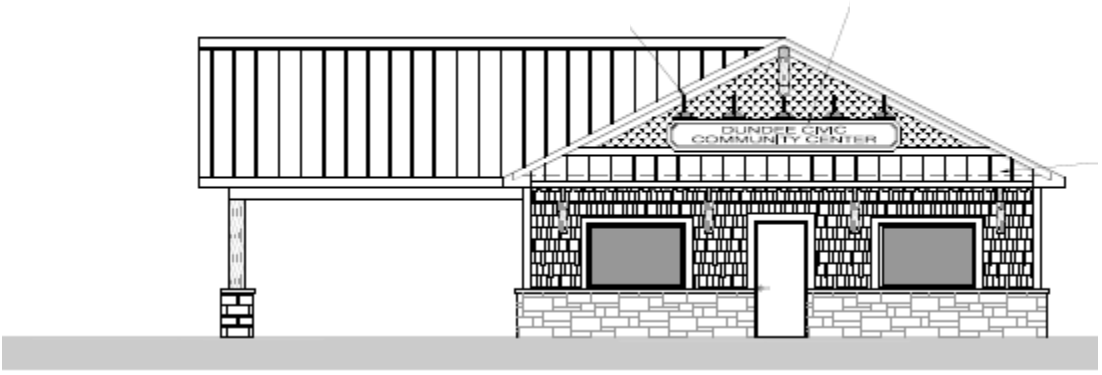
PROJECT SPECIFICATIONS

VILLAGE OF DUNDEE
CIVIC COMMUNITY CENTER BUILDING

Project Location:

165 VANNEST STREET
DUNDEE, MI 48131

Release Date: Monday, November 17, 2025
Bid Due Date: Wednesday, December 17, 2025 at 2:00 P.M.



OWNER
VILLAGE OF DUNDEE
350 WEST MONROE STREET
DUNDEE, MI 48131
PHONE: 734-529-3430

ARCHITECT/ENGINEER
DAVID ARTHUR CONSULTANTS, INC.
110 MAIN STREET
DUNDEE, MI 48131
PHONE: 734-823-5080

VILLAGE OF DUNDEE
CIVIC COMMUNITY CENTER BUILDING

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VILLAGE OF DUNDEE
CIVIC COMMUNITY CENTER BUILDING

DAVID ARTHUR CONSULTANTS, INC.

110 Main Street Dundee, Michigan 48131
Tele: (734) 823-5080 * dac@daceng.com

ADVERTISEMENT TO BID

Date: **November 17, 2025**

Project: **Village of Dundee – Civic Community Center Building, 165 Vannest Street**

Owner: **Village of Dundee, Michigan**

Architect/Engineer: **David Arthur Consultants, Inc.**
110 Main Street, Dundee, Michigan 48131
Phone: 734-823-5080, Email: dac@daceng.com

Proposal Scope: Each proposal shall include all labor and materials for the Scope of Work as noted on construction documents, including but not limited to site work, building renovation, and new construction.

Documents: Copies of the documents are on file for viewing at:

1. David Arthur Consultants, Inc., 110 Main Street, Dundee, MI 48131
2. Village of Dundee, 350 West Monroe Street, Dundee, MI 48131
3. MITN, https://www.bidnetdirect.com/mitn

Documents can be accessed through MITN. The office of David Arthur Consultants, Inc., can supply documents as follows:

1. Hard copy of drawings and specification book: $50.00, with 24-hour notice.
2. CD/flash drive of drawings and specification book: $25.00
3. PDF of drawings and specification book via e-mail: $25.00

There will be an additional non-refundable prepaid handling fee of $10.00 per set/CD/flash drive for mailing. All documents will be mailed U.S.P.S. Mail - 2-Day Priority.

Please make checks payable to "David Arthur Consultants, Inc." Credit card payments are accepted. If bidder's FedEx account number is provided, the handling fee, as mentioned above, is waived and documents will be sent using bidder's option of shipping method.

All questions and clarification requests must be emailed to David Arthur Consultants, Inc. Only registered plan holders and plan rooms will receive Addendums/Clarifications.

Bid Bond & Performance Bond:
Each proposal submitted must be accompanied by a bid bond. Bond must be from an approved surety company or a certified check must be presented made payable to the Village of Dundee in an amount not less than 5 percent (5%) of proposal amount. Awarded bidder shall be required to furnish a performance, payment, and materials payment bond equal to one hundred percent (100%) of the proposal amount, including accepted alternates. Premium of bonds shall be included in bid.

Proposal:
Electronic bids are to be submitted thru MITN only. Hard copies are to be be submitted in a sealed, opaque envelope, and on forms provided by the Engineer/Architect with the project name, bidder's name and address clearly written on the outside of the envelope.

Bids to be delivered to: Attn: Ryan Rudzis - Village Manager
Village of Dundee
350 West Monroe Street
Dundee, MI 48131

Bids will be accepted until 2:00 P.M. Wednesday, December 17, 2025, electronically via MITN, or hard copy bids at the Village Office.

A public bid opening will take place immediately following at the Village Office.

Proposals not received by the time and date specified in this notice will not be considered and will be returned to the bidder unopened. The Owner reserves the right to reject any or all bids, to waive irregularities and/or informalities and to make award in any manner deemed to be in the best interest of the Owner.

Bid proposals shall not be withdrawn for a period of sixty (60) days subsequent to opening of bid.

All modifications, corrections, or clarifications prior to receipt of the proposal will be made by an Addendum/Clarification issued by the Engineer/Architect to all bidders of record. All questions must be submitted in writing by 12:00 Noon, three business days prior to bid date.

Submission of Hard Copy Bid: Before sealing the proposal envelope, check to be sure that:

1. The Proposal Form is signed.
2. The Base Bid amount is filled in.
3. All applicable alternate amounts are filled in.
4. Bid Security is included.
5. All Addenda received are acknowledged.
6. Signature Authorization is included.

On the outside of the envelope identify:
1. The project name as noted in this invitation.
2. Bidder's name and complete address.

Electronic Submission: Submission requirements are as noted on MITN website.

Pre-Bid Conference:
There will be two (2) pre-bid conferences: Wednesday, November 25, 2025 at 2:00 P.M. and Monday December 1, 2025 at 9:00 A.M. Any and all questions pertaining to the project are to be submitted via email to dac@daceng.com. To gain access to the site, please contact:

ARMIN MOULY, PROJECT MANAGER
DAVID ARTHUR CONSULTANTS, INC.
110 Main Street, Dundee, MI 48131
Email: dac@daceng.com

PROPOSAL FOR
VILLAGE OF DUNDEE
CIVIC COMMUNITY CENTER BUILDING

TO THE VILLAGE OF DUNDEE,

The undersigned, as Bidder, hereby declares that this Proposal is made in good faith without fraud or collusion with any person or persons bidding on the same Contract; that he has read and examined the Advertisement, Information for Bidders, Proposal, General Conditions, Agreement, Forms of Bonds, Specifications and Plans, as prepared by the Engineer/Architect, and understands all of the same; that he or his representative has made personal investigation at the site and has informed himself fully with regard to the conditions to be met in the execution of this Contract, and the undersigned proposes to furnish all labor, materials, tools, power, transportation, and construction equipment necessary for the construction of the Project and performing related work in full accordance with the aforesaid Contract Documents, including any and all addenda officially issued, the receipt of which is hereby acknowledged:

Addendum No.	Date of Receipt	Signature
_____	_____	_____
_____	_____	_____

AWARD OF CONTRACT: The Contract(s) will be awarded to the lowest responsive, responsible Bidder based on a lump sum price.

LOCAL PARTICIPATION DISCOUNT: The contractor may receive a discount of five (5%) percent, for bid comparison purposes only, of the total bid price if at least 25% of the project's labor and/or materials are sourced from businesses located within a 15 mile radius of the project site. To qualify for this comparative discount a list of local subcontractors and suppliers, a breakdown showing the percentage of work or materials attributed to local businesses, and proof of local status such as a business license, tax registration, or other official documentation confirming local operation will be required prior to contract award.

PROPOSAL PRICE: The Bidder agrees to complete the Project for the following lump sum price:

_____ Dollars

($_____).

(Amount shall be shown in both words and figures. In case of a discrepancy, the amount shown in words shall govern.)

The undersigned agrees that if the foregoing Proposal shall be accepted by the Owner, he will, within ten (10) days (Sundays and legal holidays excepted) after receiving notice of such acceptance, enter into a formal AIA Contract and will complete the Project, ready for use, at the price and within the time stated in this Proposal, and that he will furnish the Owner satisfactory Contract Bonds and certificates of insurance coverage documents.

The undersigned further agrees that if the foregoing Proposal shall be accepted, he will commence off-site work immediately after the Contract has been awarded, the Agreement executed, and upon receipt of Notice to Proceed (anticipated 60 days from bid date providing Contractor requirements for work commencement have been met) and the entire scope of work shall be completed within 365 calendar days, unless noted otherwise.

The undersigned attaches hereto his Bid Security, as required by the Information for Bidders, and the undersigned agrees that in case he shall fail to fulfill his obligations under the foregoing Proposal and/or shall fail to furnish bonds, as specified, the Owner may, at its option determine that the undersigned has abandoned his rights and interests in such Contract and that his Bid Security accompanying his Proposal has been forfeited to the said Owner. The Bid Security shall be returned to the undersigned upon the execution of the Contract and the acceptance of the bonds.

In submitting this bid, it is understood that the right is reserved by the Owner to accept any bid, to reject any or all bids, and to waive irregularities in bidding that are in the interest of the Owner.

The Bidder has completed the accompanying "Legal Status" form.

Dated and Signed at:

_____

Street City State Zip Code

this _____ day of _____, 20__.

OFFICIAL ADDRESS

_____

_____

_____

Telephone

BIDDER'S NAME

_____

_____

Signature

_____

Print Name

_____

Title

NAME, ADDRESS, LEGAL STATUS, AND SIGNATURE OF BIDDER

This Proposal is submitted in the name of:

(Print)

_____

The undersigned hereby designates below his business address to which all notices directions or other communications may be served or mailed:

Mailing Address: _____

City _____ State _____ Zip Code _____

Phone: _____ Fax: _____ Email: _____

The undersigned hereby declares that he has legal status checked below:

( ) Individual
( ) Individual doing business under an assumed name
( ) Co-partnership. The assumed name of the co-partnership is registered in the County of _____, State of _____.
( ) Corporation - incorporated under the laws of the State of _____, the corporation is:
( ) Insured to do business in the State of Michigan.

The name, titles and home addresses of all persons who are officers or Partners in the organization are as follows:

NAME AND TITLE	HOME ADDRESS
_____	_____
_____	_____
_____	_____

Signed and Sealed this _____ day of _____, 20__.

_____

By (Signature)

_____

Printed Name of Signer

_____

Title

DAVID ARTHUR CONSULTANTS, INC.

SECTION 00 10 00A: LOCAL QUALIFICATION FORM

The bidding contractor may receive a discount of five (5%) percent, for bid comparison purposes only, of their total bid price if at least 25% of the project's labor and/or materials are sourced from businesses located within a 15 mile radius of the project site. Complete the following table as evidence of this possible discount.

Vendor Sub-Contractor	**Type of Materials or Labor**	**Local Status Verification** (Business License or other official documentation)	**Cost**	**% of Total Project**

SECTION 00 21 13: INSTRUCTION TO BIDDERS

ARTICLE 1: DEFINITIONS

1.1 OWNER
Village of Dundee
350 West Monroe Street
Dundee, MI 48131
Phone: 734-529-3430

1.2 ARCHITECT/ENGINEER
David Arthur Consultants, Inc.
110 Main Street
Dundee, Michigan 48131
Phone: 734-823-5080
Email: dac@daceng.com

1.3 Bidding documents include the bidding requirements and the proposed Contract Documents. The bidding requirements consist of the advertisement or invitation to bid, instructions to bidders, supplementary instructions to bidders, the bid or proposal form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of agreement between the Owner and contractor, conditions of the contract (general, supplementary and other conditions), drawings, specifications and all addenda/clarifications issued prior to execution of the contract.

1.4 Definitions set forth in the general conditions of the contract for construction and/or in other Contract Documents are applicable to the bidding documents.

1.5 Addenda/clarifications are written or graphic instruments issued by the Architect/Engineer prior to the execution of the contract, which modify or interpret the bidding documents by additions, deletions, clarifications or corrections.

1.6 A bid is a complete and properly signed proposal to do the work with the sums stipulated therein, submitted in accordance with the bidding documents.

1.7 The base bid is the sum stated in the bid for which the bidder offers to perform the work described in the bidding documents as the base, to which work may be added to or from which work may be deleted for sums stated in substitute or voluntary alternate bids.

1.8 An optional/alternate bid (or voluntary alternate) is an amount stated in the bid to be added to or deducted from the amount of the base bid if the corresponding change in the work, as described in the bidding documents, is accepted.

1.9 A unit price is an amount stated in the bid as a price per unit of measurement for materials, equipment, services or a portion of the work as described in the bidding documents.

