accomplishment of all Work inclusive of whatever miscellaneous material and/or appurtenances are required to perfect the installation, and demonstrate that all electrical systems will operate satisfactorily under normal operating conditions.

1.02 DRAWINGS & SPECIFICATIONS

A. The drawings are diagrammatic and show the general location and arrangement of equipment, outlets, lights and related electrical items. They shall be followed as closely as elements of the construction will permit. The Contractor shall provide/install all electrical systems, and associated equipment, complete and include all necessary wire/conduit, pull boxes, and other components required due to interferences, space constraints, code requirements, etc. as required to provide a complete/functional system.

B. These General Electrical Requirements are intended to augment the drawings and specifications. Should conflicts occur between the drawings and the specifications, the strictest provision shall govern. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the Architect and/or Engineer for resolution prior to rough-in.

C. The Contractor shall examine the drawings of all other trades in order to verify the conditions governing the work on the job site. Arrange work accordingly, providing all wiring, conduit, fittings, boxes, etc. as may be required to meet such conditions.

D. Deviations from the drawings, with the exception of minor changes in routing and other such incidental changes that do not affect the functioning or serviceability of the systems, shall not be made without the written approval of the Architect and/or Engineer.

E. The architectural and structural drawings take precedence in all matters pertaining to the building structure, mechanical drawings in all matters pertaining to mechanical trades and electrical drawings in all matters pertaining to electrical trades. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the Architect and/or Engineer for resolution.

1.03 COORDINATION OF WORK

A. The Contractor shall verify clearance requirements of all electrical and mechanical

equipment/systems prior to the installation of any new work. Electrical equipment, wiring, systems, etc. shall not interfere with mechanical equipment spaces. The Contractor shall coordinate his work to obtain symmetry in ceiling layouts, so that sprinkler heads, lights, diffusers, etc. are coordinated and are installed per the Architectural reflected ceiling plan.

B. The Contractor, and his Subcontractors, shall be responsible for all tasks applicable to their work in accordance with the Specifications, Drawings, and code requirements, and shall be responsible for coordinating locations and arrangements of their work to give best results with all other relevant trades.

1. Coordinate his work to obtain symmetry in ceiling layouts, so that sprinkler heads, lights, diffusers, etc. are coordinated and are installed per the Architectural reflected ceiling plan.
2. Coordinate all wall, roof, floor penetrations, equipment pads, equipment locations, system routings, etc. with architectural and structural trades.
3. Verify requirements of all equipment with shop drawing submittals prior to installation - notify Architect/Engineer of any conflicts between shop drawings and plans prior to rough-in.
4. Coordinate rough-in locations and mounting heights of all devices with locations/heights of countertops/sinks/furniture/cabinets/etc. with Architectural Elevations and other trades prior to rough-in.
5. Coordinate rough-in locations of mechanical control devices (i.e. thermostats, sensors, etc.) with mechanical trades. E.C shall provide rough-in of box for T-stat/Sensor and conduit pathway from box to mechanical unit's control box, for wiring by M.C and/or T.C.. T-stats/sensors shall be located @ 48" AFF unless noted otherwise.
6. Coordinate locations of electrical items that require access (i.e. panelboards, starters, pull boxes, etc.) with reflected ceiling plan. Items located above hard non-accessible ceilings shall be provided with access doors as required.
7. Do not route/locate below grade piping below, or with 45 degrees of the bottom corner of, foundation walls/footings. Coordinate with structural trades prior to installing piping. Any piping that crosses through/under foundation walls/footings shall be sleeved within a steel pipe sleeve at least 2” larger than the service pipe.
8. Verify clearance requirements of all mechanical, electrical, plumbing equipment/systems prior to the installation of any new work. Electrical equipment, lighting, conduit, systems, etc. shall not interfere with mechanical equipment spaces. Mechanical/plumbing equipment, piping, ductwork, systems, etc. shall not interfere with electrical equipment spaces.

1.04 INSPECTION OF SITE AND PROJECT DOCUMENTATION

A. The Contractor shall visit the site and examine/verify the conditions under which the work must be conducted before submitting proposal. The Contractor shall examine the drawings and specifications of all other trades including Mechanical, Architectural, Structural, Plumbing, and Electrical.

B. The submitting of a proposal implies that the Contractor has visited the site, examined all contract documents, and understands the conditions under which the work must be conducted.

C. The Contractor shall notify the Architect and/or Engineer, via written RFI prior to submitting his bid, of any potential conflicts/problems with the plans that he has identified during his inspection of the site and/or from the review of plans/specifications. RFIs must be submitted at least 5 working days prior to bid opening.

1.05 GENERAL SUPPORT REQUIREMENTS

A. Provide all necessary angle/brackets or supplementary steel as required for adequate support for all conduit, lighting, specialties, and equipment. Secure approval form Architect and/or Structural Engineer, in writing, before welding or bolting to steel framing or anchoring to concrete

structure, or cutting/coring thru structural systems.

B. Where conduit or equipment is supported or suspended from concrete construction, provide approved concrete inserts in formwork to receive hanger rods, such as Unistrut or Powerstrut, and where installed in metal deck, use Ramset or Welds as required.

1.06 GUARANTEE

A. Contractor shall guarantee that all labor, materials, and equipment are free from defects and agrees to replace or repair any part of this installation which becomes defective within a period of one year from the date of substantial completion following final acceptance, provided that such failure is due to defects in the equipment, material or installation. Acceptance date of substantial completion shall be Owner occupancy as determined by the Architect and/or Engineer.

B. The Contractor shall file with the Owner one set of guarantees from the equipment manufacturers including the operating conditions and performance capacities they are based on.

1.07 CODES, PERMITS AND FEES

A. Refer to Division 1, General Requirements and Supplementary Conditions.

B. Unless otherwise indicated, all required permits, plan reviews, licenses, inspections, approvals and fees for electrical work shall be secured and paid for by the Contractor.

C. All work shall be executed in accordance with the latest enforceable rules and regulations set forth in local and state codes.

1. Electrical systems shall be installed per current jurisdictional codes (Michigan Electrical Code, Michigan Energy Code, etc.), current NFPA codes (NFPA 101, NPFA 90, NFPA 72, etc.), and applicable sections of the Michigan Building Code.

D. In the event that the plans and specifications conflict with any rules, regulations, or codes applying, said rules, regulations and codes shall govern.

E. Where the drawings and/or specifications indicate materials or construction in excess of code requirements, the drawings and/or specifications shall govern.

F. Contractor shall prepare/submit any detailed drawings or diagrams which may be required by the governing authorities (i.e. Fire Alarm Shops/Plans/Calcs, Emergency lighting layouts/photometric calcs, etc.) & submit to AHJ for plan review/permit approval.

1.08 SUBSTITUTION ITEMS REQUIRING PRIOR APPROVAL

A. All items that the Contractor proposes to use in the work, that are not specifically named in the contract documents, must be submitted for review/approval. Such items must be submitted in .pdf format to the Architect and/or Engineer for approval a minimum of seven (7) days prior to bid opening. Requests for prior approval must be accompanied by complete catalog information, including but not limited to, model, size, accessories, complete electrical information and performance data in the form given in the equipment schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations. The Contractor shall call out/illustrate to the Engineer any/all differences between the basis of design and the Contractor's proposed substitution items.

B. Lighting Substitutions:

1. Furnish lighting fixtures as scheduled on drawings.

2. Lighting fixture substitutions may be considered for approval by the Architect and/or Engineer only if all of the following criteria are met:

a. Provide specification cut sheets marked-up to clearly identify the proposed luminaire including features, options, accessories, etc. required to match products indicated in the

schedules.

b. Submit all cut sheets, calculations, etc. to the Architect and/or Engineer no less than 7 days prior to bid date. Substitutions submitted after this date will not be considered.

1.09 MATERIAL AND EQUIPMENT MANUFACTURERS

A. All items of equipment shall be furnished complete with all accessories normally supplied with the catalog items listed and all other accessories necessary for a complete and satisfactory operating system. All equipment and materials shall be new and shall be standard products of manufacturers regularly engaged in the production of electrical equipment and shall be the manufacturer's latest design.

B. If equipment by an approved manufacture is other than the equipment specified as the basis of design the substituted equipment shall be equal in quality, durability, appearance, capacity and efficiency through all ranges of operation, shall conform with arrangements and space limitations of the equipment shown on the plans and/or specified, shall be compatible with the other components of the system and shall comply with the requirements for Substitution Items Requiring Prior Approval specified in this Section of the Specifications. All costs to make these items of equipment comply with original requirements including, but not limited to, conduit, wiring, bus work, enclosures, and building alterations shall be included in the original bid.

1.10 SHOP DRAWINGS

A. Refer to Division 1, General Requirements.

B. All shop drawings shall be submitted in groupings by specification section (i.e. 262416-Panelboards, 262726-Wiring Devices, etc.) and of similar and/or related items. Incomplete submittal groupings will be returned unchecked.

C. Unless noted otherwise, submit electronically in digital .pdf form, copies of complete manufacturer's shop drawings for all electrical equipment, or systems, including but not limited to, the items listed below. Where items are referred to by symbolic designation on the drawings and specifications, all submittals shall bear the same designation. Refer to other Sections of the electrical specifications for additional requirements.

1. 26 2200 Low Voltage Transformers
2. 26 2416 Panelboards
3. 26 5100 Interior Lighting
4. 26 5600 Exterior Lighting

1.11 OPERATION AND MAINTENANCE INSTRUCTIONAL MANUALS

A. Refer to Division 1, General Requirements.

B. Provide compete maintenance and operating instructional manuals covering all electrical equipment as specified herein, and individual equipment specification sections.

C. The O&M data shall be bound in a suitable number of 3" or 4", 3-ring, hard cover binders. Permanently imprinted on the cover shall be the words, "Manufacturer's Operation and Maintenance Data", project title, location of project, and the date. A table of contents shall be provided in the front of each binder.

D. Maintenance and operating instructional manuals shall be job specific to this project. Generic manuals are not acceptable. Each piece of equipment in the O&M manual shall be identified as identified on the project drawings (i.e. Transformer T-1, Distribution Panel DP-1, etc.).

E. Internally subdivide the binder contents with permanent page dividers, organized by specification section and/or major equipment/systems (i.e. 262416_PANELBOARDS, 283100_FIRE DETECTION AND ALARM, etc.).

F. Contents: Each volume of O&M manual shall have three parts:

1. Part 1: A directory listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: O&M data, arranged and subdivided by major equipment/systems. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers:
    a. List of equipment.
    b. Copies of Shop drawings and product data, approved by Architect/Engineer.
    c. Installation and operational procedures.
    d. Routine maintenance procedures.
    e. Trouble shooting procedures.
    f. Complete parts lists by nomenclature, manufacturer's part number and use.
    g. Recommended spare parts lists.
    h. Lubrication chart listing all types of lubricants to be used for each piece of equipment and the recommended frequency of lubrication.
    i. Complete wiring and schematic diagrams.
    j. Elevations and/or sections cut through all of the major equipment and sub-assemblies.
3. Part 3: Project documents and certificates, including the following:
    a. Warranty certificates.
    b. Copies of approved construction permits.
    c. Contractor's and equipment manufacturer's telephone numbers for warranty repair services.

G. Two (2) Maintenance and Operating manuals shall be provided, in digital .pdf format, to the Architect and/or Engineer for review when construction is 75% complete.

H. A minimum of two (2) hard copies, as well as digital .pdf format, of all approved Operation and Maintenance literature shall be furnished to the Owner within 10 days after final inspection. O&M manuals must be completed prior to start of Owner training as the manuals shall be used as the basis of the training.

1.12 INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection the Contractor shall instruct Owner's designated personnel in operation, adjustment and maintenance of electrical equipment and systems at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.

C. Use Operation and Maintenance Manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.13 RECORD DRAWINGS

A. Contractor shall submit to the Architect and/or Engineer, record drawings which have been neatly marked to represent as-built conditions for all new electrical work.

B. The Contractor shall keep accurate note of all deviations from the construction documents and discrepancies in the concealed conditions and other items of construction on field drawings as

they occur. Proper circuiting, conduit runs, location and number of electrical devices shall be indicated on the "as-built" drawings. The marked up field documents shall be available for review by the Architect, Engineer and Owner at their request.

1.14 HAZARDOUS CONDITIONS

A. Prior to starting work in any hazardous conditions area, the Contractor shall obtain approval from the Owner or their designated representative to perform testing and abatement, if necessary, of all hazardous materials including, but not limited to, asbestos. The Contractor shall visit the site prior to construction and indicate to the Owner's representative the areas that may need testing and abatement (i.e. existing light fixtures/ceilings/flooring that needs removal, etc.). The Contractor shall not perform any inspection, testing, containment, removal or other work that is related in any way whatsoever to hazardous materials under the contract.

PART 2 PRODUCTS

2.01 MATERIALS

A. All material and equipment furnished and installed by the Contractor for the permanent Work shall be new, unused, of the best quality of make specified, shall be free from defects of any character, and shall be listed as approved by the UL and/or FM.

B. Outdoor electrical equipment shall be weatherproof, NEMA 3R or NEMA 4X (stainless steel), unless otherwise indicated.

C. Unless otherwise specified in other Division 26 sections, the sheet metal surfaces of equipment enclosures shall be coated with a rust resisting primer. Over the primer, a corrosion resistant baked enamel finish shall be applied. The color shall be ASA No. 49, medium light gray.

PART 3 EXECUTION

3.01 INSTALLATION OF EQUIPMENT

A. Install equipment in strict accordance with all directions and recommendations furnished by the manufacturer. Where such directions are in conflict with the drawings and specifications, report such conflicts to the Architect and/or Engineer for resolution.

3.02 CHASE, SHAFTS AND RECESSES

A. Coordinate with architectural and other trades to ensure accurate location and size of chases, shafts and recesses.

3.03 CUTTING, CORING AND PATCHING

A. Refer to General Conditions.

B. The Contractor shall perform all cutting, coring, and patching that may be necessary for the installation of their Work. All cutting, coring, patching and repair work shall be performed by the Contractor through qualified Subcontractors. Contractor shall include full cost of same in his bid.

C. Secure approval form Architect and/or Structural Engineer, in writing, before cutting, welding/bolting to, or anchoring from any structural building components (i.e. structural steel, load bearing walls, footings/foundations, concrete floors/ceilings, etc.).

3.04 EXCAVATION AND BACKFILLING

A. Provide all excavation, trenching, tunneling and backfilling required for the electrical work.

B. Where conduit is installed less than 2'6" below the surface of pavement, provide concrete encasement, 4" minimum coverage, all around or as shown on the electrical drawings.

C. Install warning tape for all buried circuits.

D. Refer to Architectural, Structural, and Site/Civil Specification sections for excavation and backfilling details.

3.05 EQUIPMENT FOUNDATIONS AND SUPPORTS

A. Shall be as required for equipment mounting or as shown on plans.

B. For equipment suspended from ceiling or walls, furnish and install all inserts, rods, structural steel frames, brackets and platforms required. Obtain approval of Architect and/or Structural Engineer for same including loads, locations, and methods of attachment.

3.06 SLEEVES

A. Provide and install Schedule 40 black steel pipe sleeves, cut to length, wherever conduits pass through above grade walls and floors. Provide and install galvanized steel pipe sleeves, cut to length, wherever conduits pass through below grade foundation walls and slab on grade floors. Sleeves shall terminate flush with walls in finished areas. All sleeves through the floor are to extend two (2) inches above finish floor.

B. Provide escutcheons at each penetration through walls, floors, and ceilings in exposed areas.

C. Patch sleeves to match building material.

3.07 SEALING OF ELECTRICAL OPENINGS

A. Seal the space around conduits in sleeves through walls, floors and ceilings.

B. Refer to specification 078400-Firestopping.

C. Provide adequate clearance to allow for proper sealing.

D. Provide/install fireproof wall and floor sleeves as required at all applicable wall, ceiling, and floor penetrations. Refer to Architectural plans for wall assembly ratings.

E. Sleeves placed in floors shall be flush with the underside of the floor construction and shall have planned, square ends, extending 2 inches above the finished floor, unless otherwise noted or detailed.

F. Where sleeves pass through reinforced concrete floors, they shall be properly set in position prior to concrete pouring in such a way that they will be maintained in position until the concrete is set.

G. Conduits passing through below grade perimeter walls or slabs on grade shall have the space between the pipe and sleeve sealed watertight with a mechanically expandable elastomer seal device.

3.08 FIRESTOP MATERIALS

A. Refer to specification 078400-Firestopping.

B. Use only firestop products that have been tested according to ASTM E-814 and UL 1479 for the conditions set forth regarding construction assembly type, penetrating item type, annular space requirements and fire rating.

C. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in other related specification sections.

1. For non-combustible penetrations including conduit not passing through a sleeve, the following materials are acceptable:

   a. Hilti FS 601 Elastmeric Firestop Sealant.

   b. 3 M.

   c. CSD Sealing Systems.

   d. Firestop Systems.

2. For non-combustible penetrations including sleeved conduits, the following materials are acceptable:

a. Hilti FS 601 Elastmeric Firestop Sealant.

b. 3 M.

c. CSD Sealing Systems.

d. Firestop Systems.

3. For combustible penetrations including cables and cable bundles, the following materials are acceptable:

a. Hilti FS 611A Intumescent Firestop Sealant.

b. 3 M.

c. CSD Sealing Systems.

d. Firestop Systems.

3.09 EQUIPMENT CONNECTIONS

A. Make connections to equipment, fixtures and other items included in the work in accordance with the approved shop drawings and rough-in measurements furnished by the manufactures of the particular equipment furnished. All additional connections not shown on the drawings, but called out by the equipment manufacturer's shop drawings, shall be provided at no additional cost.

3.10 CLEANING

A. Each Trade shall be responsible for removing all debris daily as required to maintain the work area in a neat, orderly condition.

B. Final cleanup shall include, but not be limited to, washing of fixture lenses or louvers, switchboards, substations, motor control centers, panels, etc. Fixture reflectors and lenses or louvers shall be left with no water marks or cleaning streaks.

3.11 HAZARDOUS/CLASSIFIED LOCATIONS

A. Explosion-Proof Rated Areas: All electrical systems (i.e. conduit, fittings, circuits, devices, equipment, etc.) installed in classified areas shall be installed as required by NEC and applicable NFPA rules. Sealing fittings shall be properly installed at all required locations in accordance with code regulations. Automatic drain conduit seals shall be used wherever necessary to ensure the prevention of moisture accumulation. Approved breathers shall be installed in appropriate locations.

3.12 INSTALLATION IN PLENUM SPACES

A. Equipment and systems installed in mechanical return air plenum spaces shall of non-combustible materials which meet building code required smoke and flame spread ratings.

B. Coordinate location of mechanical plenum spaces with mechanical trades for plenum rated cable requirements.

3.13 PAINTING

A. All electrical systems, equipment, conduit, etc. exposed in finished areas shall be painted to match the surrounding finishes. Refer to specification section 09900 - Coordinate color with Architect

3.14 PROTECTION AND HANDLING OF EQUIPMENT AND MATERIALS

A. Equipment and materials shall be protected from theft, injury or damage.

B. Protect equipment outlets, pipe and duct openings with temporary plugs or caps.

C. Provide adequate storage for all equipment and materials delivered to the job site. Equipment

set in place in unprotected areas must be provided with temporary protection.

3.15 ACCESSIBILITY

A. All equipment shall be installed so as to be readily accessible for operation, maintenance, and repair, as required by the equipment manufacturer and as subject to the approval of the Engineer.

3.16 NAMEPLATES AND DIRECTORIES

A. Identify switchgear, unit substations, motor controls, panelboards, safety switches, etc., with manufacturer's nameplate, shop order, where applicable on composite assemblies, and designations used on the Drawings. Nameplates shall be laminated phenolic plastic, beveled edged white with engraved black letters. Except where impractical, letter and numerals shall be a minimum of 1/2 inch high. Nameplates shall be mechanically secured. Pressure sensitive nameplates are not acceptable. Panel directories shall be neatly typed, showing equipment served and location for each breaker or switch with a clear plastic protective cover.

3.17 EXTRA WORK

A. Refer to Division 1, General Requirements.

B. For any extra electrical work which may be proposed, the Electrical Contractor shall furnish to the General Contractor/Construction Manager, an itemized breakdown of the estimated cost of all materials and labor required to complete this work. The estimate cost breakdown shall include unit prices (same prices for increase/decrease of work) for all materials (i.e. wire, conduit, devices, equipment, equipment rental, etc.) and all labor (i.e. manhours, overtime, etc.) which may be required for any proposed extra work. The Contractor shall not proceed until receiving a written order from the General Contractor establishing the agreed price and describing the work to be done.

3.18 DRAWINGS AND MEASUREMENTS

A. These specifications and accompanying drawings are intended to describe and provide for finished work. They are intended to be cooperative, and what is called for by either the drawings or specifications shall be as binding as if call for by both. The work herein described shall be complete in every detail.

B. The Drawings are not intended to be scaled for rough-in measurements, nor to serve as Shop Drawings. Field measurements necessary for ordering materials and fitting the installation to the building construction and arrangement shall be taken by the Contractor. The Contractor shall check latest architectural drawings to locate light switches, check latest structural drawings for interferences, etc.

3.19 DEMOLITION AND REMOVAL WORK

A. All demolition of existing electrical equipment and materials shall be done by the Contractor unless otherwise indicated.

B. In general, demolition work is indicated on the drawings. However, the Contractor shall visit the job to determine the full extent and character of this work.

C. The Contractor shall review all other contract documents (i.e. architectural plans, mechanical plans, etc.) to review the extent of demolition and remodeling work.

D. Unless specifically noted, removed materials shall not be reused in the work. Salvaged materials that are to be reused shall be stored safe against damage and turned over to the appropriate trade for reuse. Salvaged materials of value that are not to be reused shall remain the property of the Owner unless such ownership is waived. Remove items from the systems and turn over to the Owner unless such ownership is waived. Items on which the Owner waives ownership shall become the property of the Contractor, who shall remove and legally dispose of same, away from the premises. Properly dispose of lighting fixture lamps and ballasts.

E. Work that has been cut or partially removed shall be protected against damage until covered by

permanent construction.

F. Where equipment or fixtures are removed, wire shall be removed, outlets shall be properly blanked off, and conduits capped. After alterations are done, the entire installation shall present a "finished" look, as approved by the Architect and/or Engineer. The original function of the existing electrical work to be modified shall not be changed unless required by the specific revisions shown on the drawings.

G. The Contractor is required to maintain service by rerouting wiring for power and lights as necessary. Where walls and ceilings are to be removed as shown on the drawings, the conduit is to be cut off by the Electrical Trades so that the abandoned conduit in these walls and ceilings may be removed with the walls and ceilings by the Architectural Trades. All dead-end conduit runs shall be plugged at the remaining line outlet boxes or the panels.

H. Where new walls, ceilings, and/or floors are installed which interfere with existing outlets, devices, etc., which are to remain, the Electrical Trades shall adjust, extend and reconnect such items as required to maintain continuity of same.

I. Where devices on existing walls are no longer active, but wires feeding outlets are active, provide blank cover plates and box extensions are required to meet new finishes. Where devices and wires feeding them are no longer active, fill outlet boxes with plaster for finishing by others.

J. Where circuits, conduit, boxes, etc. are no longer used/in service they shall be entirely removed back to the panel (source of power).

K. Where shown as to use existing circuits and equipment in remodeled areas, the Contractor shall verify circuit identification, circuit loads, and as-build methods of installation to complete the demolition and new work in accordance with current codes.

L. Conceal all electrical work wherever possible. Use of surface raceway ("Wiremold") or exposed conduits will be permitted only where approved by the Architect and/or Engineer.

3.20 WORK IN EXISTING BUILDINGS

A. The Owner will provide access to existing buildings as required. Access requirements to occupied buildings shall be identified on the project schedule. The Contractor, once work is started in the existing building, shall complete same work without interruption so as to return work areas as soon as possible to Owner.

B. Adequately protect and preserve all existing and newly installed work. The Contractor shall repair any damages that they are responsible for at their expense.

C. Consult with the Architect and/or Engineer as to the methods of carrying on the work so as not to interfere with the Owner's operation any more than absolutely necessary. Accordingly, all service lines shall be kept in operation as long as possible and the services shall only be interrupted at such time as will be designated by the Architect, Engineer, and/or Owner's Representative.

END OF SECTION

SECTION 26 0519

LOW-VOLTAGE ELECTRICAL POWER CABLES (600 V AND LESS)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wire and cable for 600 volts and less.

B. Wiring connectors and connections.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

B. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 PROJECT CONDITIONS

A. Verify that field measurements are as shown on the Drawings.

B. Conductor sizes are based upon copper unless indicated as aluminum "AL" on the Drawings.

C. Wire and cable routing shown on the Drawings are approximate unless dimensioned. Route wire and cable as required to meet project conditions.

D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1. Contractor shall coordinate all proposed routings through occupied areas with the Architect/Owner as required to determine acceptable appearance of new routings prior to rough-in.

PART 2 PRODUCTS

2.01 WIRING REQUIREMENTS

A. Concealed Dry Interior Locations: Use only building wire in conduit.

1. Or building wire in raceway where approved by Architect/Owner.

B. Exposed Dry Interior Locations: Use only building wire in conduit building wire with Type THHN,THWN,XHHW insulation in conduit.

C. Above Accessible Ceilings: Use only building wire in conduit or metal clad cable.

D. Wet or Damp Interior Locations: Use only building wire with Type THWN, XHHW insulation in conduit.

E. Exterior Locations: Use only building wire with Type THWN or XHHW insulation in conduit.

F. Underground Installations: Use only building wire with Type THWN or XHHW insulation in conduit.

G. Use stranded conductors for control circuits.

H. Use conductor not smaller than 10 AWG for power and lighting circuits.

I. Use conductor not smaller than 14 AWG for control circuits.

J. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.