1.10 A bidder is a person or entity that submits a bid.

1.11 A sub-bidder is a person or entity that submits a bid to a bidder for materials, equipment or labor for a portion of the work.

ARTICLE 2: BIDDER'S REPRESENTATIONS

2.1 The bidder by making a bid, represents that:

A. The bidder has read and understands the bidding documents and the bid is made in accordance therewith.

B. The bidder has read and understands the bidding documents or Contract Documents, to the extent that such documentation relates to the work for which the bid is submitted, for other portions of the project, if any, being bid concurrently or presently under construction.

C. The bidder has visited the site, become familiar with local conditions under which the work is to be performed and has correlated the bidder's personal observations with the requirements of the proposed Contract Documents.

D. The bid is based upon all labor, materials, equipment and systems required by the bidding documents without exception.

ARTICLE 3: BIDDING DOCUMENTS

3.1 COPIES

A. Bidders may obtain complete sets of the bidding documents from the issuing Architect/Engineer's office for a set fee, designated in the advertisement or invitation to bid. A bidder receiving a contract award may retain the bidding documents and three (3) additional sets of drawings will be issued at no charge to awarded bidder, if requested.

B. Bidders shall use complete sets of bidding documents in preparing bids; neither the Owner nor Architect/Engineer assumes responsibility for errors, omissions or misinterpretations resulting from the use of incomplete sets of bidding documents.

C. In making copies of the bidding documents available on the above terms, the Owner and the Architect/Engineer do so only for the purpose of obtaining bids on the work and do not confer, license or grant permission for any other use of the bidding documents.

3.2 INTERPRETATION OR CORRECTIONS OF BIDDING DOCUMENTS

A. The bidder shall carefully study and compare the bidding documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the work for which the bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect/Engineer errors, inconsistencies or ambiguities discovered.

B. **Bidders and sub-bidders requiring clarification or interpretation of the bidding documents shall make a written request only, which shall reach the Architect/Engineer by noon three (3) business days prior to the date for receipt of bids. DAVID ARTHUR CONSULTANTS email address is dac@daceng.com. Only registered plan holders and plan rooms will receive Addendum regarding questions or clarifications submitted to David Arthur Consultants, Inc.**

C. Interpretations, corrections and changes of the bidding documents will be made by addendum/clarification. Interpretations, corrections, and changes of the bidding documents made in any other manner will not be binding, and bidders shall not rely upon them.

3.3 SUBSTITUTIONS OR ALTERNATES

A. The materials, products and equipment described in the bidding documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

B. No substitution or alternate will be considered prior to receipt of bids unless written request for approval has been received by the Architect/Engineer at least five (5) business days prior to the date for receipt of bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance, test data, and other information necessary for an evaluation. A statement setting forth changes in other material, equipment, or other portions of the work including changes in the work of other contracts that incorporation of the proposed substitution would require shall be included.

The burden of proof of the merit of the proposed substitution is upon the proposal. The Architect/Engineer's decision of approval or disapproval of a proposed substitution shall be final.

C. If the Architect/Engineer approves a proposed substitution or alternate prior to receipt of bids, such approval will be set forth in an addendum/clarification. Bidders shall not rely upon approvals made in any other manner.

D. No substitutions or alternates will be considered after the contract award unless specifically provided in the Contract Documents, by means of an addendum or other written approval.

3.4 ADDENDA/CLARIFICATIONS

A. Addenda/clarifications will be distributed to all who are known by the Architect/Engineer's office as being a registered plan holder. Any subcontractor without an original set of plans and specifications who is interested in receiving a copy of the addenda/clarifications shall contact the contractor who provided the drawings.

B. **Copies of addenda will be made available for review where bidding documents are on file.**

C. No addenda/clarifications will be issued later than two (2) business days prior to the date for receipt of bids, except an addendum withdrawing the request for bids or one which includes postponement or extension of the date for receipt of bids.

D. Each bidder shall ascertain, prior to submitting a bid, that the bidder has received all addenda issued and the bidder shall acknowledge their receipt in the bid.

ARTICLE 4: BIDDING PROCEDURES

4.1 FORM AND STYLE OF BIDS

A. Bids shall be submitted on forms identical to the form included with the bidding documents. Electronic (e-mail) bids will only be accepted thru MITN.

B. All blanks on the bid form shall be completed in ink or other electronic method.

C. Where so indicated by the makeup of the bid form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the amount written in words shall govern. All item numbers must add up to the bid total and all items must be filled in. Failure to fill in items may be considered an incomplete bid.

D. Interlineations, alterations, and erasures must be initialed by the signer of the bid.

E. Where two (2) or more bids for designated portions or proposals of the work have been requested, the bidder may, without forfeiture of the bid security, state the bidder's refusal to accept the award of less than the combination of bids stipulated by the bidder, the bidder shall make no additional stipulations on the bid form nor qualify the bid in any other manner.

F. Each copy of the bid shall include the legal name of the bidder and a statement that the bidder is a sole proprietor, partnership, corporation or other legal entity. Each original shall be signed by the person or persons legally authorized to bind the bidder to a contract. A bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the bidder.

G. Failure to include any of the above information may render the submitted bid incomplete and may be rejected by the Owner.

4.2 BID SECURITY

A. If so stipulated in the advertisement or invitation to bid, or supplementary instructions to bidders, bid shall be accompanied by a bid bond and/or bid security in the form and amount required, pledging that the bidder will enter into a contract with the Owner on the terms stated in the bid and will, if required furnish bonds covering the faithful performance of the contract and payment of all obligations arising hereunder. Should the bidder refuse to enter into such contract or fail to furnish such bonds, if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with subparagraph 5.2.A.

B. If a surety bond is required, it shall be written on the most current version of industry standard, bond documents, or a certified check. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

C. The Owner will have the right to retain the bid security of bidders to whom an award is being considered until either (a) the contract has been executed and bonds, if required, have been furnished; or (b) the specified time has elapsed so that bids may be withdrawn, or (c) all bids have been rejected.

4.3 SUBMISSION OF BIDS

A. Hard copy submissions:

1. All copies of the bid, the bid security, if any, and other documents required to be submitted with the bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the bids and shall be identified with the project name, the bidder's name and address and, if applicable, the designated portion of the work for which the bid is submitted.
2. **If the bids are sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" with the name of project, as stated on Invitation to Bid, on the face thereof. Any mailed bids must arrive at the designated drop-off location by the date and time required.**
3. Bids shall be deposited at the designated location prior to the time and date for receipt of bids. Bids received after the time and date for receipt of bids will be returned unopened and will not be considered.
4. The bidder shall assume full responsibility for timely delivery at the location designated for receipt of bids.
5. Oral, telephone, or telegraphic (including facsimile) bids are invalid and will not receive consideration.

B. Electronic Submissions:

1. Electronic submissions will be accepted through MITN only. No other electronic submissions will be accepted.

4.4 MODIFICATION OR WITHDRAWL OF BID

A. A bid may not be modified, withdrawn, or canceled by the bidder during the stipulated time period following the time and date designated for the receipt of bids, and each bidder so agrees in submitting a bid.

B. Prior to the time and date designated for receipt of bids, a bid submitted may be modified or withdrawn by notice to the party receiving bids at the place designated for receipt of bids. Such notice of modification of a bid shall be in writing over the signature of the bidder. The written confirmation over the signature of the bidder shall be mailed and received on or before the date and time set for receipt of bids or delivered and replaced, in person, by the bidding contractor. A change shall be so worded as not to reveal the amount of the original bid. Withdrawal of a bid shall be in writing to the office of the Owner prior to the time and date of receipt of bids or in person by the bidding contractor

or an authorized representative of the bidding contractor. Proper credentials will be required at time of pick up.

C. Withdrawn bids may be resubmitted up to the date and time designated for the receipt of bids provided that they are then fully in conformance with the instructions to bidders.

ARTICLE 5: CONSIDERATION OF BIDS

5.1 OPENING OF BIDS

A. Unless stated otherwise in the advertisement or invitation to bid, the properly identified bids received on time will be opened publicly and will be reviewed. An abstract (bid tabulation) of the bids will be made available by the Architect/Engineer to all bidders within 72 hours. When it has been stated that bids will be opened privately, an abstract of the same information may, at the discretion of the Owner, be made available to the bidders within a reasonable time. Bidders may request a copy of the abstract.

5.2 REJECTION OF BIDS

A. **The Owner shall have the right to reject: any proposal, bid or combination (labor, materials, or both breakdowns), all bids, reject a bid not accompanied by a required bid security or by other data required by the bidding documents, or reject a bid which is in any way incomplete or irregular or if they feel is not in their best interest.**

5.3 ACCEPTANCE OF BID (AWARD)

A. It is the intent of the Owner to award a contract to the lowest responsible bidder provided the bid has been submitted in accordance with the requirements of the bidding documents and does not exceed the funds available. The Owner shall have the right to waive informalities or irregularities in a bid received and to accept the bid, which, in the Owner's judgment, is in the Owner's best interests.

B. The Owner shall have the right to accept substitutions or voluntary alternates in any order or combination, unless otherwise specifically provided in the bidding documents, and to determine the low bidder on the basis of the sum of the base bid and substitutions, or alternates or donations accepted.

C. The Owner shall have the right to accept proposals in any order or combination, unless otherwise specifically provided in the bidding documents, and to determine the low bidder on the basis of the individual or sum of the proposals accepted (which may also include accepted substitutions or alternates).

D. The Owner requires the bidder have minimum of five (5) years successful experience in this type of commercial construction. A qualification statement justifying five (5) years experience may be required and used as a consideration of awarding this contract.

E. Time of Construction: The bidding contractor accepts the project schedule, which may be identified as calendar days, as specified in the proposal form.

ARTICLE 6: POST-BID INFORMATION

6.1 SUBMITTALS

A. The bidder shall, if so requested, as soon as practical, or as requested, after the bid opening, furnish to the Owner through the Architect/Engineer in writing:
   1. A designation of the work to be performed with the bidder's own forces.
   2. Names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the work.

3. Names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the work.
4. If so requested by the Owner or Architect/Engineer, Contractor will provide additional breakdown of construction costs for each proposal(s) on a line by line, trade-by-trade, or task-by-task basis, or in the form of quotation or a bill of materials.
5. Detailed project schedule.
6. List of subcontractors with contact person(s) address, office phone, cell phone, and fax numbers, email address, and description of work to be performed.
7. Contractor Qualifications - A list of references, minimum of five (5), including project name, scope, date of work, contact person for the Owner and phone number for similar type of work previously performed.

B. If requested by the Owner or Architect/Engineer, above information shall be submitted within 40 days of the bid opening. Notification during the bid opening will be given to whoever is requested to submit the above information.

C. The bidder will be required to establish, to the satisfaction of the Owner and Architect/Engineer, the reliability and responsibility of the persons or entities proposed to furnish and perform the work described in the bidding documents.

D. Prior to the award of the contract, the Owner or Architect/Engineer will notify the bidder in writing if either the Owner or Architect/Engineer, after due investigation, has reasonable objection to a person or entity proposed by the bidder. If the Owner or Architect/Engineer has reasonable objection to a proposed entity, the bidder may, at the bidder's option:
1. Withdraw the bid, or
2. Submit an acceptable substitute person or entity with an adjustment in the base bid or alternate bid to cover the difference in cost occasioned by such substitution or voluntary alternate or donation.
3. The Owner may accept the adjusted bid price or disqualify the bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

E. Persons and entities proposed by the bidder, as noted in the subcontractor list and to whom the Owner and Architect/Engineer have made no reasonable objection, must be used on the work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect/Engineer.

F. Owner's Financial Capability. A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

ARTICLE 7: PERFORMANCE BOND AND PAYMENT BOND

7.1 BOND REQUIREMENTS

A. The successful bidder shall furnish bonds covering the faithful performance of the contract and payments of all obligations arising thereunder. Bonds may be secured through the bidder's usual sources.

B. The cost of furnishing such bonds stipulated in the bidding documents shall be included in the bid. If the furnishing of such bonds is required after receipt of bids and before execution of the contract, the cost of such bonds shall be added to the bid in determining the contract sum.

C. If the Owner requires that bonds be secured from somewhere other than the bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

7.2 TIME OF DELIVERY AND FORM OF BONDS

A. The bidder shall deliver the required bonds to the Owner through the Architect/Engineer no later than five (5) days following the date of execution of the contract. If the work is to be commenced prior thereto, in response to a letter of intent, the bidder shall, prior to commencement of the work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this subparagraph.
B. The bonds shall be written on the most current version of standard bond documents or bonding companies' standard forms. All bonds, with the exclusion of the bid bond, shall be written in the amount of the contract sum.
C. The bonds shall be dated on or after the date of the contract.
D. The bidder shall require the attorney-in-fact who executes the required bonds, on behalf of the surety, to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8: FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

8.1 CONTRACT FORMS TO BE USED

A. The agreement for the work will be written on AIA Owner/Contractor forms provided by the Owner.

END OF SECTION

AFFIDAVIT OF COMPLIANCE – IRAN ECONOMIC SANCTIONS ACT

Michigan Public Act No. 517 of 2012

The undersigned, the owner or authorized officer of _____(the "Bidder"), pursuant to the compliance certification requirement provided in the Village of Dundee, Michigan, Invitation To Bids for the Civic Community Center Building, hereby certifies, represents and warrants that the Bidder (including its officers, directors and employees) is not an "Iran Linked Business" within the meaning of the Iran Economic Sanctions Act, Michigan Public Act No. 517 of 2012 (the "Act"), and that in the event Bidder is awarded a Contract as a result of the aforementioned Invitation To Bid, the Bidder will not become an "Iran Linked Business" at any time during the course of performing under the Contract.