K. Use 8 AWG conductors for 30 ampere, 120 volt branch circuits longer than 75 feet.

L. Conductor sizes are based on copper unless indicated as aluminum or "AL".

M. Cables for fire/smoke detection systems or for use in plenums without conduit shall be UL listed for plenum application, UL Style 1330, meeting ASTM D-2116 and ICEA color codes.

N. All feeders not sized on the plans shall be sized by the CONTRACTOR for a maximum of 2% voltage drop. All branch circuits shall be sized for a maximum of 3% voltage drop.

2.02 WIRE MANUFACTURERS

A. Cerro Wire Inc.: www.cerrowire.com.

B. Industrial Wire & Cable, Inc.: www.iewc.com.

C. Southwire Company: www.southwire.com.

D. Royal.

E. Rome.

F. General Cable.

G. Triangle.

2.03 BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor: Copper. Class B strand per ICEA S-61-402.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: NFPA 70.

1. For Feeders and Branch Circuits Equal to and Smaller Than 4/0 AWG (Dry and Damp locations): Type THHN rated 90 degrees C.
2. For Feeders and Branch Circuits Equal to and Smaller Than 4/0 AWG (Wet locations): Type THWN rated 90 degrees C.
3. For Feeders and Branch Circuits Larger Than 4/0 AWG (Dry and Damp locations): Type XHHW rated 90 degrees C.

E. Color Coding:

1. Branch circuits shall have their insulation color coded the entire length as noted below.
2. Feeder conductors shall have their ends taped, when entering junction boxes or panels, as noted below.
3. Color coding shall be as follows:
   a. 208/120 volt, 3 phase, 4 wire:
      1) grounded neutral - white
      2) phase A hot leg - black
      3) phase B hot leg - red
      4) phase C hot leg - blue
      5) ground - green
   b. 480/277 volt, 3 phase, 4 wire:
      1) grounded neutral - white with a color tracer

2) phase A hot leg - brown
3) phase B hot leg - orange
4) phase C hot leg - yellow
5) ground - green with a color tracer

c. 480 volt, 3 phase, 3 wire:
1) phase A hot leg - brown
2) phase B hot leg - orange
3) phase C hot leg - yellow
4) ground - green with a color tracer

2.04 CONTROL WIRING

A. Control circuit, single conductor field wire shall be No. 14 AWG, stranded copper with 30 mil thick wall of cross linked polyethylene or polyvinyl chloride insulation rated to withstand a copper temperature of 90 degrees C. at 600 volts without deterioration. It shall meet applicable ICEA Standards.

B. Multi conductor control cable shall consist of individual conductors, No. 14 AWG, stranded copper with 30 mil thick wall of insulation rated to withstand a copper temperature of 75 degrees C without deterioration. The insulation shall be a 20 mil wall of polyethylene with a 10 mil thick polyvinyl chloride jacket. The individual conductors shall be identified per Paragraph 5.6.3. of ICEA Publication No. S 61402 and shall be cabled together with suitable fillers and binder tape to give the completed cable a substantially circular cross section.

2.05 METAL CLAD CABLE (TYPE MC CABLE)

A. Description: NFPA 70, Type MC.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation Temperature Rating: 75 degrees C.

E. Insulation Material: Thermoplastic.

F. Armor Material: Steel.

G. Armor Design: Interlocked metal tape.

H. Fittings: Shall be specifically designed for use with type MC cable.

2.06 WIRING CONNECTORS

A. Split Bolt Connectors:
1. Manufacturers:
a. Black Burn.
b. T & B.
c. Burndy.

B. Solderless Pressure Connectors:
1. Manufacturers:
a. AMP.
b. T & B.
c. 3 M.

C. Spring Wire Connectors:
   1. Manufacturers:
      a. Buchanah Model B-Cap.
      b. 3 M Model Scotchlok or Hyflex.
      c. Panduit Model P-Conn.

D. Compression Connectors:
   1. Manufacturers:
      a. Neer.
      b. T & B.
      c. Appleton.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that mechanical work likely to damage wire and cable has been completed.

C. Verify that raceway installation is complete and supported.

D. Verify that field measurements are as indicated.

3.02 PREPARATION

A. Completely and thoroughly swab conduit/raceway before installing wire.

3.03 INSTALLATION

A. Install wire and cable securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Route wire and cable as required to meet project conditions.
   1. Wire and cable routing indicated is approximate unless dimensioned.
   2. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.

C. Use wiring methods indicated.

D. All wiring shall be installed in conduit or approved raceway. All raceways shall be provided with a ground conductor unless noted otherwise.

E. Use stranded conductors for control circuits.

F. Pull all conductors into raceway at same time.

G. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

H. Protect exposed cable from damage.

I. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure. Do not rest cable on ceiling panels.

J. Use suitable cable fittings and connectors.

K. Neatly train and lace wiring inside boxes, equipment, and panelboards.

L. Clean conductor surfaces before installing lugs and connectors.

M. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

N. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

O. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.

P. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

Q. Identify and color code wire and cable under provisions of Section 26 0553. Identify each conductor with its circuit number or other designation indicated.

R. Branch circuits may be combined up to 8 conductors (A-phase, B-phase, C-phase, neutral and A-phase, B-phase, C-phase, neutral) and 2 ground conductors in conduit. Contractor shall be responsible for derating conductors as required by N.E.C Article 310, Note 8.

S. Do not share neutral conductor on load side of dimmers.

T. Branch circuit neutral conductors: The use of multi-wire branch circuits with a common neutral is not permitted. Each branch circuit shall be furnished and installed with an accompanying neutral conductor sized the same as the phase conductor.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding components.

B. Provide all components necessary to complete the grounding system(s) consisting of:

1. New grounding for new circuits connected to existing/new metal underground water pipe.
2. New grounding for new circuits connected to new bonding to reinforcing steel in foundation footing.
3. New grounding for new circuits connected to new metal frame of the building.
4. New Concrete-encased electrode.
5. New Rod electrodes.

1.02 REFERENCE STANDARDS

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

B. NFPA 99 - Standard for Health Care Facilities; National Fire Protection Association.

1.03 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms.

1.04 SUBMITTALS

A. Test Reports: Indicate overall resistance to ground and resistance of each electrode.

B. Project Record Documents: Record actual locations of components and grounding electrodes.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience with service facilities within 100 miles of Project.

C. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

D. The Contractor shall be responsible for providing all grounding required in accordance with NEC and local code requirements. Grounding shown on the plans is minimum required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cooper Power Systems: www.cooperpower.com.

B. Lightning Master Corporation: www.lightningmaster.com.

C. American Electric.

D. Chance.

E. Burndy.

F. Cadweld.

2.02 GENERAL

A. The contractor shall install a grounding system in accordance with the drawings, specifications, and with the National Electrical Code, NEMA, USASI, and IEEE Standards, latest editions. The ground bar at the main service disconnect shall be bonded to the water mains, structural steel, driven ground rods, etc. by grounding electricode conductors as required for a code compliant grounding system. Maximum grounding resistance shall be achieved per NEC requirements.

2.03 ELECTRODES

A. Manufacturers:

1. Cooper Power Systems: www.cooperpower.com.
2. Framatome Connectors International: www.fciconnect.com.
3. Lightning Master Corporation: www.lightningmaster.com.
4. Chance.
5. American Electric - Blackburn.

B. Rod Electrodes: Copper-clad steel.

1. Diameter: 3/4 inch (19 mm).
2. Length: 10 feet (3000 mm).

2.04 CONNECTORS AND ACCESSORIES

A. Mechanical Connectors: Bronze.

1. Manufacturers: Chance, Burndy, American Electric - Blackburn.

B. Exothermic Connections:

1. Product: Cadweld.

C. Wire: Stranded copper.

D. Foundation Electrodes: #1/0 AWG minimum.

E. Grounding Electrode Conductor: Size to meet NFPA 70 N.E.C. code requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

B. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.02 INSTALLATION

A. Install ground electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.

B. Provide grounding electrode conductor and connect to reinforcing steel in foundation footing. Bond steel together.

C. Provide bonding to meet requirements described in Quality Assurance.

D. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

E. Ground cables shall be protected by sleeves where the cables extend through a concrete surface. Ground inserts shall be used where ground cables extending through the surface would be exposed to damage during or after construction.

F. Where ground cables are installed in metallic conduit, the cables shall be bonded to the conduit

at both ends of the run.

G. Welds on ground cables shall be cleaned and painted with an asphalt base paint where buried underground or imbedded in concrete.

H. Install a minimum #12 AWG green grounding wire for each branch circuit. The grounding wire shall be connected to the grounding terminal bus bars in panelboards, and these bars shall be grounded to the building's grounding system.

I. On projects involving additions to existing buildings, the new building addition’s foundation steel reinforcing shall be bonded to the existing building’s grounding electrode system with a minimum #2 CU ground wire.

END OF SECTION

SECTION 26 0529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Conduit and equipment supports.

B. Anchors and fasteners.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

B. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 MATERIALS

A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.

B. Supports: Fabricated of structural steel or formed steel members; galvanized. All structural supports and channels shall be manufactured from a minimum of #16 gauge ASTM A570 grade 33 steel.

C. Anchors and Fasteners:

1. Do not use spring clips.
2. Obtain permission from ENGINEER before using powder-actuated anchors.
3. Concrete Structural Elements: Use precast inserts, expansion anchors, or preset inserts.
4. Steel Structural Elements: Use beam clamps or welded fasteners.
5. Concrete Surfaces: Use expansion anchors.
6. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use hollow wall fasteners.
7. Solid Masonry Walls: Use expansion anchors or preset inserts.
8. Sheet Metal: Use sheet metal screws.

D. Formed Steel Channel:

1. Product: B-Line Strut.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.

1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

2. Obtain permission from Engineer before drilling or cutting structural members.

B. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

C. Install surface-mounted cabinets and panelboards with minimum of four anchors.

D. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch off wall.

E. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

SECTION 26 0534

CONDUIT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Conduit, fittings and conduit bodies.

1.02 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC).

B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT).

C. ANSI C80.5 - American National Standard for Electrical Rigid Aluminum Conduit (ERAC).

D. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

E. NECA 101 - Standard for Installing Steel Conduit (Rigid, IMC, EMT); National Electrical Contractors Association.

F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association.

G. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; National Electrical Manufacturers Association.

H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit; National Electrical Manufacturers Association.

I. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing; National Electrical Manufacturers Association.

J. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 SUBMITTALS

A. Project Record Documents: Accurately record actual routing of conduits larger than 2 inches (51 mm) in diameter.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

C. Explosion-Proof Rated Areas: All conduits installed in explosion proof areas shall be PVC coated galvanized rigid steel conduit with explosion-proof fittings rated for the Hazardous Class Division as required by NEC and applicable NFPA rules. Sealing fittings shall be properly installed at all required locations in accordance with code regulations. Automatic drain conduit seals shall be used wherever necessary to ensure the prevention of moisture accumulation. Approved breathers shall be installed in appropriate locations.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept conduit on site. Inspect for damage.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.06 PROJECT CONDITIONS

A. Verify that field measurements are as shown on the drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1. Contractor shall coordinate all proposed routings through occupied areas with the Architect/Owner as required to determine acceptable appearance of new routings prior to rough-in

E. Coordinate painting requirements of exposed conduit in finished areas with specification section 09900 and color with Architect.

PART 2 PRODUCTS

2.01 CONDUIT REQUIREMENTS

A. Conduit Size: Comply with NFPA 70.

1. Minimum Size: 3/4 inch (19 mm) where concealed within unaccessible construction (i.e. within walls, above drywall ceilings, etc.), 1/2" minimum elsewhere.

B. Underground Installations:

1. More than 5 Feet (1.5 Meters) from Foundation Wall: Use galvanized rigid steel conduit, thickwall nonmetallic conduit, or thinwall nonmetallic conduit.

2. Within 5 Feet (1.5 Meters) from Foundation Wall: Use galvanized rigid steel conduit, or thickwall nonmetallic conduit.

3. In or Under Slab on Grade: Use galvanized rigid steel conduit, or thickwall nonmetallic conduit.

4. Minimum Size: 1 inch (25 mm).

C. Outdoor Locations Above Grade: Use galvanized rigid steel conduit.

D. In Slab Above Grade:

1. Use galvanized rigid steel conduit.

2. Maximum Size Conduit in Slab: 3/4 inch (19 mm); 1/2 inch (13 mm) for conduits crossing each other.

E. Wet and Damp Locations: Use galvanized rigid steel conduit or rigid aluminum conduit

F. Dry Locations:

1. Concealed: Use galvanized rigid steel conduit or electrical metallic tubing.

2. Exposed: Use galvanized rigid steel conduit or electrical metallic tubing.

G. Transformer and Motor Connections:

1. Liquidtight flexible metal conduit (maximum length shall be 3'-0").

H. Lighting fixtures:

1. Interior: From junction box to lighting fixture shall be flexible metal conduit (maximum length shall be 6'-0").

2. Exterior: From junction box to lighting fixture shall be liquidtight flexible metal conduit (maximum length shall be 3'-0").

I. AC/MC Cable:

1. Use for concealed branch circuit drops to devices or light fixtures. Do not use AC/MC cable for homeruns to panelboards.