The Bidder further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than $250,000.00 or 2 times the amount of the Contract or proposed Contract for which the false certification was made, whichever is greater, the cost of the Village of Dundee's investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on an Invitation To Bid for three (3) years from the date it is determined that the person has submitted the false certification.

BIDDER: _____ (company name)

By: _____ (signature)

Printed Name: _____

Its: _____

Date: _____

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

by _____, Notary Public _____ County, _____.

My Commission Expires: _____

SECTION 01 30 00: ADMINISTRATION REQUIREMENTS

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Details, requirements, references, and procedures for the completion of the subject project.

1.02 REFERENCES

A. Conform to reference standards as of date of bid submittal.
B. If reference standard is in conflict with Contract Documents, request clarification from the Architect/Engineer before proceeding. In general, the more restrictive requirements shall apply.
C. Applicable Codes:
   1. The Building Code – 2021 Michigan Building Code.
   2. Plumbing Code – 2024 Michigan Plumbing Code.
   3. Electrical Code – 2023 National Electrical Code with Part 8 Technical Amendments.
   4. Mechanical Code – 2021 Michigan Mechanical Code.
   5. Accessibility – 2021 Michigan Building Code, ICC/ANSI–A117.1-2009.
D. The Contractor shall be responsible to require employees, subcontractors, and any persons performing job-related services to comply with municipal regulations and standard practices for construction activities regarding working hours, parking, noise, and protection of the property and safety.

1.03 DEFINITIONS/NOTES/ABBREVIATIONS

A. CONTRACT DOCUMENTS:
   1. Bidding Instructions: (In specifications and supplements distributed by Architect/Engineer or Owner.
   2. Form of Proposal: Distributed by Architect/Engineer or Owner.
   3. Owner – Contractor Agreement: Current Version of AIA supplied agreement document. (Not bound in Specifications and furnished by Owner upon award of project.)
   4. General Provisions: Articles as noted in current version of AIA supplied agreement document's General Conditions of the Contract for Construction. General Conditions are by reference as related to AIA supplied agreement.
   5. Issued addenda.
   6. Critical Path Schedule – graph showing construction schedule /estimated and required due dates.
B. OWNER
   Village of Dundee
   350 West Monroe Street
   Dundee, MI 48131
C. ARCHITECT/ENGINEER/DESIGNER
   David Arthur Consultants, Inc.
   110 Main Street, Dundee, Michigan 48131
   734-823-5080, dac@daceng.com
D. CONTRACTOR
   1. As named in Construction Contract, unless otherwise defined such as general Contractor, term Contractor shall be understood to mean any Contractor or Contractors who have entered into separate contract with Owner.

E. GENERAL CONTRACTOR
1. As named in Construction Contract. Contract for all or part of scope of work except those parts for which Owner has contracted separately.

F. BULLETIN
1. Letter or form issued after award of contract requesting information and/or pricing for a change or amendment of Contract Documents. Change Order is issued, from this information.

G. CHANGE ORDER
1. Letter or form authorizing changes in the Contract Documents, typically resulting from a bulletin.

H. FIELD ORDER
1. Letter or form authorizing changes which do not change the contract amount.

I. SCOPE OF WORK
1. All that which shall be done as described within Contract Documents.

J. REASONABLE TIME
1. Whenever reasonable time is specified in any of Contract Documents, time allowed shall be forty-eight (48) hours.

K. ADDENDUM/CLARIFICATION

E. Letter or form clarifying, amending, or interpreting Contract Documents issued before receipt of bids.

F. ABBREVIATIONS:

AATCC	American Association of Textile Chemists and Colorists
AHJ	Authority Having Jurisdiction
AIA	American Institute of Architects
ACI	American Concrete Institute
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
APA	American Plywood Association
ASA	American Standards Association
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWSC	American Welding Society Code
BHMA	Builders Hardware Manufacturer Association
BOCA	Building Officials Code Association
DAC	David Arthur Consultants
FS	Federal Specifications
GANA	Glass Association of North America
LEED	Leadership in Energy and Environmental Design
MBC	Michigan Building Code
MPC	Michigan Plumbing Code
MMC	Michigan Mechanical Code
NAAMM	National Association of Architectural Metal Manufacturers
NBS	National Bureau of Standards
NEC	National Electrical Code
NFPA	National Fire Protection Association
NWWDA	National Wood Window and Door Association
SDI	Steel Deck Institute
SJI	Steel Joist Institute
SPR	Simplified Practice Recommendation
SBCCI	Standard Building Code Congress International
UBC	Uniform Building Code
UL	Underwriter's Laboratories, Inc.
USGBC	United States Green Building Council
VOC	Volatile Organic Compound

1.04 CONTRACT

A. This project shall be performed under the conditions of agreement document and general conditions edition as provided by Owner.

1.05 SCOPE OF WORK OR ITEMS SUPPLIED BY OWNER OR OTHERS

A. Items noted in Contract Documents, and in specifications as “NIC” or “By Others” shall be furnished and/or installed by the Owner.
B. Owner shall supply the following items:
   1. None
C. For items supplied by others, the Contractor shall coordinate his work and utilities with the work supplied and installed by the other Contractors.

1.06 CONTRACTOR USE OF PREMISES

A. Contractor has use of the entire site as designated as “extent of work” on Contract Documents and as discussed at the pre-construction meeting.
B. Work hours and noise ordinances must be obeyed. These rules shall be reviewed at the pre-construction meeting.
C. Extra care shall be taken by the Contractor, subcontractors, all delivery trucks, and any other person involved with this project around the existing site. This construction area is to be roped off to prevent anyone from damaging any existing features. The Contractor shall be responsible for any damage done to the area by any person associated with the construction project. The Contractor shall be responsible for any cost incurred due to damage done during construction.
D. Coordination between Owner, Architect/Engineer, and Contractor shall be discussed at the pre-construction meeting.

1.07 SITE SAFETY

A. Provide protective fencing and barriers at walks and parking to ensure safe passage on site.
B. Contractor shall coordinate with the Building Inspector with regards to any required separation between occupied spaces and the construction area. Contractor to provide any and all separation measures required and shall be maintained throughout construction or as required by the Building Inspector or authority having jurisdiction.
C. The Contractor is fully responsible for job site safety, including work personnel as well as employees and attendees. Compliance with the rules of OSHA, State of Michigan, and any other authority having jurisdiction shall cover where applicable and at all stages of the project.

1.08 CASH ALLOWANCES

A. Allowances are to include the actual cost to the Contractor for all the material, delivery to site, and sales tax unless noted otherwise.
B. Costs not included in Allowances but included in base price of work are: storage of material on-site, protection of material on-site before and after installation, uncrating of material, installation, and finishing of material.
C. Allowances are noted in individual specification sections.

1.09 UNIT PRICES

A. Included with bid submittal, the Contractor shall identify unit prices for providing the items as shown on Base Bid Form, if applicable.

1.10 INSPECTION AND TESTING

A. The Owner shall pay an independent testing agency to perform tests required under this contract. The Architect/Engineer and Owner shall determine the testing agency to be used and inform Contractor of the contact person and phone number.
B. The Contractor shall be responsible for contacting the testing agency and scheduling tests, as they are required.
C. Testing.
   1. Concrete samples and testing as determined by the Architect/Engineer.
   2. Bearing soil at footings and foundations as determined by the Architect/Engineer.
   3. Tests as noted in specific sections of these specifications or as determined by Architect/Engineer.
   4. Areas of compaction and backfilling as determined by Architect/Engineer.
   5. Others as determined during construction and by Architect/Engineer.
D. Re-testing and repair of work not conforming to the specifications of this project shall be done at the cost of the Contractor.
E. The Owner shall not pay for any overtime billed by the testing company and shall be the responsibility of the Contractor.
F. Scheduling shall be coordinated for the number of site visits that shall be permitted by the contract. Any additional testing needed beyond what is agreed to at the beginning of the project shall be the responsibility of the Contractor, regardless of whether it shall be the initial testing of materials or conditions.
G. Final payment shall be held until all invoices from the testing company have been submitted for verification of all testing costs incurred.

1.11 PERMITS AND FEES

A. Owner shall pay for the Building Permit, if applicable.
B. Contractor shall pay for permits required for individual trades, if needed.
C. Initial inspection fees required by governmental agencies shall be paid by the Owner unless such inspections are required due to incomplete or incorrect work performed by the Contractor in which case the Contractor shall be held liable for all additional inspection fees incurred.

1.12 SCHEDULE OF VALUES AND APPLICATIONS FOR PAYMENTS

A. A Schedule of Values shall be developed by the Contractor and shall become part of the Contract Documents after approval by Architect/Engineer and Owner.
B. Applications for payment shall be made on the latest version of the AIA Forms G-702 and G-703 or equal, as supplied by Contractor for review and approved by Architect/Engineer and Owner.
C. Applications for payment shall be made monthly or as determined by length of project.
D. Ten (10) % retention of payment until 80% of the contract is complete, and then five (5) % held until punch list items are completed.
E. A signed and notarized e-mailed copy of the payment request shall be accepted, reviewed by the Architect/Engineer and approved if request meets level of work completed.
F. Mobilization, and permits shall not exceed 10 % of the contract price in the schedule of values.

1.13 BULLETIN AND CHANGE ORDER PROCEDURES

A. Bulletins are the result of Owner directives, uncovered site conditions, or Contractor inquiry based on requests for information/clarification.
B. Bulletins may be submitted by the Architect/Engineer in letter format and may contain drawing attachments to clarify work needed.
C. Bulletins shall be sent to the Contractor for pricing and input on work outside the current project scope and contract. No guarantee of work, change of project scope, or change in contract amount shall result from a bulletin.
D. Change Order requests shall be prepared by the Contractor on AIA Form G-701 or as supplied by Architect/Engineer.
E. Change Orders shall be based on a fixed-price basis when the scope of work is known.
F. Change Orders shall be used to adjust allowances where necessary.
G. Change Orders shall be used to document work done on a unit price basis.
H. Request for an extension of Date of Completion due to increased scope of work from Change Orders, shall be reviewed and approved based on the work's impact on the Critical Path Schedule chart and under the allowable time specified for a time extension as described earlier in the liquidated damages, if applicable, section of the proposed agreement. Additional time required to perform work included with a bulletin or change order required shall be included and noted separately within said change order request with the proposal and approved with the change order, where additional time is not included and specifically noted with a response to a bulletin or as part of a change order required – it is assumed there will be no change to the current project schedule.
I. It shall be the Contractor's responsibility to submit a detailed Change Order request prior to any work taking place which deviates from the Contract Documents issued for construction or project specifications. Any work performed without an approved Change Order shall not be considered by the Owner/Architect/Engineer for monetary compensation. It shall be the responsibility of the Contractor to repair or redo any work that was done without the approval of a Change Order in order to meet the intent of the Contract Documents and specifications and to the satisfaction of the Owner/Architect/Engineer.
J. The Contractor shall document and submit any request for an extension of the Date of Completion. The Contractor shall submit to the Owner and Architect/Engineer the dates which were lost and the reason for such loss within 10 days of the first requested day. A failure to provide clear and adequate reasons for the extension within the designated time shall result in the denial of part, or all, of the time extension request.

1.14 COORDINATION OF SCOPE OF WORK

A. Contractor shall be responsible for coordinating scheduling, submittals, and work of the various specification sections to ensure an efficient and orderly sequence of interdependent construction elements.
B. Contractor shall be responsible for giving each subcontractor a full set of Contract Documents and specifications for their use.

1.15 FIELD ENGINEERING AND FIELD MEASUREMENT VERIFICATION

A. The Contractor shall be responsible for verifying all field measurements and site conditions as they pertain to general layout and shop drawings adjacent to work area.
B. Contractor shall measure and inspect the existing elements and locations adjacent to
C. scope of work area. Notify the Architect/Engineer of any discrepancies or problems immediately.

D. Contractor shall contact Architect/Engineer immediately after uncovering any or all existing items which are included with this project for further inspection, prior to continuing any work.

E. Contractor shall verify location, dimensions, and conditions of area prior to start of work.

1.16 ARCHITECT/ENGINEER'S STATUS DURING CONSTRUCTION

A. OWNER'S Representative - The Architect/Engineer may act as the Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of the Architect/Engineer as the Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of the Owner and Architect/Engineer.

B. Visits to Sites

1. The Architect/Engineer will make visits to the site at intervals appropriate to the various stages of construction, as the Architect/Engineer deems necessary, in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of the Contractor's executed work. Based on information obtained during such visits and observations, the Architect/Engineer, for the benefit of Owner, will determine, in general, if the work is proceeding in a timely manner and according to the project schedule. The Architect/Engineer's efforts will be directed toward providing the Owner a greater degree of confidence that the completed work will conform generally to the Contract Documents. On the basis of such visits and observations, the Architect/Engineer will keep the Owner informed of the progress of the work and will endeavor to guard the Owner against defective work.
2. The Architect/Engineer's visits and observations are subject to all the limitations on the Architect/Engineer's authority and responsibility set forth in Article 9 - 9.9, and particularly, but without limitation, during or as a result of the Architect/Engineer's visits or observations of the Contractor's work, the Architect/Engineer will not supervise, direct, control, or have authority over or be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the Contractor to comply with laws and regulations applicable to the performance of the work.

C. Clarifications and Interpretations

1. The Architect/Engineer will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as the Architect/Engineer may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Documents. Such written clarifications and interpretation will be binding on the Owner and the Contractor. If the Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the contract price or contract times, or both, that should be allowed as a result of a written clarification or interpretations, a claim may be made therefore as provided in paragraph 1.13.

D. Authorized Variations in Work

1. The Architect/Engineer may authorize minor variations in the work from the requirements of the Contract Documents which do not involve an adjustment in the contract price or the contract times and are compatible with the design concept of the completed project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a field order and will be binding on the Owner and also on the Contractor, who shall perform the scope of work involved promptly. If the Owner and the Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the contract

price or contract times, or both, as a result of a Field Order, a claim may be made therefore as provided in paragraph 1.13.

E. Rejecting Defective Work
   1. The Architect/Engineer will recommend to the Owner that the Owner disapprove or reject work which the Architect/Engineer believes to be defective, or that the Architect/Engineer believes will not produce a completed project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed project as a functioning whole as indicated by the Contract Documents. The Architect/Engineer will also have authority to require special inspection or testing of any work, whether or not the work is fabricated, installed, or completed.

F. Determinations of Unit Price Work and Adjustment Prices:
   1. The Architect/Engineer may determine the actual quantities and classifications of unit price work and adjustment price work performed by the Contractor. The Architect/Engineer will review, with the Contractor, preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an application for payment or otherwise). The Architect/Engineer's written decision thereon will be final and binding (except as modified by the Architect/Engineer to reflect changed factual conditions or more accurate data) upon the Owner and the Contractor, subject to the provisions of paragraph 1.13.
   2. Prolonged scheduling causing additional fees for third-party testing shall be the responsibility of the Contractor. Any cost above this amount will be the responsibility of the Contractor and deducted from the final payment.

G. Decisions on Requirements of Contract Documents and Acceptability of Work
   1. The Owner or Architect/Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the work thereunder. Claims, disputes and other matters relating to the acceptability of the work, the quantities and classifications of unit price work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the scope of work, and claims seeking changes in the contract price or contract times will be referred initially to the Owner and Architect/Engineer in writing, in accordance with the provisions of paragraph 1.13, with a request for a formal decision.
   2. When functioning as interpreter and judge, the Architect/Engineer will not show partiality to the Owner or the Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by the Architect/Engineer with respect to any such claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided) will be a condition precedent to any exercise by the Owner or the Contractor of such rights or remedies as either may otherwise have under the contract documents or by laws or regulations in respect of any such claim, dispute, or other matter.

H. Limitations on Architect/Engineer's Authority and Responsibilities
   1. Neither the Architect/Engineer's authority or responsibility under Article 9 or under any other provision of the Contract Documents nor any decision made by the Architect/Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by the Architect/Engineer shall create, impose, or give to any duty in contract, tort, or impose, or otherwise owed by the Architect/Engineer to the Contractor, any subcontractor, any supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
   2. The Architect/Engineer will not supervise, direct, control or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the Contractor to comply with laws and regulations applicable to the performance of the scope of work. The Architect/Engineer will

not be responsible for the Contractor's failure to perform the Work in accordance with the Contract Documents.

3. The Architect/Engineer will not be responsible for the acts or omissions of Contractor or any subcontractor, any supplier, or of any other individual or entity performing any of the work.
4. The Architect/Engineer's review of the final application for payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required, will only be to determine generally that their content complies with the requirements of, and in the case of certificate of inspection, test, and approvals that the results certified indicate compliance with the Contract Documents.
5. The limitations upon authority and responsibility set forth in Article 9 - 9.9 shall also apply to the Architect/Engineer's consultants and assistants.

1.17 CHANGES IN THE WORK; CLAIMS

A. Authorized Changes in the Work
   1. Without invalidating the agreement and without notice to any surety, the Owner may, at any time or from time to time, order additions, deletions, or revisions in the work by a written amendment, a change order, or a work change directive. Upon receipt of any such document, Contractor shall promptly proceed with the work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
   2. If the Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the contract price or contract times, or both, that should be allowed as a result of a work change directive, a claim may be made therefore as provided in paragraph 1.13.

B. Unauthorized Changes in the Work
   1. The Contractor shall not be entitled to an increase in the contract price or an extension of the contract dates with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in the Contract Documents, except in the case of an emergency or in the case of uncovering work. In the case of uncovering work, where unexpected conditions are exposed, the Architect/Engineer is to be notified immediately and a request for time extension shall be submitted for additional time needed to remedy the situation.

C. Execution of Change Orders
   1. The Owner and Contractor shall execute appropriate change orders recommended by the Architect/Engineer (or written amendments) covering:
      1. Changes in the work which are:
         a. Ordered by Owner pursuant to paragraph 1.13 or
         b. Required because of acceptance of defective work or the Owner's correction of defective work, or
         c. Agreed to by the parties;
      2. Change in the contract price or contract dates, or both, which are agreed to by the parties, including any undisputed sum or amount of time for work actually performed in accordance with a work change directive; and
      3. Changes in the contract price or contract dates, or both, which embody the substance of any written decision rendered by the Architect/Engineer pursuant to paragraph 1.13; provided that, in lieu of executing any such change order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable laws and regulations, but during any such appeal, Contractor shall carry on the work and adhere to the progress schedule.

D. Notification to Surety

1. If notice of any change affecting the general scope of the work or the provisions of the Contract Documents (including, but not limited to, contract price or contract time) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be the Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

E. Claims and Disputes

1. *Notice:* Written notice stating the general nature of each claim, dispute, or other matter shall be delivered by the claimant to the Architect/Engineer and the other party to the contract promptly but in no event later than 10 days after the start of the event giving rise thereto. Notice of the amount or extent of the claim, dispute, or other matter with supporting data shall be delivered to the Architect/Engineer and the other party to the contract within 30 days after the start of the event (unless the Architect/Engineer allows additional time for claimant to submit additional or more accurate data in support of such claim, dispute, or other matter). A claim for an adjustment in contract price or time shall be prepared in accordance with the provisions of the Contract Documents. Each claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to the Architect/Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless the Architect/Engineer allows additional time).
2. The Architect/Engineer's Decision: The Architect/Engineer will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. The Architect/Engineer's written decision on such claim, dispute, or other matter will be final and binding upon the Owner and Contractor unless:
    a. An appeal from the Architect/Engineer's decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in the Contract Documents; or
    b. If no such dispute resolution procedures have been set forth, a written notice of intention to appeal from the Architect/Engineer's written decision is delivered by the Owner or Contractor to the other and to the Architect/Engineer within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after substantial Completion, whichever is later (unless otherwise agreed in writing by the Owner and Contractor), to exercise such rights or remedies as the appealing party may have with respect to such claim, dispute, or other matter in accordance with applicable laws and regulations.
3. If the Architect/Engineer does not render a formal decision in writing within the time stated in the Contract Documents, a decision denying the claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.
4. No claim for an adjustment in contract price or contract times (or milestones) will be valid if not submitted in accordance with this paragraph 1.13.

1.18 GENERAL INFORMATION

A. Notice Of Commencement/Notice Of Furnishing

1. This project is located on a publicly owned land. A lien cannot be recorded against a publicly owned property, no notice of commencement will be issued or recorded on this project.

1.19 LIQUIDATED DAMAGES

A. It is hereby understood and mutually agreed, between the Contractor and the Owner that the date of completion, as specified in the Proposal, is an essential condition of this Contract, and that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and prevailing industrial conditions.

B. The Contractor shall not be charged with liquidated damages or any excess cost when the Owner determines that the Contractor is without fault due to unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including but not restricted to acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and severe weather.

1.20 PRECONSTRUCTION AND PREINSTALLATION MEETINGS

A. The Architect/Engineer, while coordinating with the Owner, shall schedule a pre-construction meeting at the site after awarding the contract, after being in receipt of all required information, and prior to start of construction. Time and date of this meeting shall be established once the Contractor has submitted all the requested information.

B. When required by an individual specification section, a pre-installation meeting shall be held at the site prior to commencement of that scope of work. The Contractor shall notify Architect/Engineer a minimum of two (2) working days in advance of such meetings.

1.21 CONSTRUCTION SCHEDULE

A. Upon being awarded the contract, the Contractor shall present a Critical Path Construction Schedule. This schedule shall become part of the Contract Documents. The schedule shall identify all major categories of which shall include the following:
   1. Owner supplied items.
   2. Scope of work done by Owner's subcontractors and others.
   3. Start and completion dates.
   4. Lag times for noncritical activities.
   5. The dates required for submittals and shop drawing approval.
   6. The completion date of the project, noting allowance for weather delays.

B. This schedule shall be revised and updated on a monthly basis, or sooner, as required to incorporate changes in the project due to delays caused by weather, Change Orders, or other factors.

C. Time for extended general conditions shall not be approved unless adequately documented on this schedule.

D. Where the project continues beyond the punch list walk by the designated time, two (2) weeks unless specifically noted in the punch list, the Contractor shall be solely responsible for any and all fees, including but not limited to; architectural, engineering, professional, consulting, and any other costs to resolve the punch list item completion, beyond that date through the close out of the project. These fees shall be paid by being deducted from the total contract amount.

1.22 PROGRESS MEETINGS

A. Meetings shall be held at the site as determined by the Owner or Architect/Engineer. Time and day of the meetings shall be decided after awarding the contract. It shall be a weekday mutually agreeable to all parties. Any information to be distributed at the meeting shall be provided in sets and or copies of six (6).

B. The Architect/Engineer shall take minutes of the meetings and distribute copies to Owner, Contractor, and other attendees. Contractor shall be responsible for distributing pertinent information to any person (associated) subcontracted or with them.
C. Contractor shall have the job superintendent at these meetings, and subcontractors as deemed necessary.

1.23 CUTTING AND PATCHING

A. Contractor shall obtain written directions or Contract Documents from the Architect/Engineer prior to cutting. Holes may only be drilled in structural members in areas specifically noted on Contract Documents.
B. All holes cut in concrete, masonry walls, or floors shall be core drilled.
C. Contractor shall provide cutting and patching as required to do the following:
   1. Correct any defective work.
   2. Uncover and fix any defective work.
   3. Remove samples of installed work for testing.
   4. Provide openings in completed work for penetrations as needed.
D. If cutting and patching is for work done under a Change Order, the cost shall be part of the cost of that Change Order.
E. All patches shall be finished to match adjacent surfaces.

1.24 SUBMITTAL PROCEDURES

A. Submittals shall be made in a timely manner and in accordance with the construction schedule.
B. Submittals shall be sent with a transmittal noting the project, subcontractor, supplier, and the type of response needed.
C. Revise and re-submit submittals as required. Note changes made from prior submittals.
D. Keep one (1) copy of all approved submittals on-site and one (1) copy for inclusion in Project Manual.
E. Architect/Engineer shall review submittals within 10 working days from date of receipt. Contractor shall allow 25 working days for a complete review and approval process for each submittal. Priority shall be given to submittals coordinating with the Critical Path Schedule.
F. All work done for which submittals have been made and approved shall conform to the approved submittals and manufacturers' recommendations.
G. Shop drawings shall be governed by the following:
   1. The Contractor shall review all shop drawings provided by others and stamp each set, if in compliance, with the Contract Documents.
   2. Submit one (1) electronic and three (3) hard copy sets of blue or black line drawings of all required shop drawings to Architect/Engineer for review.
H. Architect/Engineer shall review shop drawings for compliance with design intent only. Contractor is responsible for coordinating scope of work on shop drawings with field conditions.
I. All shop drawings "approved as noted" shall be corrected and resubmitted to the Architect/Engineer as a record copy. Return one (1) corrected set to the Architect/Engineer and retain one for inclusion in the Project Manual.
J. Product literature and data.
   1. Submit one (1) electronic and three (3) sets of product literature, cut sheets, and specifications required by individual specification sections.
   2. Literature shall be from the manufacturers' catalogues or other printed literature and shall include the information to confirm that the product or material described conforms to the specifications for this project.