J. Control Wiring (fire alarm, clock systems, bell systems, paging systems, sound systems, security systems, temperature controls systems):

1. Use electrical metallic tubing, except when making final connection to moving equipment where flexible conduit or sealtite should be used.

2.02 METAL CONDUIT

A. Manufacturers:

1. Allied Tube & Conduit: www.alliedtube.com.
2. Beck Manufacturing, Inc.: www.beckmfg.com.
3. Wheatland Tube Company: www.wheatland.com.
4. Century.

B. Rigid Steel Conduit: ANSI C80.1. Galvanized Rigid Steel (GRS).

C. Rigid Aluminum Conduit: ANSI C80.5.

D. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

1. Connectors and couplings shall be threaded, set-screw, or compression type, and concrete tight and/or rain tight where required.
2. Locknuts shall be malleable iron or steel. Bushings shall be malleable iron, steel, or plastic. Malleable iron or steel bushings shall be zinc or cadmium plated and shall have insulating insert of thermostatic plastic molded and locked into bushing ring. Plastic bushings shall be thermostatic phenolic insulating type. Use of non-rigid plastic bushings is prohibited.

2.03 FLEXIBLE METAL CONDUIT

A. Manufacturers:

1. AFC Cable Systems, Inc.: www.afcweb.com.
2. Electri-Flex Company: www.electriflex.com.
3. International Metal Hose: www.metalhose.com.

B. Description: Interlocked steel construction.

C. Fittings: NEMA FB 1. cast fittings.

D. Flexible metal conduit shall have a separate grounding conductor.

2.04 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Manufacturers:

1. AFC Cable Systems, Inc.: www.afcweb.com.
2. Electri-Flex Company: www.electriflex.com.
3. International Metal Hose: www.metalhose.com.
4. Anaconda Type "UA" for less than 1-1/4" and Type "EF" for larger than 1-1/2".

B. Description: Interlocked steel construction with PVC jacket.

C. Fittings: NEMA FB 1. cast fittings.

D. Flexible metal conduit shall have a separate grounding conductor.

2.05 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:

1. Allied Tube & Conduit: www.alliedtube.com.
2. Beck Manufacturing, Inc.: www.beckmfg.com.
3. Wheatland Tube Company: www.wheatland.com.

B. Description: ANSI C80.3; galvanized tubing.

C. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron set screw type.

1. Connectors and couplings shall be threaded, set-screw, or compression type, and concrete tight and/or rain tight where required.
2. Locknuts shall be malleable iron or steel. Bushings shall be malleable iron, steel, or plastic. Malleable iron or steel bushings shall be zinc or cadmium plated and shall have insulating insert of thermostatic plastic molded and locked into bushing ring. Plastic bushings shall be thermostatic phenolic insulating type. Use of non-rigid plastic bushings is prohibited.

2.06 NONMETALLIC CONDUIT

A. Manufacturers:

1. AFC Cable Systems, Inc.: www.afcweb.com.
2. Electri-Flex Company: www.electriflex.com.
3. Carlon.

B. Description: NEMA TC 2; Schedule 40 = Thinwall; 80 = Thickwall PVC.

C. Fittings and Conduit Bodies: NEMA TC 3.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify routing and termination locations of conduit prior to rough-in.

B. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

3.02 INSTALLATION

A. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Install steel conduit as specified in NECA 101.

C. Install nonmetallic conduit in accordance with manufacturer's instructions.

D. Arrange supports to prevent misalignment during wiring installation.

E. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

F. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.

G. Fasten conduit supports to building structure and surfaces under provisions of Section 26 0529.

H. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

I. Do not attach conduit to ceiling support wires.

J. Arrange conduit to maintain headroom and present neat appearance.

K. Route exposed conduit parallel and perpendicular to walls.

L. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

M. Route conduit in and under slab from point-to-point.

N. Do not cross conduits in slab.

O. Maintain adequate clearance between conduit and piping.

P. Maintain 12 inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).

Q. Cut conduit square using saw or pipecutter; de-burr cut ends.

R. Bring conduit to shoulder of fittings; fasten securely.

S. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

T. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations, and to cast boxes.

U. Install no more than equivalent of three 90 degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch (50 mm) size. Elbows larger than 3" dia. shall be long radius elbows.

V. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

W. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control, and expansion joints.

X. Provide suitable pull string in each empty conduit except sleeves and nipples.

Y. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

Z. Ground and bond conduit under provisions of Section 26 0526.

AA. Identify conduit under provisions of Section 26 0553.

BB. Underground exterior conduits shall be sloped away from the building at a minimum of 4" per 100' or 0.33%.

CC. Install insulating bushings at open ends of telephone, data, video, security, etc. conduits.

DD. Drawstrings shall be provided for all new empty conduits. Drawstring shall be wax impregnated, nylon, or other synthetic material resistant to moisture and mildew to prevent deterioration.

EE. All underground conduits and/or duct banks shall be installed 24" minimum below grade (unless noted otherwise) and shall slope minimum of 0.33% to manholes, handholes, cable vaults, or other structures.

3.03 FIRESTOPPING

A. Use only firestop products that have been tested according to ASTM E-814 and UL 1479 for the conditions set forth regarding construction assembly type, penetrating item type, annular space requirements and fire rating.

B. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

1. For non-combustible penetrations including conduit not passing through a sleeve, the following materials are acceptable:

a. Hilti FS 601 Elastmeric Firestop Sealant.

b. 3 M.

c. CSD Sealing Systems.

d. Firestop Systems.

2. For non-combustible penetrations including sleeved conduits, the following materials are acceptable:

a. Hilti FS 601 Elastmeric Firestop Sealant.

b. 3 M.

c. CSD Sealing Systems.

d. Firestop Systems.

3. For combustible penetrations including cables and cable bundles, the following materials are acceptable:

a. Hilti FS 611A Intumescent Firestop Sealant.

b. 3 M.

c. CSD Sealing Systems.

d. Firestop Systems.

4. For large or complex penetrations involving multiple conduits, cable trays, electrical bussway, etc. the following materials are acceptable:

a. Hilti FS 635 Firestop Compound.

b. 3 M.

c. CSD Sealing Systems.

d. International Protective Coatings - KBS Sealbags.

3.04 PAINTING

A. All conduit exposed in finished areas shall be painted to match the surrounding finishes. Refer to specification section 09900 - Coordinate color with Architect.

END OF SECTION

SECTION 26 0537

BOXES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall and ceiling outlet boxes.

B. Pull and junction boxes.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

B. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association.

C. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association.

E. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 SUBMITTALS

A. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Provide products listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

C. Pull boxes, junction boxes, and cable support boxes of proper size and design shall be provided in accordance with the N.E.C. and as required to facilitate installation of wires. All boxes shall be sized in accordance with the N.E.C. Covers shall be gasketed and held in place with corrosion resistant machine screws. Cable supports for vertical runs shall be provided at code required locations, within pull or junction boxes. Boxes shall be NEMA 12 for inside and NEMA 4 for outside use where exposed to the weather or where otherwise called for on the drawings.

PART 2 PRODUCTS

2.01 OUTLET BOXES

A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.

1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch (13 mm) male fixture studs where required.

2. Concrete Ceiling Boxes: Concrete type.

B. Cast Boxes: NEMA FB 1, Type FD, cast feralloy. Provide gasketed cover by box manufacturer. Provide threaded hubs.

C. Wall Plates for Finished Areas: As specified in Section 26 2726.

D. Outlet and switch boxes shall be minimum of 2-1/8" deep. When installed in a poured wall a 2-1/2" minimum deep box shall be used. When installed in masonry a 3-1/2" minimum deep box shall be used.

E. Use 2-gang 4" square boxes with single plaster rings for single device outlets.

F. Outlet boxes installed in hazardous areas shall be approved for the Hazardous Class, Division and Group as required by N.E.C. and/or identified on the drawings.

2.02 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Hinged Enclosures: As specified in Section 26 2716.

C. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:

1. Material: Galvanized cast iron.

2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

D. In-Ground Cast Metal Box: NEMA 250, Type 6, inside flanged, recessed cover box for flush mounting:

1. Material: Galvanized cast iron.

2. Cover: Smooth cover with neoprene gasket and stainless steel cover screws.

3. Cover Legend: "ELECTRIC".

E. Fiberglass Handholes: Die molded glass fiber hand holes:

1. Composite handholds shall be constructed of polymer concrete and reinforced by a heavy weave fiberglass. The handholes shall have internal dimensions indicated on plans, minimum size 36”L x 24”W x 30”Deep. The material shall have the following properties:

a. Compressive strength: 11,000 PSI; Tensile strength: 1,700 PSI; Flexural strength: 7,500 PSI.

2. Cable Entrances: Pre-cut 4 x 4 inch cable entrance mouseholes at center bottom of each side.

3. Cover: Glass fiber weatherproof cover with nonskid finish, stainless steel screws, and labeled “ELECTRIC”.

4. Provide all accessories (i.e top/bottom extensions, etc.) as required to accommodate conduit routings into/out of the handholes.

5. Manufacturer:

a. Hubbell, Quazite.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify locations of boxes and outlets in offices and work areas with Owner prior to rough-in.

B. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose.

3.02 INSTALLATION

A. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.

C. Coordinate installation of outlet boxes for equipment connected under Section 26 2717.

D. Set wall mounted boxes at elevations to accommodate mounting heights indicated.

E. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.

F. Orient boxes to accommodate wiring devices oriented as specified in Section 26 2726.

G. Maintain headroom and present neat mechanical appearance.

H. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

I. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches (150 mm) from ceiling access panel or from removable recessed luminaire.

J. Provide identification labels on all junction boxes indicating what systems/equipment circuits are feeding (i.e. Lights in Room #102) and where they are being fed from (i.e. Panel LP-1)

K. Install boxes to preserve fire resistance rating of partitions and other elements.

L. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

M. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

N. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

O. Use flush mounting outlet box in finished areas.

P. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

Q. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches (150 mm) separation. Provide minimum 24 inches (600 mm) separation in acoustic rated walls.

R. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

S. Use stamped steel bridges to fasten flush mounting outlet box between studs.

T. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

U. Use adjustable steel channel fasteners for hung ceiling outlet box.

V. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches (305 mm) of box.

W. Use gang box where more than one device is mounted together. Do not use sectional box. Telephone/Data gang boxes shall be separate from power device gang boxes.

X. Use 2-gang 4" square boxes with single plaster rings for single device outlets.

Y. Use cast outlet box in exterior locations and wet locations.

Z. Large Pull Boxes (boxes larger than 100 cubic inches in volume or 12 inches in any dimension): Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.03 ADJUSTING

A. Adjust flush-mounting outlets to make front flush with finished wall material.

B. Install knockout closures in unused box openings.

3.04 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates and labels.

B. Wire and cable markers.

C. Conduit markers.

D. Underground waring tape.

E. Panel schedules.

1.02 REFERENCE STANDARDS

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

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Brady Corporation: www.bradycorp.com.

B. Seton Identification Products: www.seton.com/aec.

C. Thomas & Betts.

D. Panduit.

2.02 NAMEPLATES AND LABELS

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

B. Locations:

1. Each electrical distribution and control equipment enclosure (including starters, disconnects, panelboards, breakers at distribution panels, etc.).
2. Communication cabinets.

C. Letter Size:

1. Use 1/2 inch letters for identifying equipment and loads. Identification shall indicate where the load is fed from.

2.03 WIRE MARKERS

A. Description: Vinyl cloth type self-adhesive wire markers.

B. Description: tape or split sleeve type wire markers.

C. Locations: Each conductor at panelboard gutters, pull boxes, and junction boxes each load connection.

1. Identify circuit feeder numbers at all wiring devices (receptacle, light switches, dimmers, etc.) with a self-adhesive wire marker taped to the back of the device cover plate.

D. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
2. Control Circuits: Control wire number indicated on shop drawings.

2.04 CONDUIT MARKERS

A. Description: Size: 1-1/8"x4-1/2" minimum. Color: Background color as specified below with black lettering.

B. Location: Furnish markers for each conduit longer than 6 feet (2 m).

C. Spacing: 20 feet (6 m) on center.

D. Color:

1. Fire Alarm System: Red.
2. Telephone System: Blue.
3. 4800 Volt System: Orange.

E. Legend:

1. 480 Volt System: 480 Volt.
2. 277 Volt System: 277 Volt.
3. 240 Volt System: 240 Volt.
4. 208 Volt System: 208 Volt.
5. Fire Alarm System: Fire Alarm.
6. Telephone System: Telephone.
7. 4800 Volt System: 4800 Volt.

2.05 UNDERGROUND WARNING TAPE

A. Description: 4 inch (100 mm) wide plastic tape, detectable type colored red with suitable warning legend describing buried electrical lines.

2.06 PANEL SCHEDULES

A. Each panel shall have a typewritten panel schedule indicating loads. A clear plastic cover over the schedule shall be provided to protect it.

B. Existing panel schedules shall be improved to indicate all existing loads and/or updated to indicate all changes that have occurred during renovation. Typing over writing over existing entries on existing schedules is not acceptable. A new schedule shall be provided. Entries must be in type written form.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.02 INSTALLATION

A. Install nameplates and labels parallel to equipment lines.

B. Secure nameplates to equipment front using screws or rivets.

C. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.

D. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches (75 mm) below finished grade.

E. Identify all boxes for fire alarm circuits by painting cover plates red.

END OF SECTION

SECTION 26 2200

LOW-VOLTAGE TRANSFORMERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General purpose transformers.

1.02 RELATED REQUIREMENTS

A. Section 26 0526 - Grounding and Bonding for Electrical Systems.

B. Section 26 0553 - Identification for Electrical Systems: Nameplates.

C. Section 26 0534 - Conduit: Flexible conduit connections.

1.03 REFERENCE STANDARDS

A. IEEE C57.94 - Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type General Purpose Distribution and Power Transformers.

B. IEEE C57.96 - Guide for Loading Dry-Type Distribution and Power Transformers.

C. NECA 1 - Standard for Good Workmanship in Electrical Contracting.

D. NECA 409 - Standard for Installing and Maintaining Dry-Type Transformers.

E. NEMA ST 20 - Dry-Type Transformers for General Applications; National Electrical Manufacturers Association.

F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

G. NEMA TP 1 - Guide for Determining Energy Efficiency for Distribution Transformers.

H. NEMA TP 2 - Standard Test Method for Measuring the Energy Consumption of Distribution Transformers.

I. NEMA TP 3 - Standard for the Labeling of Distribution Transformer Efficiency.

J. NFPA 70 - National Electrical Code; National Fire Protection Association.

K. UL 506 - Standard for Specialty Transformers; Current Edition, Including All Revisions.

L. UL 1561 - Standard for Dry-Type General Purpose and Power Transformers; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. Product Data: Provide outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.

B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

C. Project Record Documents: Record actual locations of transformers.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.

C. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose

specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Square D: www.squared.com. Base Bid Square D, other approved manufacturer's may only be bid as alternates to the base bid and shall be clarified as such in the Contractor's bid.

B. GE Industrial: www.geindustrial.com.

C. Siemens.

2.02 ALL TRANSFORMERS

A. Description: Factory-assembled, dry type transformers for 60 Hz operation designed and manufactured in accordance with NEMA ST 20 and listed and labeled by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

B. Unless noted otherwise, transformer ratings indicated are for continuous loading according to IEEE C57.96 under the following service conditions:

1. Altitude: Less than 3,300 feet (1,000 m).
2. Ambient Temperature: Not exceeding 86 degrees F (30 degrees C) average or 104 degrees F (40 degrees C) maximum measured during any 24 hour period.

C. Core: High grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Keep magnetic flux densities substantially below saturation point, even at 10 percent primary overvoltage. Tightly clamp core laminations to prevent plate movement and maintain consistent pressure throughout core length.

D. Impregnate core and coil assembly with non-hydroscopic thermo-setting varnish to effectively seal out moisture and other contaminants.

E. Basic Impulse Level: 10 kV.

F. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.

G. Isolate core and coil from enclosure using vibration-absorbing mounts.

H. Nameplate: Include transformer connection data, ratings, wiring diagrams, and overload capacity based on rated winding temperature rise.

2.03 GENERAL PURPOSE TRANSFORMERS

A. Description: NEMA ST 20, factory-assembled, air cooled dry type transformers, ratings as indicated.

B. Insulation system and average winding temperature rise for rated kVA as follows:

1. 1-15 kVA: Class 185 with 8 degrees C rise.
2. 16-500 kVA: Class 220 with 80 degrees C rise.

C. Case Temperature: Do not exceed 35 degrees C rise above ambient at warmest point at full load.

D. Transformer windings shall be Aluminum.

E. Winding Taps:

1. Transformers Less than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.
2. Transformers 15 kVA and Larger: NEMA ST 20.

F. Sound Levels: Maximum sound levels are as follows:

1. 1-5 kVA: 40 dB.
2. 6-25 kVA: 45 dB.
3. 26-150 kVA: 50 dB.
4. 151-225 kVA: 55 dB.
5. 226-300 kVA: 55 dB.
6. 301-500 kVA: 60 dB.

G. Basic Impulse Level: 10 kV for transformers less than 300 kVA, 30 kV for transformers 300 kVA and larger.

H. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.

I. Mounting: Provide Wall mount kit.

1. 1-15 kVA: Suitable for wall mounting.
2. 16-75 kVA: Suitable for wall or trapeze mounting.
3. Larger than 75 kVA: Suitable for floor mounting.

J. Coil Conductors: Continuous windings with terminations brazed or welded.

K. Transformer Enclosure: NEMA ST 20.

1. Type 1.
2. Ventilated.
3. Provide lifting eyes or brackets.

L. Isolate core and coil from enclosure using vibration-absorbing mounts.

M. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.

N. Efficiency: Transformers shall be low loss type with minimum efficiencies (as tested in accordance with NEMA Tp-2 and CSA 802.2-00) per the tables below when operated at 35% of full load capacity:

1. Single Phase:
   a. 15 kVA: 97.7%
   b. 25 kVA: 98%
   c. 37.5 kVA: 98.2%
   d. 50 kVA: 98.3%
   e. 75 kVA: 98.5%
   f. 100 kVA: 98.6%
   g. 167 kVA: 98.7%

h. 250 kVA: 98.8%

i. 333 kVA: 98.9%

2. Three Phase:

a. 15 kVA: 97.0%

b. 30 kVA: 97.5%

c. 45 kVA: 97.7%

d. 75 kVA: 98.0%

e. 112.5 kVA: 98.2%

f. 150 kVA: 98.3%

g. 225 kVA: 98.5%

h. 300 kVA: 98.6%

i. 500 kVA: 98.7%

j. 750 kVA: 98.8%

2.04 SOURCE QUALITY CONTROL

A. Factory test transformers according to NEMA ST 20.

B. Production test each unit according to NEMA ST 20.

PART 3 EXECUTION

3.01 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1.

B. Install transformers in accordance with manufacturer's instructions.

C. Install transformers in accordance with NECA 409 and IEEE C57.94.

D. Use flexible conduit, under the provisions of Section 26 0534, 2 feet (600 mm) minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

E. Arrange equipment to provide minimum clearances as specified on transformer nameplate and in accordance with manufacturer's instructions and NFPA 70.

F. Set transformers plumb and level.

G. Use flexible conduit, under the provisions of Section 26 0534, 2 feet (600 mm) minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

H. Mount wall-mounted transformers using integral flanges or accessory brackets furnished by the manufacturer. Mount transformer on flanges/brackets via vibration isolating pads suitable for isolating the transformer noise from the building structure. Anchor to the wall utilizing structural anchors as required to adequately support wall mounted transformers.

I. Mount floor-mounted transformers on vibration isolating pads suitable for isolating the transformer noise from the building structure.

J. Provide grounding and bonding in accordance with Section 26 0526.

K. Remove shipping braces and adjust bolts that attach the core and coil mounting bracket to the enclosure according to manufacturer's recommendations in order to reduce audible noise transmission.

L. Where not factory-installed, install lugs sized as required for termination of conductors as shown on the drawings.

M. Install transformer identification nameplate in accordance with Section 26 0553.

3.02 ADJUSTING

A. Measure primary and secondary voltages and make appropriate tap adjustments.

B. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

END OF SECTION

SECTION 26 2416

PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Power distribution panelboards.

B. Lighting and appliance panelboards.

C. Overcurrent protective devices for panelboards.

1.02 REFERENCE STANDARDS

A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; Federal Specification; Revision D.

B. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

C. NECA 407 - Standard for Installing and Maintaining Panelboards; National Electrical Contractors Association.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

E. NEMA PB 1 - Panelboards; National Electrical Manufacturers Association.

F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; National Electrical Manufacturers Association.

G. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association.

H. NFPA 70 - National Electrical Code; National Fire Protection Association.

I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

K. UL 67 - Panelboards; Current Edition, Including All Revisions.

L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

B. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.

C. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
5. Notify ENGINEER of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.07 MAINTENANCE MATERIALS

A. Furnish two of each panelboard key.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. General Electric Company: www.geindustrial.com.

B. Schneider Electric; Square D Products: www.schneider-electric.us.

C. Siemens.

2.02 ALL PANELBOARDS

A. Provide products listed and labeled by Underwriters Laboratories Inc. as suitable for the purpose indicated.

B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:

1. Altitude: Less than 6,600 feet (2,000 m).
2. Ambient Temperature:
   a. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).

C. Short Circuit Current Rating: Refer to plans – Contractor shall verify AIC with local utility prior to ordering panelboards.

D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

F. Bussing: Sized in accordance with UL 67 temperature rise requirements.

1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

G. Conductor Terminations: Suitable for use with the conductors to be installed.

H. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

2. Boxes: Galvanized steel unless otherwise indicated.

a. Provide wiring gutters sized to accommodate the conductors to be installed.

3. Fronts:

a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.

b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.

4. Lockable Doors: All locks keyed alike unless otherwise indicated.

I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.03 LIGHTING AND APPLIANCE PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:

1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

2. Main and Neutral Lug Type: Mechanical.

C. Bussing:

1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.

2. Phase and Neutral Bus Material: Aluminum.

a. Provide double neutral bus where scheduled.

3. Ground Bus Material: Aluminum.

a. Provide insulated ground bus where scheduled.

D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.

E. Enclosures:

1. Provide surface-mounted or flush-mounted enclosures as indicated.

2. Provide clear plastic circuit directory holder mounted on inside of door.

F. Manufacturers:

1. Square D NQ or NF type. BASE BID SQUARE D.

2. Equal by approved manufacturer may be bid as alternate.

G. Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.

H. Minimum Integrated Short Circuit Rating: As indicated on drawings or minimum as listed below.

1. 208/240 Volt Panelboards: 14,000 amperes rms symmetrical.

2. 480/277 Volt Panelboards: 22,000 amperes rms symmetrical.

I. Molded Case Circuit Breakers: Thermal magnetic trip circuit breakers, bolt-on type, with common trip handle for all poles; UL listed.

1. Type SWD for lighting circuits.
2. Type HACR for air conditioning equipment circuits.
3. Class A ground fault interrupter circuit breakers where scheduled.
4. Do not use tandem circuit breakers.
5. Lock-on devices shall be provided for all branch circuits supplying exit lighting, un-switched night lighting, emergency lighting, security systems, clock and program systems, and/or fire alarm.

J. Enclosure: NEMA PB 1, Type 1. (Type 3R for exterior locations).

K. Cabinet Front: Flush or Surface (as noted on plans) cabinet front with concealed trim clamps, concealed hinge, metal directory frame, and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

2.04 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:

1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
2. Interrupting Capacity:
   a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
   b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
3. Conductor Terminations:
   a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install panelboards securely, in a neat and workmanlike manner in accordance with NECA 1 (general workmanship), NECA 407 (panelboards), and NEMA PB 1.1.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required supports in accordance with Section 26 0529.

E. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

F. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches (2000 mm) above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 26 0526.

H. Install all field-installed branch devices, components, and accessories.

I. Install panelboards in accordance with NEMA PB 1.1 and NECA 1.

J. Install panelboards plumb. Install recessed panelboards flush with wall finishes.

K. Height: 6 feet (1800 mm) to top of panelboard; install panelboards taller than 6 feet (1800 mm) with bottom no more than 4 inches (100 mm) above floor.

L. Provide filler plates to cover unused spaces in panelboards.

M. Provide computer-generated circuit directory for each lighting and appliance panelboard, and each power distribution panelboard provided with a door, clearly and specifically indicating the loads served. Identify spares and spaces.

N. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

O. Provide identification nameplate for each panelboard in accordance with Section 26 0553.

P. Provide arc flash warning labels in accordance with NFPA 70.

Q. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling/ in crawl space/to j-box/etc. for future use. Identify each as SPARE.

1. Minimum spare conduits: 5 empty 1 inch (DN27). Spare conduits shall be stubbed up into an accessible ceiling space, or floor below.

3.02 FIELD QUALITY CONTROL

A. Perform inspection, testing, and adjusting in accordance with Section 01 4000.

B. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA STD ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than 400 amperes. Tests listed as optional are not required.

C. Correct deficiencies and replace damaged or defective panelboards or associated components.

D. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

3.03 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

END OF SECTION

SECTION 26 2701

ELECTRICAL SERVICE ENTRANCE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metering transformer cabinets.

B. Meter bases.

C. Contractor shall arrange with Utility Company for permanent electrical service, either rnew service or renovations to existing service. Contractor shall be responsible for providing drawings to the Utility Company for Coordination of services and charges. Contractor shall provide conduit for primary cable from service to transformer, transformer pad (if pad mounted), and installation of meter base per utility requirements. Owner shall pay for any direct utility costs for new or modified service charges.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

B. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 SYSTEM DESCRIPTION

A. Service Entrance: Either Overhead or Underground service entrance, per the plans, but also as coordinated with and determined by the Electrical Utility.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with utility company written requirements and NFPA 70.

1. Maintain one copy of each document on site.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.05 PRE-INSTALLATION MEETING

A. Convene four (4) weeks prior to commencing work of this section. Review service entrance requirements and details with Utility Company representative at least eight (8) weeks prior to start of new electrical service.