3. Product literature shall be specific regarding the conditions under which the product must be installed.
4. Include manufacturers' warranties in all submittals.

K. Electronic Submittals are permitted with the following stipulations.
1. One (1) electronic copy of the subject submittal shall be accepted for review.
2. The submittal must contain the Contractor's stamp and signature indicating that the transmitted information is in compliance with the Contract Documents.
3. Approval of the submittal shall not be given until the three (3) hard copy sets are received in the office of the Architect/Engineer.

L. Samples and Mock-ups:
1. Submit samples as required by the individual specification sections or at the request of the Owner or Architect/Engineer at no additional cost to the Owner.
2. Samples and mock-ups used for approval of the installation of material shall remain intact and visible during installation and shall be the standard by which the installation of that material is judged.
3. Samples of materials shall be kept in a protected area for reference throughout the duration of the project.

M. No substitutions may be made by the Contractor without written approval by the Owner or Architect/Engineer.

1.25 MANUFACTURER'S CERTIFICATES AND WARRANTIES

A. When called for in an individual specification section, submit certification by the manufacturer or supplier that the installed product is installed (and operating) in accordance with the manufacturer's specifications. Distribute two (2) copies of this certificate to the Architect/Engineer and keep one (1) copy for inclusion in each of the Project Manuals.

B. The Contractor warrants to the Owner that all workmanship by all trades involved and all materials provided shall be of the best quality. The Contractor shall correct any defective or rejected work prior to acceptance and warrants to the Owner that any defects in workmanship and materials occurring within one (1) year from final acceptance shall be corrected expeditiously at the Contractor's expense.

1.26 PREPARATION AND EXAMINATION

A. Clean all surfaces prior to applying next material.

B. Prepare all surfaces including priming, cleaning, and application of sealer or bonding agent as per manufacturer's written specifications.

C. Verify that existing site and substrate conditions are acceptable prior to starting subsequent scope of work. Beginning new scope of work is an implied acceptance of the existing conditions.

1.27 INSURANCE REQUIREMENTS

A. Prior to commencement of the scope of work, the Contractor shall obtain and provide all necessary insurance coverage verification as required by law, as well as for his sub-contractors. Contractor shall also provide copies or verification of such coverage to the Owner and Architect/Engineer. Coverage is to include Bodily Injury, Property Damage, Workman's Compensation, etc., as carried by an insurer in the State of Michigan. The Contractor assumes responsibility for all loss of material and tools, destruction of equipment and other machinery, and shall indemnify and hold harmless the Owner and Architect/Engineer against all claims arising out of the performance of this contract.

B. Minimum insurance limits shall be as follows:
1. Workmen's Compensation coverage as required by all applicable Federal, State, or other laws including employer's liability with a limit of at least $500,000.

2. Comprehensive General Liability including Subcontractor's liability, contingent liability, contractual liability, products, and completed operations, all on the occurrence basis with personal injury coverage and broad form property damage. Limits shall be at least the following.
   a. Each Occurrence $1,000,000
   b. General Aggregate $2,000,000
3. Comprehensive Automobile Liability, including non-ownership and hired car coverage as well as Owner's vehicles, with at least the following limits.
   a. Combined Single Limit $1,000,000
   b. Umbrella or excess liability coverage $1,000,000

C. Each subcontractor shall provide Proof of Insurance to the Contractor prior to commencement of scope of work. Insurance coverage shall remain in effect throughout the duration of the subcontractor's scope of work. Should a subcontractor's coverage expire, the subcontractor shall notify the Contractor, the Architect/Engineer, and the Owner thirty (30) days prior to expiration. The Owner or Contractor may insure the scope of work and deduct the costs from the subcontractor's contract amount.

D. Prior to any permit being issued, the above minimal insurance certificates must be presented to David Arthur Consultants, Inc. or Owner with the following stipulations:
1. The Owner and the Architect/Engineer named as additional insured and certificate holder.
2. No deductible.
3. Provide thirty (30) day notice of cancellation.

1.28 SITE OFFICE AND TEMPORARY SERVICES

A. It is at the Contractor's discretion to provide a temporary work trailer/office on-site. The location of such trailer shall be coordinated with the Architect/Engineer and the local governing agency. The Contractor shall be responsible for any and all permits required for the temporary trailer.

B. The Contractor shall provide temporary toilets with a weekly cleaning service contract. Use of facility owner toilet facilities is not permitted.

C. Contractor may use existing electrical service available on site. The Contractor shall provide any and all extension cords needed. The Contractor shall also be responsible for any blown fuses or other damage, which occurs by his use of the electrical services.

D. The Contractor shall be permitted to use the existing hydrants and water service.

E. Temporary heat in construction areas, if needed, shall be paid for by Contractor up to a point of receipt of a Temporary Certificate of Occupancy or at a time mutually agreed upon between the Owner and Contractor.

F. Contractor shall ensure that heat is maintained in work areas at a minimum of 50° F., to protect work requiring temperature control and to protect water piping.

G. Contractor shall provide weather tight enclosure(s) for work as required throughout course of project.

1.29 PROTECTION OF STORED AND INSTALLED WORK

A. Contractor is responsible for adequate protection of all installed work, not turned over to the Owner, including any existing or remaining items.

B. Installed work shall be protected from extreme heat and cold.

C. Traffic shall be prohibited on waterproofed surfaces.

D. Contractor is responsible for repairing damage to any installed work or existing items to remain.

E. Material shall be stored in a neat and orderly manner and adequately protected from damage.

1.30 PROGRESS CLEANING AND WASTE REMOVAL

A. Contractor shall provide dumpsters as needed for waste removal of all site debris and any of the Subcontractor's debris. Use of the Owner's existing dumpsters shall be prohibited.
B. Contractor shall keep the site and structures clean and free of debris at all times.
C. Debris shall be picked up and site cleaned daily. Surrounding work areas shall be broom cleaned daily and all debris removed.

1.31 STARTING SYSTEMS

A. Contractor to ensure that equipment is ready for operation prior to start-up.
B. Start-up shall be done by qualified technicians trained to install and operate the equipment.
C. Contractor shall provide reports as required by individual specification sections that equipment has been installed properly and is operating as designed.

1.32 PROCEDURES PRIOR TO SUBSTANTIAL COMPLETION

A. Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion.
    1. Advise Owner of pending insurance changeover requirements.
    2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
    3. Complete startup and testing of systems and equipment.
    4. Perform preventive maintenance on equipment used prior to Substantial Completion.
    5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings, if applicable.
    6. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
    7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
    8. Complete final cleaning requirements.
    9. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
    10. The Contractor shall have a designated time period to complete the punch list items and provide the required information noted above. If the project is not completed in this time period, refer to Section 1.18 above.

1.33 FINAL COMPLETION PROCEDURES

A. Before requesting final inspection for determining final completion, complete the following:
    1. Submit a final application for payment.
    2. Certified list of incomplete items: submit certified copy of architect's substantial completion inspection list of items to be completed or corrected (punch list), endorsed and dated by architect. Certified copy of the list will state that each item has been completed or otherwise resolved for acceptance.
    3. Certificate of insurance: submit evidence of final, continuing insurance coverage complying with insurance requirements.
B. Inspection: submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect/Engineer will either proceed with inspection or notify contractor of unfulfilled requirements. Architect/Engineer will

review a final certificate for payment after inspection or will notify contractor of construction that must be completed or corrected before certificate will be accepted for processing.

1. Request reinspection when the work identified in previous inspections as incomplete is completed or corrected.

1.34 PROJECT CLOSEOUT

A. The listing noted is a general list for overall project closeout. Refer to each specification section for closeout requirements.

B. Remove any temporary utilities and restore site and building to a finished condition.

C. Remove all construction debris and construction dumpsters from site.

D. Cleaning:

1. Wipe or spray down all walls, clean all doors, windows, appliances and restroom fixtures.
2. Broom clean and mop all hard surface floors.
3. Store all spare parts and maintenance materials as required by individual specification sections in areas as designated by Owner.

E. Ensure that all systems are functioning properly.

F. Demonstrate to Owner the operation and maintenance of all equipment.

G. Follow close-out procedures as specified in each specification section, if applicable, (After substantial completion prior to final payment.)

H. Contractor shall submit to Owner the Project Manual containing the following:

1. Copy of all bulletins, request for information, or clarification communication during the course of project.
2. Copy of all requisitions.
3. Copy of all Change Orders.
4. Copy of all approved submittals
5. Copy of all product literature, operation manuals, and maintenance schedules, if not already included with submittals.
6. Provide a list of all subcontractors, trades each provided, contact person and their phone numbers for each subcontractor.
7. Copies of warranties from all subcontractors and suppliers with contact information.
8. Copies of final lien waivers from all subcontractors.

I. Final Certificate of Occupancy, original, hard copy issued by governing agency.

J. Contractor is to supply Project Manual in electronic format. Submit three (3) discs/flash drives with folder designations.

END OF SECTION

SECTION 02 32 00: GEOTECHNICAL INVESTIGATIONS

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein, if necessary, and/or as shown per Contract Documents includes, but is not limited to, the following:

1. An investigation report by:
   Intertek Professional Services Industries, Inc.
   Project #03811381, dated 6.19.23, available upon request.
2. Geotechnical investigations, to determine the nature of subsoil conditions, have been made at various locations on the Project Site. Borings indicate only the subsoil conditions at the point where borings were made and samples were taken, and are not intended to indicate the subsoil conditions for the entire Project Site.
3. Data contained in the report and logs are not intended as representations or warranties of accuracy or continuity of such subsoil conditions between borings.
4. It is expressly understood that the Owner will not be responsible for interpretations or conclusions drawn there from by Bidders and the successful Bidder.
5. Additional borings and other explanatory operations may be made by the Contractor and shall be done at no additional expense to the Owner.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 REPORTS AND LOGS

A. The complete geotechnical report and logs are made available only for the convenience of the Bidders and the successful Bidder, upon request.

END OF SECTION

SECTION 02 41 13: SELECTIVE SITE DEMOLITION

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor, material, and equipment required to perform the scope of work described herein and/or as shown per Contract Documents:
   1. Extent of selective demolition work is shown on Contract Documents.
   2. Removal Scope of Work specified in other sections including cutting non-structural concrete floors.
   3. Contractor to call MISS DIG to have area flagged prior to start of any scope of work on the site.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 QUALITY ASSURANCE

A. Contractor qualifications: Contractors and subcontractors shall demonstrate not less than five (5) years successful experience in scope of work of similar character.
B. Requirements for regulatory agencies: comply with all applicable requirements, codes, and ordinances.

1.04 PROJECT CONDITIONS

A. Condition of structures: Owner or Engineer/Architect assumes no responsibility for actual condition of items or structures to be demolished.
B. Salvage items:
   1. Certain materials/products may be indicated to be reused, relocated, or retained for the Owner or use elsewhere in the project.
   2. Carefully remove, clean, protect, and store such items.
   3. Others are to be removed from the site.
   4. Turn over items to be removed but not reused or relocated to Owner and obtain receipt.
   5. Owner reserves the right to determine salvage rights of any item on site prior to the start of construction.
C. Partial demolition and removal:
   1. Items indicated to be removed but of salvageable value to Contractor shall be removed from structure as scope of work progresses.
   2. Remove salvaged items from site as they are removed.
   3. Any items, which may be considered as having historical value, be of local interest, or collectable value shall be turned over to the Owner.
D. Protections:
   1. Provide temporary barricades and other forms of protection as required to prevent injury to people during selective demolition.
   2. Provide interior bracing or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or scope of work to remain.
   3. Protect from damage existing finish work that is to remain in place.
   4. Protect floors with suitable coverings as necessary.
   5. Remove all temporary protections, bracing or supports at completion of scope of work.
E. Maintain fire protection measures during selective demolition operation.

F. Promptly repair damages caused to adjacent surfaces by demolition work at no cost to Owner.
G. Use of explosives shall not be permitted.
H. Utility services:
   1. Maintain existing utilities indicated to remain.
   2. Protect against damage during demolition operations.
I. Interruption of service(s) to be coordinated with and approved by Owner, minimum one (1) week prior to anticipated interruption.

PART 2: PRODUCTS

2.01 MATERIALS

A. Provide materials for selective demolition which shall result in equal or better work than the work being cut and patched in terms of performance characteristics and including visual effect where applicable. Comply with the requirements and use materials identical with the original materials where feasible and where recognized that satisfactory results can be produced thereby.

PART 3: EXECUTION

3.01 EXAMINATION

A. Prior to starting scope of work, inspect surrounding areas where selective demolition shall be performed. Photograph existing conditions including adjacent structure, related surfaces, finishes, and equipment, to record condition where selective demolition could cause damage, or where existing condition could be misconstrued as damage resulting from selective demolition work. Submit to the Engineer/Architect for record of existing conditions.

3.02 PREPARATION

A. Install interior bracing or supports as needed.
   1. Cease operations and notify the Engineer/Architect immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
B. Cover and protect finishes, equipment and fixtures to remain from soiling or damage when demolition work is performed in areas from which such items have not been removed.

3.03 DEMOLITION

A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Contract Documents in accordance with all governing regulations.
B. Where selective demolition terminates at construction to remain, uniformly terminate demolition to provide straight lines and smooth surfaces as required for selective demolition.
C. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
D. For interior slabs on grade, sidewalks, or other concrete flat-work, use removal methods that shall not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.
E. If unanticipated mechanical, electrical, or structural elements which conflict with intended function or design are encountered, notify the Engineer/Architect for further investigation and direction.
F. Employ only skilled tradesmen to perform selective demolition.

G. For cut work, use methods least likely to damage work to be retained and work adjoining.

H. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

I. Where selective demolition terminates at a surface, finish, or substrate to remain, completely remove all traces of material selectively demolished. Provide smooth, even substrate transition.

J. Where finishes are to be removed, completely remove related attaching materials such as nails, screws, anchors, adhesives, glues, brackets, or mounting hardware, etc. Do not damage supporting structure by removal.

3.04 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove debris, rubbish, and other materials from site as building demolition proceeds. Do not allow to accumulate.
   1. If hazardous materials are encountered during demolition operations, immediately stop work in the area affected and report the condition to Engineer/Architect immediately and in writing.
   2. If it is determined the hazardous materials are asbestos, PCB's, or other toxic substances, do no further work in the area until the materials are either removed or rendered harmless, and the area has been certified safe by appropriate authorities.

B. Burning of removed materials from selective demolition shall not be permitted on-site.

C. Legally transport debris, rubbish, and other materials resulting from selective demolition and legally dispose of off-site at licensed disposal facilities.

3.05 CLEAN-UP AND REPAIR

A. Upon completion of demolition scope of work, remove tools, equipment and demolished materials from site. Remove protections and leave all areas broom clean.

B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

C. Return adjacent areas to condition existing prior to the start of the scope of work.

END OF SECTION

SECTION 03 30 00: CAST-IN-PLACE CONCRETE

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and materials required to perform the Scope of Work described herein and/or as shown on the Contract Documents:
   1. Cast-in-place concrete.
   2. Formwork for cast-in-place concrete.
   3. Openings for other Scope of Work.
   4. Form accessories.
   5. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.
   6. Finishing and curing of horizontal and vertical concrete surfaces.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. Submit mix design for all structural concrete for review prior to pouring concrete.
B. Supply data from the manufacturer on the following products. Keep one (1) copy of all information on-site at all times.
   1. Admixtures.
   2. Anchors.
   3. Forming system.
   4. Releasing agents.
   5. Bonding agents.

1.04 QUALITY ASSURANCE

A. Construction and erection of formwork to comply with ACI 301 and ACI 318.
B. Concrete reinforcing to comply with ACI 301 and ACI 318.
C. Cast in place concrete work to comply with ACI 301 and ACI 318.
D. Sub grades are to be reviewed by a Engineer/Architect prior to pouring of any footings.
E. The amount of concrete testing shall be done at the discretion of the Owner and/or the Engineer/Architect.

1.05 DEFINITIONS

A. Exposed: Exposed to view by persons responsible for operation or maintenance of the structure.

PART 2: PRODUCTS

2.01 FORM MATERIALS

A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of form marks.

1. Plywood: U.S. Product Standard PS-1, B-B (Concrete Form) Plywood, Class I, Exterior Grade or better, mill-oiled, and edge-sealed, with each piece bearing a legible inspection trademark.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two (2) edges and one (1) side for tight fit.

C. Forms for Cylindrical Columns and Supports: Metal, fiberglass reinforced plastic, or paper or fiber tubes. Paper or fiber tubes constructed of laminated plies using water-resistant adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist loads imposed by wet concrete without deformation.

D. Earth Forms: May be used for unexposed surfaces only, confirm locations with Engineer/Architect prior to pouring.

E. Form Ties: Factory fabricated removable or snap-off metal type, designed to prevent form deflection and to prevent spalling concrete upon removal. Units to leave no metal closer than 1" to surface.

F. Form Release Agent:
1. Colorless mineral oil, which will not stain concrete, absorb moisture, or impair natural bonding, or color characteristics of coating intended for use on concrete including curing compound, sealer, or waterproofing.
2. Sonneborn Cast-Off WB or acceptable alternate conforming to ASTM C 309, Type-1 Class A or B, or acceptable alternate.

G. Formed construction joints for slabs on grade to be extruded plastic type, including tongue and groove profile.

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade, deformed billet steel bars, unfinished. Or ASTM A996, 60 ksi yield grade, deformed rail steel bars, unfinished.

B. Welded Wire Fabric: ASTM A185, Plain wire, in sheet form. Rolled fabric not permitted.

C. Joint dowel bars: plain steel bars, ASTM A 615. Grade 60. Cut bars true to length with ends square and free of burrs.

D. Chairs, bolsters, bar supports, and spacers to be steel and be of shape and sizes as required for proper support of reinforcing. For slabs on grade use supports with sand.

2.03 CONCRETE MATERIALS AND ADMIXTURES

A. Cement: ASTM C150, Type I - Normal Portland type.

B. Fine and Coarse Aggregates: ASTM C33 (normal weight aggregate). Materials containing deleterious substances (spalling causing) are not acceptable.

C. Water: Clean, potable, and not detrimental to concrete.

D. Air Entrainment: ASTM C260. Master Builders Micro-Air, or acceptable alternate.

E. Chemical: ASTM C494 with the admixture types as follows. Type A - water reducing; Type B – retarding; Type 0 - water reducing and retarding; Type F - water reducing, high range; Type G - water reducing, high range, and retarding. containing no chlorides, Master Builders, W.R. Grace, or acceptable alternate.

F. Fly Ash: ASTM C618 Class F or C with loss on ignition less than 3%.

2.04 CURING MATERIALS

A. Membrane Curing Compound: ASTM C309, Type 1-0, Class B, and clear with fugitive dye which disappears approximately 24 hours after exposure to sunlight; Spray-Cure Safe Cure Clear, Euclid Chemical Company Kurez, Sonneborn Kure-N-

Seal, or acceptable alternate. Curing compound shall be compatible with coatings which are to be applied to the concrete surface.

B. Absorptive Mats: Burlap-polyethylene, minimum 8-oz/sq. yd. bonded to prevent separation during handling and placing.

C. Water: Potable, not detrimental to concrete.

2.05 ACCESSORIES

A. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing, and plasticizing agents. Capable of developing minimum compressive strength of 5,000 psi in 28 days. Master Builders Masterflow 713, or acceptable alternate.

B. Epoxy Grout: Two (2) component epoxy resin bonding system capable of developing a minimum bond strength of 1,100 psi in 48 hours. ASTM C881 Type IV, Grade 3, Class B and C; Euclid Chemical Company EUCO 452 GEL, or acceptable alternate.

C. Joint Filler Type A: ASTM D994. Asphalt impregnated fiberboard or felt, W.R. Meadows Asphalt Joint; or acceptable alternate.

D. Joint Filler Type B: ASTM D1752, pre-molded sponge rubber fully compressible with recovery rate of minimum 95%. W.R. Meadows Sponge Rubber or acceptable alternate.

E. Slab edge joint filler to be a pre-molded asphaltic board, ½" thick.

F. Vapor retarder to be 6-mil polyethylene, type recommended for below grade application.

G. Drypack: One (1) part Portland cement to two (2) parts damp sand with 0.0" slump.

H. Add only the necessary amount of water to mix:
   1. Bonding agent: Acrylic or styrene butadiene.
   2. Euclid Chemical Company, "SBR Latex".
   3. Sonneborn-Rexnord, "Sonocrete".

2.06 CONCRETE MIX

A. Concrete Proportions: Comply with ACI 301, 4.2.3.

B. Class I Concrete: Provide concrete to the following criteria:
   1. Compressive Strength (7 day): 3,200 psi.
   2. Compressive Strength (28 day): 4,000 psi.
   3. Water/Cement Ratio (maximum): 0.50 by weight.
   4. Air Entrained: 6%; ± 1%.
   5. Fly Ash Content: Maximum 25% of cement content.
   6. Slump (maximum): 3" (due to water).
   7. High Range Water Reducer: Add at site to increase slump to 6"; ± 1 ½".

C. Class II Concrete: Provide concrete to the following criteria:
   1. Compressive Strength (28 day): 3,000 psi.
   2. Fly Ash Content: Maximum 25% of cement content.
   3. Slump (maximum): 6".
   4. Water/Cement Ratio (maximum): 0.50 by weight.

D. Mudmat Concrete: Provide concrete to the following criteria:
   1. Compressive Strength (28 day): 1,000 psi.

E. All entrainment for concrete exposed to the exterior to be 5 – 7 %.

PART 3: EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Prior to forming footings or preparation of slabs, verify that sub-grades are stable and able to support design loads.

B. Ensure that subgrades are free of standing water and are not frozen. **Pouring of concrete underwater is prohibited**.
C. Ensure that all footings and slab areas are properly de-watered prior to pouring.
D. Ensure proper inspections, tests, and approvals are given on piping, conduits, and other utilities that are to be encased in or covered up by concrete prior to pouring.
E. Ensure any existing concrete being poured against has been cleaned and prepared, including application of any bonding agent, prior to pouring.

3.02 FORMWORK ERECTION

A. Align joints and make watertight.
B. Coordinate with scope of work of other sections in forming and placing openings, recesses, sleeves, bolts, anchors, other inserts, and components of other scope of work.
C. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.
A. Provide chamfer strips on all external corners, and on other edges as indicated.
B. Apply releasing agent to concrete forms in accordance with manufacturers' recommendations.
    1. Do not use releasing agents on forms where finishes will be applied that are not compatible with the releasing agent.
C. Clean all forms of foreign matter before erecting.

3.03 PLACEMENT OF REINFORCEMENT

A. Place, support, and secure reinforcement against displacement. Do not deviate from required position.
B. Unless noted otherwise, maintain concrete cover for reinforcement as follows:
    1. Column ties and beam stirrups at 1½".
    2. Footings and concrete formed against earth at 3".
    3. Slabs on fill at 1½".
    4. All other at 2".
C. Lap splices and development lengths to be in accordance with industry standards, and ACI requirements.
D. Do not field cut reinforcement without Engineer/Architect's permission.
E. Ensure that reinforcement is clean and free of scaling, rust, dirt, oil, and other foreign matters.

3.04 GENERAL

A. Use Class-I concrete for structural concrete footings, concrete pavements, and equipment bases. Use Class-II concrete for floor slabs, reinforced concrete walls, sidewalks, and where indicated.
B. Install vapor retarder under interior building slabs on grade. Lap joints should be a minimum of 6" and sealed watertight by taping edges and ends.
C. Cut contraction joints within 12 hours after placement of concrete. Cut 1/4 depth of the slab thickness. Locate joints as shown or as coordinated with the Engineer/Architect.
D. When floor contains sumps, gutters, or floor drains, slope concrete for positive drainage.
E. Provide 3" thick mudmats under all foundations and base slabs as noted.
F. Construct isolation joints in slabs on grade at points of contact between slabs on grade and vertical surfaces such as column pedestals, foundation walls, or as indicated. Use joint filler and sealant as specified.
G. Verify construction joints, waterstop, and reinforcement are acceptable.

H. Provide formed or sleeved openings where required for scope of work to be embedded in or passing through concrete members. Ensure that these openings do not violate structural requirements of the member.

3.05 PLACING CONCRETE

A. When Class-I concrete arrives at the project with slump below 3", water may be added only if neither the maximum permissible water-cement ratio nor the maximum slump is exceeded. Slump adjustment, with water, shall be made only one (1) time.
B. Placement of concrete under water is not permitted.
C. Advise the designated testing agency not less than 24 hours before operations to allow for completion of quality tests.
D. Place concrete in accordance with ACI 301-10.
E. Do not place any concrete until all inspections required by the building departments, and the Engineer/Architect, have been made and approval given to pour.
F. Provide proper protection of poured concrete from heat if over 90 ºF, from freezing, and from rain or groundwater.
G. Poured concrete is to be protected from freezing for 48 hours after pouring.
H. If concrete is being poured against previously poured concrete, thoroughly clean with wire brush and apply bonding agent before pouring. Apply bonding agent in accordance with manufacturer's recommendations.
I. Separate slabs on grade from vertical surfaces with ½" thick joint filler flush with bottom of slab and ¼" from top of slab. Install sealant where noted.
J. Where new concrete is doweled or pinned to old concrete, drill hole in existing concrete, insert steel dowels or pins, pack with non-shrink grout or epoxy prior to pouring new concrete.
K. Screed all floors level unless noted to pitch to drain.
L. Coordinate placement of waterproofing with those trades.
M. Ensure that concrete is properly vibrated to prevent honeycomb or other voids.
N. Control and expansion joints in flat work.
O. Exterior Walks:
    1. Place expansion joints at perimeter where abutting other structures or appurtenances.
    2. Place expansion joints at approximately 20' o.c. for field joints or lengths of walks for 4" slabs.
    3. Provide control joints at approximately 5' o.c. for 4" slabs, or as noted on Contract Documents.
P. Interior:
    1. Control (contraction) joints to be coordinated with Engineer/Architect.
    2. Provide expansion joints where noted on Contract Documents.
Q. All expansion joints to be filled with sealant, unless noted otherwise.