PART 2 PRODUCTS

2.01 COMPONENTS

A. Metering Transformer Cabinets: Sheet metal cabinet with hinged door, conforming to utility company requirements, with provisions for locking and sealing.

1. Size: As required by utility.

B. Meter Base: Furnished by utility company.

C. Utility Transformer Pad: Prefabricated precast concrete transformer pad with cable pit.

D. Other Components: As required by utility company.

PART 3 EXECUTION

3.01 PREPARATION

A. Arrange with utility company to obtain permanent electric service to the Project. The Contractor

shall be responsible for providing drawings to the Utility Company and for Coordination of the new service or modifications to existing service.

B. Verify that field measurements are as indicated on utility company drawings.

C. Coordinate location of Utility Company's facilities to ensure proper access is available.

3.02 INSTALLATION

A. Install securely, in a neat and workmanlike manner, as specified in NECA 1.

END OF SECTION

SECTION 26 2717

EQUIPMENT WIRING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical connections to equipment.

1.02 REFERENCE STANDARDS

A. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association.

B. NEMA WD 6 - Wiring Devices - Dimensional Requirements; National Electrical Manufacturers Association.

C. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.04 COORDINATION

A. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.

B. Determine connection locations and requirements.

C. Sequence rough-in of electrical connections to coordinate with installation of equipment.

D. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.

1. Colors: Conform to NEMA WD 1.
2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

B. Disconnect Switches: As specified in Section 26 2818, 26 2913 and in individual equipment sections.

C. Wiring Devices: As specified in Section 26 2726.

D. Flexible Conduit: As specified in Section 26 0534.

E. Wire and Cable: As specified in Section 26 0519.

F. Boxes: As specified in Section 26 0537.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations. Maximum length shall be 6 feet. Minimum size shall be 3/4" diameter.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Provide receptacle outlet to accommodate connection with attachment plug.

E. Provide cord and cap where field-supplied attachment plug is required.

F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

SECTION 26 2726

WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall switches.

B. Receptacles.

C. Wall plates.

1.02 REFERENCE STANDARDS

A. FS W-C-596 - Connector, Electrical, Power, General Specification for; Federal Specification; Revision G.

B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); Federal Specification; Revision F.

C. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

D. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association.

E. NEMA WD 6 - Wiring Device -- Dimensional Requirements; National Electrical Manufacturers Association.

F. NFPA 70 - National Electrical Code; National Fire Protection Association.

G. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.

H. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.

I. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cooper Wiring Devices: www.cooperwiringdevices.com.

B. Leviton Manufacturing, Inc.: www.leviton.com.

C. Hubbell.

D. Bryant.

2.02 ALL WIRING DEVICES

A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.03 WALL SWITCHES

A. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.

1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

B. Wall Switches: NEMA WD 1, General Duty, Spec. Grade, AC only general-use snap switch. Switches shall be binding screw type, side and back wired type.

1. Body and Handle: Ivory plastic with toggle handle. Coordinate color selection with Architect prior to ordering.
2. Ratings: Match branch circuit and load characteristics.

C. Single Pole Single Throw Wall Switches

1. Products:
   a. Hubbell 1221.
   b. Arrow Hart 1991.
   c. Leviton 1221.

D. Three Way Wall Switches

1. Products:
   a. Hubbell 1223.
   b. Arrow Hart 1993.
   c. Leviton 1223.

E. Four Way Wall Switches

1. Products:
   a. Hubbell 1224.
   b. Arrow Hart 1994.
   c. Leviton 1224.

2.04 RECEPTACLES

A. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.

1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
2. NEMA configurations specified are according to NEMA WD 6.

B. Receptacles: NEMA WD 1, General duty, Spec. Grade, grounded type

1. Configuration: NEMA WD 6, type as specified and indicated.

C. 20 Amp Duplex Convenience Receptacles.

1. Hubbell 5362.
2. Arrow Hart 5362.

3. Leviton 5362.
4. Device Body: Ivory; Coordinate color selection with Architect prior to ordering. All devices on emergency circuits shall be red in color.

D. 20 Amp GFCI Receptacles: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

1. Hubbell.
2. Arrow Hart.
3. Leviton.
4. Device Body: Ivory. Coordinate color selection with Architect prior to ordering. All devices on emergency circuits shall be red in color.
5. GFCI receptacles shall meet UL 2003 standards.

2.05 WALL PLATES

A. All Wall Plates: Comply with UL 514D.

1. Configuration: One-piece cover as required for quantity and types of corresponding wiring devices.
2. Screws: Metal with slotted heads finished to match wall plate finish.

B. Interior wall plates:

1. Stainless Steel Cover Plates:
   a. Hubbell "S" series.
   b. Leviton 8400 series.
   c. Arrow Hart "S" series.

C. Exterior wall plates:

1. WeatherProof (WP) Cover Plates (where located outdoors and where indicated on plans as "WP"): Raintight/gasketed, clear impact resistant thermoplastic, spring retained cover with offset device opening for cord exit.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify that conditions are satisfactory for installation prior to starting work.

G. Verify door openings/swings with Architectural trades prior to installation.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of wiring devices provided under this section.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

E. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.

F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

H. Install wiring devices plumb and level with mounting yoke held rigidly in place.

I. Install wall switches with OFF position down.

J. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

K. Do not share neutral conductor on branch circuits utilizing wall dimmers.

L. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

M. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

N. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

O. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

P. Use jumbo size plates for outlets installed in masonry walls.

Q. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.04 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 26 0537 to obtain mounting heights indicated on drawings.

B. Install wall switches, dimmers, motor control switches, and fire alarm pull stations at 50 inches to center of box above finished floor. For CMU walls - 48" to top of box above finished floor.

C. Install convenience receptacles 18 inches (450 mm) above finished floor to center of box (not otherwise specified).

D. Install convenience receptacles in CMU walls at 16 inches above floor to bottom of box.

E. Unless noted otherwise, install GFI receptacles in toilet rooms, janitor closets, and storage rooms 48 inches to top of the box above floor.

F. Install convenience receptacles 6 inches (150 mm) above counter. Or as required to accommodate the counter construction - refer to Architectural elevations.

G. Install fire alarm horns, strobes, speakers at 96 inches above floor (to top of box) or 6 inches below ceiling, whichever is less. But no lower than 80" above finish floor.

H. Coordinate the installation of wiring devices with underfloor duct service fittings provided under Section 26 0540.

I. Coordinate all finishes and colors of wiring devices with Architect prior to ordering.

3.05 FIELD QUALITY CONTROL

A. Inspect each wiring device for damage and defects.

B. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.

C. Test each receptacle to verify operation and proper polarity.

D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

E. Correct wiring deficiencies and replace damaged or defective wiring devices.

F. NOTE: All receptacles in Wet Locations (e.g. Outdoors, Below Grade, Carwashs, etc.) and/or Damp Locations (e.g. Basements, Crawlspaces, Cold storage areas, Under outdoor canopys, etc.) shall be "Weather Resistant" (WR) rated.

3.06 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.07 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

SECTION 26 2813

FUSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fuses.

1.02 REFERENCE STANDARDS

A. NEMA FU 1 - Low Voltage Cartridge Fuses; National Electrical Manufacturers Association.

B. NFPA 70 - National Electrical Code; National Fire Protection Association.

C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements; Current Edition, Including All Revisions.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.04 MAINTENANCE MATERIALS

A. Furnish three of each size and type fuse installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cooper Bussmann, Inc.: www.cooperbussmann.com.

B. GE Industrial: www.geindustrial.com.

C. Mersen (formerly Ferraz Shawmut): ferrazshawmut.mersen.com.

D. Littelfuse, Inc.: www.littelfuse.com.

2.02 FUSES

A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose indicated.

B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.

C. Provide fuses of the same type, rating, and manufacturer within the same switch.

D. Comply with UL 248-1.

E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.

F. Voltage Rating: Suitable for circuit voltage.

G. Main Service Switches Larger than 600 amperes: Class L (time delay).

H. Main Service Switches: Class RK1 (time delay).

I. Power Load Feeder Switches Larger than 600 amperes: Class L (time delay).

J. Power Load Feeder Switches: Class RK1 (time delay).

K. Motor Load Feeder Switches: Class RK1 (time delay).

L. Other Feeder Switches Larger than 600 amperes: L time delay.

M. Other Feeder Switches: Class RK1 (time delay).

N. General Purpose Branch Circuits: Class RK1 (time delay).

O. Motor Branch Circuits: Class L time delay.

PART 3 EXECUTION

3.01 INSTALLATION

A. Do not install fuses until circuits are ready to be energized.

B. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION

SECTION 26 5100

INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior luminaires.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

B. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; National Electrical Contractors Association.

C. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; National Electrical Contractors Association.

D. NFPA 70 - National Electrical Code; National Fire Protection Association.

E. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association.

F. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Shop Drawings: Indicate dimensions and components for each fixture that is not a standard product of the manufacturer.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70 and NFPA 101.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.

1.06 SUBSTITUTION ITEMS REQUIRING PRIOR APPROVAL

A. All items that the CONTRACTOR proposes to use in the work, that are not specifically named in the contract documents, must be submitted for review/approval. Such items must be submitted in duplicate to the ARCHITECT and/or ENGINEER for approval a minimum of ten (10) days prior to bid opening. Requests for prior approval must be accompanied by complete catalog information, including but not limited to, model, size, accessories, complete electrical information and performance data in the form given in the equipment schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations.

B. Lighting Substitutions:

1. Furnish lighting fixtures as scheduled on drawings.
2. Lighting fixture substitutions may be considerred for approval by the ARCHITECT/ENGINEER only if all of the following criteria are met:
   a. Provide specification cut sheets marked-up to clearly identify the proposed luminaire including features, options, accessories, etc. required to match products indicated in the schedules.
   b. Provide detailed point-by-point lighting calculations for all areas proposed luminaire will be installed.
   c. Submit all cut sheets, calculations, etc. to the ARCHITECT/ENGINEER no less than 10 days prior to bid date. Substitutions submitted after this date will not be considerred.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acuity/Lithonia Lighting.

B. Eaton/Cooper Lighting.

C. Hubbell Lighting.

D. Or as noted in lighting schedule on the drawings.

2.02 LUMINAIRES

A. Provide products that are listed and labeled as complying with UL 1598, where applicable.

B. Provide products that comply with requirements of NFPA 70 and NFPA 101.

C. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

D. Unless otherwise indicated, provide complete luminaires including LED light source, lamp(s) and all sockets, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

2.03 LUMINAIRES

A. Furnish products as indicated in Schedule included on the Drawings.

2.05 LAMPS

A. All LED light sources or Lamps:

1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the ENGINEER to be inconsistent in perceived color temperature.

PART 3 EXECUTION

3.01 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

E. Install suspended luminaires using pendants supported from swivel hangers (except where noted to use chain hangers). Provide pendant length required to suspend luminaire at indicated height.

F. Support luminaires independent of ceiling framing.

G. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.

H. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prevent movement.

I. Install wall mounted luminaires at height as indicated on Drawings or in Architectural plans.

J. Install accessories furnished with each luminaire.

K. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within fixture; use flexible conduit.

L. Connect luminaires to branch circuit outlets provided under Section 26 0537 using flexible conduit.

M. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

N. Bond products and metal accessories to branch circuit equipment grounding conductor.

O. All night lights, emergency lights, and exit signs shall be circuited from the unswitched hot leg of the general lighting circuit for the area served by the night/emergency/exit lights.

P. Coordinate location of emergency battery ballast unit remote test switch/charge light with Architect prior to rough-in.

Q. Remote mount battery packs for emergency ballasts in ceiling spaces above heated areas for outdoor emergency fixtures.

3.02 FIELD QUALITY CONTROL

A. Inspect each product for damage and defects.

B. Operate each luminaire after installation and connection to verify proper operation.

3.03 CLEANING

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

B. Clean electrical parts to remove conductive and deleterious materials.

C. Remove dirt and debris from enclosures.

D. Clean photometric control surfaces as recommended by manufacturer.

E. Clean finishes and touch up damage.

3.04 SCHEDULE - See Drawings

END OF SECTION

SECTION 26 5600

EXTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior luminaires.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

B. NECA/IESNA 501 - Recommended Practice for Installing Exterior Lighting Systems.

C. NFPA 70 - National Electrical Code; National Fire Protection Association.

D. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.

C. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.

C. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

D. All lighting systems shall provided/installed to meet applicable building codes (i.e. N.E.C, Life Safety Code NFPA 101, Energy Code, etc.).

1. Contractor shall design/provide/install lighting controls (i.e. occupancy sensors, lighting relay control panels, photocells, etc.) as required to comply with the Michigan Energy Code.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

C. Receive, handle, and store wood poles in accordance with ANSI O5.1.

1.07 SUBSTITUTION ITEMS REQUIRING PRIOR APPROVAL

A. All items that the CONTRACTOR proposes to use in the work, that are not specifically named in the contract documents, must be submitted for review/approval. Such items must be submitted in duplicate to the ARCHITECT and/or ENGINEER for approval a minimum of ten (10) days prior to

bid opening. Requests for prior approval must be accompanied by complete catalog information, including but not limited to, model, size, accessories, complete electrical information and performance data in the form given in the equipment schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations.

B. Lighting Substitutions:

1. Furnish lighting fixtures as scheduled on drawings.
2. Lighting fixture substitutions may be considered for approval by the ARCHITECT/ENGINEER only if all of the following criteria are met:
   a. Provide specification cut sheets marked-up to clearly identify the proposed luminaire including features, options, accessories, etc. required to match products indicated in the schedules.
   b. Provide detailed point-by-point lighting calculations for all areas proposed luminaire will be installed.
   c. Submit all cut sheets, calculations, etc. to the ARCHITECT/ENGINEER no less than 10 days prior to bid date. Substitutions submitted after this date will not be considered.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Eaton/Cooper Lighting Group.

B. Acuity/Lithonia.

C. Hubbell Lighting Group Products.

D. Or as noted in lighting schedule on the drawings.

2.02 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the Drawings.

2.03 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

D. Unless otherwise indicated, provide complete luminaires including LED light sources, lamp(s) and all sockets, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

PART 3 EXECUTION

3.01 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship) and NECA/IESNA 501 (exterior lighting).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

E. Install accessories furnished with each luminaire.

F. Bond products and metal accessories to branch circuit equipment grounding conductor.

G. All night lights, emergency lights, and exit signs shall be circuited from the unswitched hot leg of the general lighting circuit for the area served by the night/emergency/exit lights.

3.02 FIELD QUALITY CONTROL

A. Inspect each product for damage and defects.

B. Operate each luminaire after installation and connection to verify proper operation.

C. Correct wiring deficiencies and repair or replace damaged or defective products.

3.03 CLEANING

A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

B. Clean electrical parts to remove conductive and deleterious materials.

C. Remove dirt and debris from enclosure.

D. Clean photometric control surfaces as recommended by manufacturer.

E. Clean finishes and touch up damage.

3.04 SCHEDULE - See Drawings

END OF SECTION

SECTION 31 05 13

SOILS FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Subsoil materials.
   2. Topsoil materials.

B. Related Sections:
   1. Section 31 05 16 – Aggregates for Earthwork.
   2. Section 31 23 23 - Fill.
   3. Section 32 91 19 - Landscape Grading.
   4. Section 32 92 19 - Seeding.

1.2 REFERENCES

A. MDOT Standards:
   1. Michigan Department of Transportation Standard Specifications for Construction.

B. ASTM International:
   1. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

1.3 SUBMITTALS

A. Sieve Analysis: Submit sieve analysis of imported materials.

B. Manufacturer’s Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Furnish each soil material from single source throughout the Work.

PART 2 PRODUCTS

2.1 SUBSOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Subsoil Type S1:
   1. ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetable, contaminates and other deleterious matter.
   2. Material shall be acceptable to the Soils Engineer or Architect in the absence thereof.

2.2 TOPSOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Topsoil Type S2:
1. Screened, fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay lumps, brush, weeds, and other litter or stones larger than 1/2 inch.

2.3 SOURCE QUALITY CONTROL

A. When analysis indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXCAVATION

A. Remove excavated materials not intended from reuse, from site.

B. Remove excavated materials not meeting specified requirements from site.

C. Excavated materials not used on site shall become property of the Contractor and are the Contractor’s responsibility to remove and dispose of in accordance with all state, county and local laws.

3.2 STOCKPILING

A. Stockpile materials on site at locations designated by the Owner and/or Architect/Engineer.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Stockpile topsoil 8 feet high maximum.

E. Prevent intermixing of soil types or contamination.

F. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 31 05 16

AGGREGATES FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Fine aggregate materials.

B. Related Sections:
1. Section 31 05 13 - Soils for Earthwork: Fill and grading materials.
2. Section 31 22 13 - Rough Grading.
3. Section 31 23 17 - Trenching.
4. Section 31 23 23 - Fill.
5. Section 32 11 23 - Aggregate Base Courses.
6. Section 32 91 19 - Landscape Grading.

1.2 REFERENCES

A. ASTM International:
1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

B. MDOT Standards:
1. Michigan Department of Transportation Standard Specifications for Construction.

1.3 SUBMITTALS

A. Materials Source: Submit name of imported materials suppliers.

B. Sieve Analysis: Submit sieve analysis for aggregate materials.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Furnish each aggregate material from single source throughout the Work.

B. Perform Work in accordance with 2012 MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 FINE AGGREGATE MATERIALS

A. Fine Aggregate Type A1:
1. Conforming to MDOT Class II standard for granular material up to 3” diameter.

2.2 SOURCE QUALITY CONTROL

A. Fine Aggregate Material - Testing and Analysis: Perform in accordance with ASTM C136.

B. When tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXCAVATION

A. Excavate aggregate materials from on-site locations as indicated as specified in Section 31 22 13.

B. Stockpile excavated material meeting requirements for fine aggregate materials.

C. Remove excess excavated materials not intended for reuse, from site.

D. Remove excavated materials not meeting requirements for fine aggregate materials from site.

3.2 STOCKPILING

A. Stockpile materials on site at locations designated by Owner.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.

D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Removing surface debris.
   2. Removing designated trees, shrubs, and other plant life.
   3. Excavating topsoil.

B. Related Sections:
   1. Section 31 22 13 - Rough Grading.

1.2 REFERENCES

A. MDOT Specifications:
   1. Michigan Department of Transportation Standard Specifications for Construction.

1.3 QUALITY ASSURANCE

A. Conform to applicable code for soil erosion controls.

B. Perform Work in accordance with 2012 MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

A. Call Local Utility Line Information service not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

3.2 PROTECTION

A. Locate, identify, and protect utilities to remain, from damage.

B. Protect trees, plant growth, and features to remain, as final landscaping as specified in Section 01 50 00 - Temporary Facilities and Controls.

C. Protect bench marks, survey control points, and existing structures to remain from damage or displacement.

3.3 CLEARING

A. Clear areas required for access to site and execution of Work.

B. Remove trees and shrubs within marked areas. Remove stumps, main root ball, and root system.

3.4 REMOVAL

A. Remove debris, rock, and extracted plant life from site.

B. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.

C. Do not burn or bury materials on site. Leave site in clean condition.

3.5 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, relandscaped, or regraded, without mixing with foreign materials for use in finish grading.

B. Do not excavate wet topsoil.

C. Stockpile to depth not exceeding 8 feet and protect from erosion.

D. Remove excess topsoil not intended for reuse, from site.

END OF SECTION

SECTION 31 22 13

ROUGH GRADING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Excavating subsoil.
2. Cutting, grading, filling, rough contouring, and compacting site for site structures, building pads, and aggregate base courses.

B. Related Sections:
1. Section 31 05 16 – Aggregates for Earthwork: Soils for fill.
2. Section 31 10 00 - Site Clearing: Excavating topsoil.
3. Section 31 23 16 - Excavation: Building excavation.
4. Section 31 23 17 - Trenching: Trenching and backfilling for utilities.
5. Section 31 23 23 - Fill: General building area backfilling.
6. Section 32 91 19 - Landscape Grading: Finish grading with topsoil to contours.

1.2 REFERENCES

A. Michigan Department of Transportation:
1. 2012 MDOT Standard Specifications for Construction.

B. ASTM International:
1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
3. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 CLOSEOUT SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: as specified in Section 31 05 13.

B. Subsoil Fill: as specified in Section 31 05 16.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Protect utilities to remain from damage.

C. Protect plant life, lawns, and other features remaining as portion of final landscaping.

D. Protect bench marks, survey control point, existing structures, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 SUBSOIL EXCAVATION

A. Excavate subsoil from areas to be further excavated, relandscaped, or regraded.

B. Do not excavate wet subsoil.

C. Remove excess subsoil not intended for reuse, from site.

D. Stockpile subsoil to depth not exceeding 8 feet and protect from erosion.

E. Stability: Replace damaged or displaced subsoil as specified for fill.

3.4 FILLING

A. Fill areas to contours and elevations with unfrozen materials.

B. Place fill material in continuous layers and compact in accordance with schedule at end of this section.

C. Maintain optimum moisture content of fill materials to attain required compaction density.

D. Slope grade away from building minimum 5 percent slope for minimum distance of 10 ft, unless noted otherwise.

E. Make grade changes gradual. Blend slope into level areas.

F. Repair or replace items indicated to remain damaged by excavation or filling.

3.5 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

3.6 FIELD QUALITY CONTROL

A. Perform laboratory material tests in accordance with ASTM D136.

B. Perform in place compaction tests in accordance with the following:
   1. Density Tests: ASTM D2922.
   2. Moisture Tests: ASTM D3017.

C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

D. Frequency of Tests:
   1. Provide a minimum of 1 subgrade compaction test for each 2,000 square feet of of building pad.
   2. Provide a minimum of 1 subgrade compaction test for each 1,000 square yards of gravel parking lot.
   3. Provide a minimum of 1 subgrade compaction test for each 1,000 square feet of concrete paving.

3.7 SCHEDULES

A. Subsoil Fill:
   1. General Fill: Type S1 to subgrade elevation; compacted to 95% maximum density.

END OF SECTION

SECTION 31 23 16

EXCAVATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavating for building foundations.
   2. Excavating for slabs-on-grade.

B. Related Sections:
   1. Section 31 05 13 - Soils for Earthwork: Stockpiling excavated materials.
   2. Section 31 05 16 – Aggregates for Eartwork: Materials for fill.
   3. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
   4. Section 31 23 17 - Trenching: Excavating for utility trenches.
   5. Section 31 23 23 - Fill.

1.2 REFERENCES

A. Michigan Department of Transportation:
   1. 2012 MDOT Standard Specifications for Construction.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Protect utilities to remain from damage.

C. Protect plant life, lawns, and other features remaining as portion of final landscaping.

D. Protect bench marks, survey control points, existing structures to remain, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.2 EXCAVATION

A. Excavate subsoil to accommodate building foundations, slabs-on-grade and site structures.

B. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with Section 31 23 17 and Section 31 23 23.

C. Slope banks with machine to angle of repose or less until shored.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Grade top perimeter of excavation to prevent surface water from draining into excavation.

F. Trim excavation. Remove loose matter.

G. Notify Architect/Engineer of unexpected subsurface conditions.

H. Correct areas over excavated with fill Type A1 specified in Section 31 05 16.

I. Remove excess and unsuitable material from site.

J. Stockpile excavated material in area designated on site in accordance with Section 31 05 13.

K. Repair or replace items indicated to remain damaged by excavation.

3.3 PROTECTION

A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

END OF SECTION

SECTION 31 23 17

TRENCHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Excavating trenches for utilities from 5 feet outside building.
2. Compacted fill from top of utility bedding to subgrade elevations.
3. Backfilling and compaction.

B. Related Sections:
1. Section 31 05 13 - Soils for Earthwork: Soils for fill.
2. Section 31 05 16 – Aggregates for Earthwork.
3. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
4. Section 31 23 16 - Excavation: General building excavation.
5. Section 31 23 23 - Fill: General backfilling.
6. Section 32 91 19 - Landscape Grading: Filling of topsoil over backfilled trenches to finish grade elevation.

1.2 REFERENCES

A. ASTM International:
1. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
2. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

B. Michigan Department of Transportation
1. 2012 MDOT Standard Specifications for Construction.

1.3 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with MDOT Standard Specifications for Construction.

1.5 COORDINATION

A. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. Subsoil Fill: Type S1 as specified in Section 31 05 13.

PART 3 EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Protect plant life, lawns, and other features remaining as portion of final landscaping.

C. Protect bench marks, existing structures, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

D. Maintain and protect above and below grade utilities indicated to remain.

3.2 TRENCHING

A. Excavate subsoil required for utilities.

B. Do not advance open trench more than 200 feet ahead of installed pipe.

C. Cut trenches sufficiently wide to enable installation.

D. Excavate bottom of trenches maximum 2 feet wider than outside diameter of pipe.

E. Excavate trenches to depth required for installation of utilities. Provide uniform and continuous bearing and support for bedding material and pipe.

F. Do not interfere with 45 degree bearing splay of foundations.

G. Slope side walls of excavation starting 2 feet above top of pipe.

H. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth until suitable material is encountered.

I. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type A1 as specified in Section 31 05 16 and compact to density equal to or greater than requirements for subsequent backfill material.

J. Trim excavation. Remove loose matter.

K. Correct areas over excavated areas with compacted backfill as specified for authorized excavation.

L. Remove excess subsoil not intended for reuse, from site.

M. Stockpile excavated material in area designated on site in accordance with Section 31 05 13.

3.3 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen fill materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Place fill material in continuous layers and compact in accordance with schedule at end of this section.
   1. 12 inches compacted depth.

D. Employ placement method that does not disturb or damage utilities in trench.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Do not leave trench open at end of working day.

3.4 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

A. Perform in place compaction tests in accordance with the following:
   1. Density Tests: ASTM D2922.
   2. Moisture Tests: ASTM D3017.