3.06 CONCRETE FINISHING

A. Concrete Floor Surfaces: ACI 301, 5.3.4.2., troweled finish.
    1. Maximum Variation of Surface Flatness for Exposed Concrete Floors: 1/8" in 10' or ¼" maximum difference between any two (2) points.
B. Concrete Surfaces Not Exposed: ACI 301, 5.3.3.3.a, rough form finish.
C. Exposed Formed Surfaces: ACI 301, 5.3.3.4.b, grout cleaned finish.
D. Exterior Traffic Surfaces: ACI 301, 5.3.4.2.d, broom finish.
E. At areas with floor drains, maintain a level slab at walls and slope from walls to drain. Slope at 1/8" per foot unless otherwise noted.
F. Confirm finish with any coating and manufacturer's recommendations.

3.07 CURING

A. Horizontal Surfaces: Cure floor surfaces in accordance with ACI 301 using any of the following accepted procedures:
B. Spraying: Spray water over floor slab areas and maintain wet for seven (7) days.
C. Absorptive Mat: Saturate lap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides. Maintain in place for seven (7) days.
D. Membrane Curing Compound: Pavement, walks, and curbs only.
E. Vertical Surfaces: Cure surfaces using the following accepted procedure.
   1. Formwork: Keep forms in place for seven (7) days.
F. Protect concrete from premature drying immediately after pouring.

3.08 FORM REMOVAL

A. Do not remove forms until concrete has set sufficiently to carry its own weight and imposed loads.
B. Do not remove forms in hot or cold weather until proper protection is in place to keep concrete from curing too fast or freezing.
C. Remove formwork in a way that complies with all codes.
D. Remove formwork in a way that does not damage concrete surfaces.

3.09 QUALITY CONTROL

A. Each wall shall be plumb to within 1/8” per 8’ of length.
B. Each wall shall be straight to within ¼” per 10’ of length.
C. All floors shall be level to within ¼” per 20’ of length.
D. All floors shall be true to within ¼” per 10’ of length.
E. The following inspections are required in addition to those required by the building department.
   1. Layout of footings prior to pouring, after forms and reinforcing are in place.
   2. Layout of building lines on footing prior to setting of walls forms.
   3. Reinforcing steel prior to closing of forms.
   4. Level top of forms prior to pouring.
   5. Review of insulation and waterproofing under slabs.
F. Concrete tests are required for each pour. Provide four (4) test cylinders for pours up to 50 yards. Leave one (1) cylinder on the site protected in same manner that other concrete is protected. Take one (1) slump test for each set of cylinders taken.
G. Contractor to contact Owner and Engineer/Architect three (3) days prior to any concrete pour to allow inspection scheduling.
   a. Concrete pour will not be allowed if Owner and Engineer/Architect are not contacted per above requirements.

3.10 DEFECTIVE CONCRETE

A. Modify or replace as required by the Owner or Engineer/Architect all concrete that does not comply with drawings, specifications, and details noted herein or on the Contract Documents. Contractor shall bear all direct and associated cost of this replacement.

END OF SECTION

SECTION 04 20 00: UNIT MASONRY

PART 1: GENERAL

1.01 SUMMARY

A. Scope in this section includes providing all labor and material required to perform the scope of work described herein and/or as shown per Contract Documents.
   1. Concrete masonry units.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 REFERENCES

A. ASTM A82 – Spec. for Cold Drawn Steel Wire
B. ASTM A153 – Class B-2, Spec. Zinc Coating (Hot Dip) on iron and Steel Hardware (Canada same).
C. ASTM A167 – Spec. for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
D. ASTM 580 – Spec. for Stainless Steel Wire.
E. ASTM C144 – Spec. for Aggregate for Masonry (Canada – A179-94).
F. ASTM C150 – Spec. for Portland Cement.
G. ASTM E2010 and NFPA 257 – Fire Test of Window Assemblies (equivalent to UL 9 and CAN 4-S106-M80).
H. ASTM C207 – Spec. for Hydrated Lime for Masonry Purposes (Canada same).
I. ASTM C270 – Spec. for Mortar for Unit Masonry (Canada – A179-94).
J. ASTM D1187 – Type II-Spec. for Asphalt-Base Emulsions (For Metal Surfaces).
K. ASTM D1227 – Type II-Spec. for Emulsified Asphalt (For Porous Surfaces).
L. ASTM A123 – Zinc (Hot-Dip Galvanized) coatings on Iron and Steel Products.
M. ASTM A167 – Stainless and Heat-Resisting chromium-Nickel Steel Plate.
N. ASTM A525 – Steel Sheet, Zinc Coated, Galvanized by the Hot-Dip Process.
O. ASTM A580 – Stainless and Heat-Resisting Steel Wire.
P. ANSI/ ASTM A82 – Cold-Drawn Steel Wire for Concrete Reinforcement.
Q. ASTM C90 – Hollow Load Bearing Concrete Masonry Units.
R. IMIAC – International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction
S. UL – Underwriters' Laboratories

1.04 SUBMITTALS

A. Product data for each different masonry unit, accessory, and other manufactured product specified.
B. See Contract Documents for reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement.
C. Samples for initial selection of the following:
   1. Unit masonry samples in 2 full-scale forms showing the full range of colors and textures available for each different exposed masonry unit required and dimensions to be expected in the completed construction.
   2. Colored-masonry mortar: 2-4" samples showing the full range of colors available.
D. Material certificates, signed by manufacturer and Contractor, certifying that each material complies with requirements for all of the following:

1. Each different type of masonry block including style and size.
2. Each different cement product required for mortar and grout, including the name of the manufacturer, brand, type, and weight slips at the time of delivery.
3. Each material and grade indicated for reinforcing bars.
4. Each type and size of joint reinforcement.
5. Each type and size of anchors, ties, and metal accessories.

E. Supply data from the manufacturer for all types of mortar used.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not install until they are in an air-dried condition, and the material moisture content is within manufacturers' requirements.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.06 PROJECT CONDITIONS

A. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three (3) days after building masonry walls.

C. Stain prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that comes into contact with such masonry.
1. Protect the base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of door frames, and any other products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

D. Hot –Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100º F (38º C) and above.

E. Coordinate the masonry work with installation of door anchors.

PART 2: PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Manufacturers:
1. Tri-County Block & Brick, Swanton, Ohio, 419-826-7060 or acceptable alternate.

B. Provide shapes indicated and as follows for each form of concrete masonry unit required.
1. Provide special shapes for lintels, corners, jambs, control joints, headers, bonding, and other special conditions as noted per Contract Documents.
2. Provide square-edged units for outside corners, except where indicated as bull nose.

C. Concrete Masonry Units: ASTM C 90 and as follows:
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength as indicated below:
   a. 1500 psi (10.3 MPa). Not less than the units' compressive strength required to produce concrete unit masonry construction of compressive strength indicated.
2. Weight Classification: Medium weight.
3. Provide Type I, moisture-controlled units.
4. Size: Manufactured to the actual dimensions listed below (within tolerances specified in the applicable referenced ASTM specification) for the corresponding nominal sizes indicated per Contract Documents:
   a. 6" (150 mm) nominal: 5-5/8" (143 mm) actual.
5. Non-exposed faces and faces exposed to interior only: Manufacturer's standard texture, unless otherwise indicated.
6. Exterior faces: Manufacturer's standard smooth face, unless otherwise indicated.
7. Provide Type I, moisture-controlled units.
   a. All colors to be selected by Owner.

2.02 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color selected by Owner.

B. Masonry Cement: ASTM C 91. For pigmented mortars, use premixed, colored masonry cements of formulation required to produce color indicated, or if not indicated, as selected from manufacturer's standard formulations. Pigments shall not exceed 5% of masonry cement by weight for mineral oxides nor 1% for carbon black.

C. Mortar Cement: Commercial Industry Standard. For pigmented mortars, use premixed, colored mortar cements of formulation required to produce color indicated, or if not indicated, as selected from manufacturer's standard formulations. Pigments shall not exceed 5% of mortar cement by weight for mineral oxides nor 1% for carbon black.

D. Hydrated Lime: ASTM C 207, Type S.

E. Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207. For pigmented mortars use colored Portland cement-lime mix of formulation required to produce color indicated, or if not indicated, as selected from manufacturer's standard formulations. Pigments shall not exceed 10% of Portland cement by weight for mineral oxides nor 2% for carbon black.

F. Aggregate for Mortar: ASTM C 144; except for joints less than ¼" (6.5 mm), use aggregate graded with 100% passing the No. 16 (1.18 mm) sieve.

G. Aggregate for grout: ASTM C 404.

H. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this Article; combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.

I. Epoxy Pointing mortar: ASTM C 395, epoxy-resin-based material formulated for use as pointing mortar for, and approved by manufacturer of, structural clay tile facing units; in color indicated or, if not otherwise indicated, as selected by Owner or Engineer/Architect from manufacturer's standard colors.

J. Cold-weather admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.

K. Water: Potable.

L. Color: Standard grey.

2.03 REINFORCING STEEL

A. Steel Reinforcing Bars with material and grade as follows:
   1. Billet steel complying with ASTM A 615 (ASTM A 615M).
   2. Grade 60.
B. Deformed Reinforcing wire: ASTM A 496, with ASTM A 153, Class B-2 zinc coating:
   1. Welded-Wire Fabric: ASTM A 185.

2.04 TIES AND ANCHORS, GENERAL

A. Provide ties and anchors specified in subsequent articles that comply with requirements for metal and size of this article, unless otherwise indicated.

2.05 MASONRY CLEANERS

A. Job-mixed detergent solution. Solution of ½-cup (0.14-L) dry measure tetra sodium polyphosphate and ½-cup (0.14-L) dry measure laundry detergent dissolved in 1-gallon (4 L) of water.
B. Cleaning agent as recommended by brick or block manufacturer to ensure no harm to exterior surfaces.

2.06 MORTAR AND GROUT MIXES

A. Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated and previously approved by the architect/engineer.
   1. Do not use calcium chloride in mortar or grout.
   2. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, in order to ensure that mortar color is consistent.
B. Mortar for unit masonry:
   1. Comply with ASTM C 270, Proportion Specification, for types of mortar indicated below.
   2. Comply with ASTM C 270, Proportion Specification, for job-mixed mortar; and ASTM C 1142 for ready-mixed mortar, of types indicated below.
   3. Comply with ASTM C 270, Property Specification, for job-mixed mortar; and ASTM C 1142 for ready-mixed mortar, of types indicated below…repeat
   4. Comply with MBC-Section 2103 for Mortar Cement types indicated below.
   5. Comply with BIA M1, Proportion Specification, for types of mortar indicated below:
      a. Limit cementitious materials in mortar to Portland cement and lime.
      b. Limit cementitious materials in mortar for exterior use to Portland cement and lime.
      c. For masonry below grade in contact with earth and where indicated, use type indicated below:
         1) Type S
      d. For reinforced masonry and where indicated, use type indicated below:
         1) Type S
      e. For exterior above grade, load-bearing and non load-bearing walls and parapet walls; for interior load-bearing walls; for interior non load-bearing partitions, and for other applications where another type is not indicated, use type indicated below:
         1) Type N or RN
C. Grout for Unit Masonry:
   1. Use fine grout for all applications.

2. Strength: 3000 PSI @ 28 days
3. Slump: 7.8”
4. Thoroughly mix ingredients in quantities needed for immediate use in accordance with ASTM C476 fine grout.

D. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer’s directions.

2.07 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35%; formulated from neoprene urethane or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

PART 3: EXECUTION

3.01 EXAMINATION & PREPORATION

A. The Engineer/Architect shall examine conditions with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of unit masonry. Do not proceed with installation until inspected by architect/engineer and all unsatisfactory conditions have been corrected.

B. Pre-installation meeting: The Masonry Contractor shall notify the Engineer/Architect two (2) days prior to the start of installation of any masonry or grout to review all details and to coordinate the intent of any and all scope of work.

C. Apply bonding agents where required prior to start of instillation.

D. Brace masonry for wet grout pressure.

3.02 GENERAL INSTALLATION

A. Thickness: Build single-wythe walls to the actual thickness of the masonry units, using the units of thickness indicated.

B. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting, where possible. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Install all materials in accordance with manufacturer recommendations.

D. Do not displace reinforcing while placing grout.

3.03 CONSTRUCTION TOLERANCES

A. Variation from plumb: For vertical lines and surfaces of columns and walls, do not exceed 1/8” in 8’. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/8” in 8’. For vertical alignment of head joints, do not exceed plus or minus 1/8” in 10’ (6 mm in 3 m). ¼” per story non-cumulative

B. Variation from level: for bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/8” in 20’ nor ¼” in 40’. For top surface of bearing walls, do not exceed 1/8” in 10’ nor 1/16” within width of a single unit, nor 1/32 inch between units.