B. When tests indicate Work does not meet specified requirements, [remove Work, replace, compact, and retest.

C. Frequency of Tests: one test for each 100 lineal feet of trench.

3.6 PROTECTION OF FINISHED WORK

A. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.7 SCHEDULE

A. General Trenching:
   1. Cover pipe and bedding with Fill Type S1 to subgrade elevation.
   2. Compact uniformly to minimum 95 percent of maximum density.

END OF SECTION

SECTION 31 23 23

FILL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Backfilling building perimeter to subgrade elevations.
2. Backfilling site structures to subgrade elevations.
3. Fill under building slab-on-grade.
4. Fill for over-excavation.

B. Related Sections:
1. Section 31 05 13 - Soils for Earthwork: Soils for fill.
2. Section 31 05 16 - Aggregates for Earthwork: Aggregates for fill.
3. Section 31 22 13 - Rough Grading: Site filling.
4. Section 31 23 16 - Excavation.
5. Section 31 23 17 - Trenching: Backfilling of utility trenches.
6. Section 32 91 19 - Landscape Grading: Filling of topsoil to finish grade elevation.

1.2 REFERENCES

A. ASTM International:
1. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
2. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

B. Michigan Department of Transportation:
1. 2012 MDOT Standard Specifications for Construction.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. Subsoil Fill: Type S1 as specified in Section 31 05 13.

B. Structural Fill: Type A5 as specified in Section 31 05 16.

PART 3 EXECUTION

3.1 PREPARATION

A. Compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with structural fill and compact to density equal to or greater than requirements for subsequent fill material.

3.2 BACKFILLING

A. Backfill areas to contours and elevations with unfrozen materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

C. Place fill material in continuous layers and compact in accordance with schedule at end of this section.

D. Employ placement method that does not disturb or damage other work.

E. Maintain optimum moisture content of backfill materials to attain required compaction density.

F. Backfill against supported foundation walls.

G. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

H. Slope grade away from building minimum 5 percent slope for minimum distance of 10 ft, unless noted otherwise.

I. Make gradual grade changes. Blend slope into level areas.

J. Remove surplus backfill materials from site.

K. Leave fill material stockpile areas free of excess fill materials.

3.3 TOLERANCES

A. Top Surface of Backfilling Within Building Areas: Plus or minus 1 inch from required elevations.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

C. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.4 FIELD QUALITY CONTROL

A. Perform in place compaction tests in accordance with the following:
   1. Density Tests: ASTM D2922.
   2. Moisture Tests: ASTM D3017.

B. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

C. Frequency of Tests:
   1. Provide a minimum of 1 subgrade compaction test for each 1,000 square feet of building pad.
   2. Provide a minimum of 1 subgrade compaction test for each 1,000 square feet of concrete paving.
   3. Provide a minimum of 1 subgrade compaction test for each 1,000 square yards of proposed gravel parking.

3.5 PROTECTION OF FINISHED WORK

A. Reshape and re-compact fills subjected to vehicular traffic.

3.6 SCHEDULE

A. Exterior Concrete Paving:
   1. Fill Type S1, 12 inch lifts to subgrade elevation, compacted to 95 percent.

B. Foundation backfill:
   1. Fill Type S1, to subgrade elevation, compact uniformly to 95 percent of maximum density.

C. Fill to Correct Over-excavation:
   1. Fill Type A1, flush to required elevation, compact uniformly to density required for subsequent fill.

END OF SECTION

SECTION 32 11 23

AGGREGATE BASE COURSES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Aggregate base course.

B. Related Sections:
1. Section 31 05 16 – Aggregates for Earthwork:
2. Section 31 22 13 - Rough Grading: Preparation of site for base course.
3. Section 31 23 17 - Trenching: Compacted fill under base course.
4. Section 31 23 23 - Fill: Compacted fill under base course.

1.2 REFERENCES

A. ASTM International:
1. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
2. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

B. Michigan Department of Transportation:
1. 2012 MDOT Standard Specifications for Construction.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 AGGREGATE MATERIALS

A. Fine Aggregate: Fill Type A1 as specified in Section 32 05 16.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify compacted substrate is dry.
1. Remove soft substrate and replace with compacted fill as specified in Section 31 23 23.

B. Verify substrate has been inspected, gradients and elevations are correct.

3.2 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place fill on soft, muddy, or frozen surfaces.

3.3 AGGREGATE PLACEMENT

A. Place aggregate equal thickness layers to total compacted thickness of indicated on Drawings.
   1. Maximum Layer Compacted Thickness: 6 inches.
   2. Minimum Layer Compacted Thickness: 3 inches.

B. Compact aggregate to density scheduled in this section.

C. Level and contour surfaces to elevations, profiles, and gradients indicated.

D. Maintain optimum moisture content of fill materials to attain specified compaction density.

3.4 TOLERANCES

A. Maximum Variation From Flat Surface: 1/4 inch measured with 10 foot straight edge.

B. Maximum Variation From Thickness: 1/4 inch.

C. Maximum Variation From Elevation: 1/2 inch.

3.5 FIELD QUALITY CONTROL

A. Compaction testing will be performed in accordance with ASTM D2922 and ASTM D3017.

B. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

C. Frequency of Tests: One test for every 1000 square yards of each layer compacted aggregate.

3.6 COMPACTION

A. Compact materials to specified density as determined in accordance with ASTM D2922 and ASTM D3017.

3.7 SCHEDULES

A. Building Slab-on-Grade Base Course: Aggregate A1, 12 inches compacted thickness, compacted to 98% maximum density.

B. Concrete Paving Base Course: Aggregate A1, 12 inches compacted thickness, compacted to 95% maximum density.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Concrete paving for:
      a. Concrete stoops and sidewalks.

B. Related Requirements:
   1. Section 03 30 00 – Concrete materials and accessories.
   2. Section 32 11 23 - Aggregate Base Courses: base course.
   3. Section 32 91 19 - Landscape Grading: Preparation of subsoil at pavement perimeter.

1.2 REFERENCE STANDARDS

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.

B. ASTM International:
   1. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   2. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   3. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
   4. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
   5. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
   6. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
   7. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.

1.3 SUBMITTALS

A. Product Data:
   1. Submit data on curing compounds.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

B. Obtain cementitious materials from same source throughout.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

B. Installer: Company specializing in performing work of this section.

1.6 AMBIENT CONDITIONS

A. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.1 CONCRETE PAVING

A. Form Materials:
   1. Form Materials: As specified in Section 03 30 00.
   2. Joint Filler: Type A as specified in Section 03 30 00.

B. Reinforcement:
   1. Reinforcing Steel and Wire Fabric: As specified in Section 03 30 00.

C. Concrete Materials:
   1. Concrete Materials: As specified in Section 03 30 00

2.2 MIXES

A. Concrete Mix: As specified in Section 03 30 00

2.3 ACCESSORIES

A. Curing Compound: ASTM C309, Type 1, Class A.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify compacted base is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.2 PREPARATION

A. Moisten substrate to minimize absorption of water from fresh concrete.

B. Coat surfaces of manhole or catch basin frames with oil to prevent bond with concrete paving.

3.3 INSTALLATION

A. Forms:
   1. Place and secure forms and screeds to correct location, dimension, profile, and gradient.
   2. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

B. Reinforcement:
   1. Place reinforcing at mid-height of paving.
   2. Interrupt reinforcing at expansion joints.

C. Placing Concrete:
   1. Place concrete in accordance with ACI 301.
   2. Ensure reinforcing, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
   3. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
   4. Place concrete to joint pattern indicated.

D. Joints
   1. Place expansion joints at intervals indicated in Drawings.
   2. Place joint filler between paving components and building or other appurtenances.
   3. Provide scored or sawn joints at intervals indicated on Drawings.

E. Finishing:
   1. Area Paving: Light broom.
   2. Sidewalk Paving: Light broom.
   3. Direction of Texturing: Perpendicular to traffic direction.

F. Curing and Protection
   1. Place curing compound on exposed concrete surfaces immediately after finishing.
   2. Protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
   3. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.4 TOLERANCES

A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

B. Maximum Variation From True Position: 1/4 inch.

3.5 FIELD QUALITY CONTROL

A. Testing firm will take cylinders and perform slump and air entrainment tests in accordance with ACI 301.

B. Strength Test Samples:
   1. Sampling Procedures: ASTM C172.
   2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.

3. Sample concrete and make one set of three cylinders for each class of concrete at each project site.
    a. Make additional sets of cylinders if concrete delivery is suspended for longer than 7 consecutive days at any individual site.
4. Make one additional cylinder during cold weather concreting, and field cure.

C. Field Testing:
1. Slump Test Method: ASTM C143/C143M.
2. Air Content Test Method: ASTM C173/C173M.
3. Temperature Test Method: ASTM C1064/C1064M.
4. Measure slump and temperature for each compressive strength concrete sample.
5. Measure air content in air entrained concrete for each compressive strength concrete sample.

D. Cylinder Compressive Strength Testing:
1. Test Method: ASTM C39/C39M.
2. Test Acceptance: Average compressive strength of three consecutive test maximum 150 psi less than specified compressive strength.
3. Test one cylinder at 7 days.
4. Test two cylinders at 28 days.
5. Dispose remaining cylinders when testing is not required.

E. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.6 PROTECTION

A. Immediately after placement, protect paving from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian or vehicular traffic over paving for 7 days minimum after finishing.

END OF SECTION

SECTION 32 91 19

LANDSCAPE GRADING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Final grade topsoil for finish landscaping.

B. Related Sections:
   1. Section 31 22 13 - Rough Grading: Site contouring.
   2. Section 31 23 17 - Trenching: Backfilling trenches.
   3. Section 31 23 23 - Fill: Backfilling at building areas.
   4. Section 32 05 13 - Soils for Exterior Improvements.
   5. Section 32 92 19 - Seeding and Soil Supplements: Finish ground cover.

1.2 REFERENCES

A. Michigan Department of Transportation:
   1. 2012 MDOT Standard Specifications for Construction.

1.3 QUALITY ASSURANCE

A. Furnish each topsoil material from single source throughout the Work.

B. Perform Work in accordance with MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 MATERIAL

A. Topsoil: Fill Type S2, as specified in Section 31 05 13.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify building and trench backfilling have been inspected.

B. Verify substrate base has been contoured and compacted.

3.2 PREPARATION

A. Protect landscaping and other features remaining as final Work.

B. Protect existing structures, sidewalks, utilities, paving, and curbs.

3.3 SUBSTRATE PREPARATION

A. Eliminate uneven areas and low spots.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove contaminated subsoil.

C. Scarify surface to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.4 PLACING TOPSOIL

A. Place topsoil in areas where seeding, is required to nominal depth of 6 inches. Place topsoil during dry weather.

B. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.

C. Remove roots, weeds, rocks, and foreign material while spreading.

D. Manually spread topsoil close to building, and improvements to prevent damage.

E. Lightly compact placed topsoil.

F. Remove surplus subsoil and topsoil from site.

G. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.5 TOLERANCES

A. Top of Topsoil: Plus or minus 1/2 inch.

3.6 PROTECTION OF INSTALLED WORK

A. Prohibit construction traffic over topsoil.

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Fertilizing.
2. Seeding.
3. Hydroseeding.
4. Mulching.
5. Maintenance.

B. Related Sections:
1. Section 32 05 13 - Soils for Exterior Improvements: Topsoil material.
2. Section 32 91 19 - Landscape Grading: Preparation of subsoil and placement of topsoil in preparation for the Work of this section.

1.2 DEFINITIONS

A. Weeds: Vegetative species other than specified species to be established in given area.

1.3 SUBMITTALS

A. Product Data: Submit data for seed mix, fertilizer, mulch, and other accessories.

1.4 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 PRODUCTS

2.1 SEED MIXTURE

A. Seed Mixture:
1. All seed to be used shall be labeld in accordance with the U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act and shall be in accordance with the State seed rules and regulations. Seed mixture shall be "Sunny Mix" with composition of

50% Kentucky Blue Grass, 25% Creeping Red Fescue and 25% Perennial Rye Grass, by weight. Common varieties of specified seed mix will be permitted.

2.2 ACCESSORIES

A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

B. Fertilizer: Commercial grade; recommended for grass; of proportion necessary to eliminate deficiencies of topsoil: Fertilizer shall be Starter blend, high phosphorous, 15-30-15 composition.

C. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify prepared soil base is ready to receive the Work of this section.

3.2 FERTILIZING

A. Apply fertilizer at application rate recommended by manufacturer.

B. Apply after smooth raking of topsoil and prior to roller compaction.

C. Do not apply fertilizer at same time or with same machine used to apply seed.

D. Mix fertilizer thoroughly into upper 2 inches of topsoil.

E. Lightly water soil to aid dissipation of fertilizer. Irrigate top level of soil uniformly.

3.3 SEEDING

A. Apply seed at rate of 6 to 7 lbs per 1000 sq ft evenly in two intersecting directions. Rake in lightly.

B. Do not seed areas in excess of that which can be mulched on same day.

C. Do not sow immediately following rain, when ground is too dry, or when winds are over 12 mph.

D. Roll seeded area with roller not exceeding 112 lbs/linear foot.

E. Immediately following seeding and compacting, apply mulch to a uniform covering. Maintain clear of shrubs and trees.

F. Apply water with fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

END OF SECTION