C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls, and partitions, do not exceed ¼" in 10'.
D. Variation in Cross-sectional Dimensions: For columns and thickness of walls, from dimensions shown per Contract Documents, do not exceed 1/8".
E. Variations in Mortar-joint Thickness: Do not vary from bed-joint thickness indicated by more than plus or minus 1/8" with a maximum thickness limited to ½". Do not vary bed-joint thickness from bed-joint thickness of adjacent course by more than 1/8" (3 mm). Do not vary from head-joint thickness indicated by more than plus or minus 1/8" (3 mm). Do not vary head-joint thickness from adjacent head-joint thickness by more than 1/8" (3 mm). Do not vary from collar-joint thickness indicated by more than minus 1/8" (3 mm) or plus ¼" (6 mm).

3.04 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible, at other locations.
B. Lay walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.
C. Lay exposed masonry in a ½-lap running bond pattern; do not use units with less than nominal 4" (100 mm) horizontal face dimensions at corners or jambs.
D. Stopping and resuming work: in each course, rack back ½-unit length of 1/2 running bond or 1/3-unit length for 1/3 running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar prior to laying fresh masonry.
E. Fill spaces between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
F. Fill all cores in hollow concrete masonry units with grout.
G. Remove excess mortar as work progresses.

3.05 MORTAR BEDDING AND JOINTING

A. Lay masonry units as follows:
   1. With full mortar coverage on horizontal and vertical face shells.
   2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and where adjacent to cells or cavities to be filled with grout.
   3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
   4. Maintain joint widths indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with 3/8" (10 mm) joints.
B. Tool exposed joints to obtain a concave finish.

3.06 CONTROL AND EXPANSION JOINTS

A. Install control and expansion joints in unit masonry where indicated. Build-in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
B. Form control joints in concrete masonry as follows:
   1. Install preformed control-joint gaskets designed to fit standard sash block.

3.07 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units; install in fresh mortar or grout, pointed to eliminate evidence of replacement. Replace block noted with solid block where no rebar is present. Where rebar is present install hollow core block and grout fill.

B. Pointing: During the tooling of joints, enlarge voids and holes, and completely fill with mortar. Point-up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for application of sealants.

C. In progress cleaning: clean unit masonry as work progresses by dry brushing to remove mortar fins and smears prior to tooling joints.

D. Final cleaning: after mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample wall panel; leave 1/2 of panel unclean for comparison purposes.
   3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
   4. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
   5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain present on exposed surfaces.
   6. Protection: Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at time of substantial completion.

3.08 MASONRY WASTE DISPOSAL

A. Recycling undamaged, excess, masonry materials are the Contractor's property and shall be removed from the project site for his use.

B. Where approved by Engineer/Architect disposal as Fill Material: Dispose of clean masonry waste, including broken masonry units, waste mortar, and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed:
   1. Crush masonry waste to less than 4" (100 mm) in greatest dimension.
   2. Mix masonry waste with a least 2 parts specified fill material for each part masonry waste.
   3. Do not dispose of masonry waste as fill within 18" (450 mm) of finished grade or 12" of top of subbase.

C. Excess Masonry Waste: Remove excess, clean masonry waste that cannot be used as fill, as described above, and other masonry waste and legally dispose of off Owner's property.

3.09 PROTECTION OF FINISHED WORK

A. Protect all installed work during installation and throughout construction.

B. Provide temporary protective measures as needed throughout construction which will not damage or effect completed work.

END OF SECTION

SECTION 04 73 00 – MANUFACTURED STONE VENEER (WAINSCOT)

PART 1 – GENERAL

1.1 SUMMARY

- Section includes adhered manufactured stone veneer (AMSV) for exterior wainscot applications.
- Related Sections:
  - 07 25 00 – Weather Barriers
  - 07 62 00 – Sheet Metal Flashing and Trim

1.2 REFERENCES

- ASTM C1670 – Specification for Adhered Manufactured Stone Masonry Veneer Units
- ASTM C1780 – Installation of Adhered Manufactured Stone Masonry Veneer
- ICC-ES AC51 – Acceptance Criteria for AMSV
- ASTM C270 – Mortar for Unit Masonry

1.3 SUBMITTALS

- Product Data: Manufacturer's specifications and installation instructions.
- Samples: Minimum 2 units of each stone type and color.
- Certificates: Compliance with ASTM and ICC-ES standards.

1.4 QUALITY ASSURANCE

- Installer Qualifications: Minimum 5 years experience with AMSV installations.
- Mock-Up: Provide 4 sq. ft. sample panel for approval.

1.5 DELIVERY, STORAGE, AND HANDLING

- Store units on pallets, protected from moisture and contamination.

PART 2 – PRODUCTS

2.1 MANUFACTURED STONE VENEER

- Manufacturer: Cultured Stone® or approved equal.
- Physical Properties:
  - Compressive Strength: ≥ 1,800 psi
  - Shear Bond Strength: ≥ 50 psi
  - Freeze-Thaw Resistance: < 3% mass loss
  - Unit Weight: ≤ 15 lbs/sq. ft.
- Cultured Stone Platinum Pro-Fit Ledgestone (PF-8017), matching sill stones and sloped pier cap.

2.2 ACCESSORIES

- Mortar: ASTM C270 Type N or S.
- Metal Lath: 2.5 lb/yd² galvanized expanded metal.
- Water-Resistive Barrier: Two layers Grade D paper or equivalent.
- Fasteners: Corrosion-resistant nails or screws.
- Flashing: Galvanized or stainless steel per Section 07 62 00.

PART 3 – EXECUTION

3.1 EXAMINATION

- Verify substrates are clean, dry, and structurally sound.

3.2 PREPARATION

- Install WRB and flashing at base and transitions.
- Attach metal lath over WRB; apply scratch coat minimum ½" thick.

3.3 INSTALLATION

- Apply mortar to back of stone and substrate for full coverage.
- Maintain ½" joints unless dry-stack style specified.
- Install wainscot cap or ledge stone at top for water shedding.
- Provide weep screed at base for drainage.

3.4 CLEANING AND PROTECTION

- Clean excess mortar; protect finished work from damage until acceptance.

END OF SECTION

SECTION 05 12 00: STRUCTURAL STEEL FRAMING

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein and/or as shown per Contract Documents:
   1. Structural steel and all accessories.
   2. Miscellaneous steel.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.
B. Cast-In-Place Concrete, Section 03 30 00
C. Masonry, Section 04 20 00

1.03 SUBMITTALS

A. Supply data from the manufacturer on the following products:
   1. Bolts.
   2. Welding Rods.
   3. Steel primer paint & galvanizing.
B. Provide Shop Drawings and erection plans for review and approval on all structural steel. These Shop Drawings are to be prepared by a licensed Structural Engineer. Field verify all dimensions prior to preparation of Shop Drawings.
C. Provide AWS Certification for all welders. Welders must satisfy the requirements of the ANSI/AWS D1.1 Structural Welding Code-Steel, Chapter 5, Qualification.
D. Product Data: Submit producer's or manufacturer's specifications and installation instructions.
E. Shop Drawings: Submit Shop Drawings prepared under supervision of Registered Professional Engineer. Include complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams:
F. Show framing layout, dimensions, connections with adjoining materials and construction, finishes, welds, bolts and fasteners, anchoring, and all fabrications and erection accessories required.
G. Include details of cuts, splices, camber, holes and other pertinent data.
H. Verify all dimensions and correlate with adjoining construction and materials. Indicate size, type and grade of all members.
I. Reference each Shop Drawings detail to applicable details per Construction Drawings.
J. Indicate welds by standard AWS A 2.4 symbols, distinguishing between shop and field welds, and show size, length and type of each weld.
K. Indicate type, size and length of bolts, distinguishing between shop and field bolts. Identify high strength bolted slip-critical, direct tension or tensioned shear/bearing connections.
L. Submit detailed calculations prepared by Registered Professional Engineer with signature and seal supporting design of connections not shown per Construction Drawings if requested.
M. Indicate members to receive shop finishing including type of preparation, type of prime painting, and galvanizing.
N. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed by others.

O. Mill Test Reports: Submit Mill Test Reports signed by manufacturer(s) certifying that their products comply with requirements. Include test reports for:
   1. Structural steel (each type), including chemical and physical properties:
      a. Bolts (each type), nuts and washers including mechanical properties and chemical analysis.
      b. Shrink-resistant grout under plates.
      c. Structural steel primer paints.

P. Welder Certificates: Submit welder certificates signed by Contractor certifying that welders comply with specified AWS "Qualification" requirements.

Q. Quality Control Test Reports: Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of tests conducted and test results.

R. Qualification Data: Submit written information to establish Fabricator and Installer qualifications, demonstrating capabilities and experience. Include list of completed projects with project names, addresses, names of Engineer/Architect/s and Owner/s, and other information as required.

1.04 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with the latest editions of the following:
   1. AISC: Specifications for Structural Steel Buildings- Allowable Stress Design and Plastic Design.

B. Provide AWS certification for all welders.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver structural steel to project site in such quantities and at such times to ensure continuity of installation.

B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
   1. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.
   2. Cover and protect all materials from rain and moisture.

PART 2: PRODUCTS

2.01 MATERIALS (Refer also to Structural Drawings and notes.)

A. Structural steel members: ASTM A60.
B. Steel reinforcing: As noted per Contract Documents and on appropriate section.
C. Structural tubing: ASTM A500 grade B round and square.
D. Washers: ASTM A436.
E. Nuts: A563.
F. Bolts: ASTM A325 or A307 or A490 as noted.
G. Anchor bolts: ASTM A307 or A36.
H. Welding materials: AWS D1.1; E70XX low hydrogen or type required for materials being welded.
I. Grout: Non-shrink type grout, 7000 psi at 28 days.
J. Shop and touch-up primer: SSPC 13, Type 1, red oxide or galvanizing to meet organic galvanizing manufacturers recommendation for touch-ups.
K. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust

and scale, seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes prior to cleaning by grinding, or by welding and grinding, and treating and application of surface finishes.

L. Steel Wide Flange Shapes: ASTM A992, Grade 50 unless otherwise indicated.

M. Steel Angle and Channel Shapes, Plates and Bars: ASTM A50 unless otherwise indicated.

N. Cold-Formed Steel Tubing: ASTM A500, Grade B.

O. Steel Pipe: ASTM A53, Type E or S, Grade B.

P. Anchor Rods, Bolts, Nuts and Washers: ASTM A36 for unheaded rods, and ASTM A307, Grade A for headed bolts, unless otherwise indicated.

Q. High Strength Anchor Bolts: ASTM A449 threaded rod.

R. Non-High Strength Bolts, Nuts and Washers: ASTM A307, Grade A; carbon steel, hex-head bolts; carbon steel nuts; and flat, unhardened steel washers. Provide plain, uncoated finish, unless otherwise indicated.

S. High Strength Bolts, Nuts and Washers: ASTM A325, Type-1 heavy hex steel structural bolts, heavy hex carbon steel nuts, and hardened carbon steel washers, unless ASTM A490 indicated. Provide plain, uncoated finish, unless otherwise indicated.

T. Electrodes for Welding: Comply with AWS Code: Use E70 XX Series.

2.02 PRIMERS

A. Shop Primer for Structural Steel: Fast curing, lead and chromate free, universal modified alkyd primer with good resistance to normal atmospheric corrosion, complying with performance requirements of FS TT-P-664; or, at Contractor's option, use Tnemec Series 10-99.

B. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 95% zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint-20.

2.03 GROUT

A. Nonmetallic Shrinkage-Resistant Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

1. Products: Subject to compliance with requirements, provide one (1) of the following:
   a. Euco N-S Grout, Euclid Chemical Co.
   b. Five Star Grout, Five Star Products.
   c. Crystex, L&M Construction Chemicals, Inc.
   d. Masterflow 928 and 713, Master Builders Technologies, Inc.

2.04 FABRICATION

A. Fabricate all steel as per Contract Documents and approved Shop Drawings.

B. All welds to be ground smooth unless otherwise noted.

1. All bolted connections shall be detailed as slip-critical.
2. Shop prime all members.
3. Remove all oil, grease, mill scale, dirt and dust before starting fabrication.
4. Shop prime all members except as noted below. Prime to a thickness of 1.5 mils.
5. Do not prime the following:
   a. Members that will receive spray-on fireproofing.
   b. Top flanges of beams to which welded connections will be made within 2" of any field weld.
   c. The contact surfaces of Slip-Critical connections.

d. Milled contact bearing surfaces.

2.05 SHOP CONNECTIONS

A. Shop install and tighten non-high strength bolts, except where high strength bolts are indicated:
   1. Provide high strength threaded fasteners for bolted connections, except where non-high strength bolts are indicated.
   2. See Contract Documents and Shop Drawings for additional requirements.

B. Shop install and tighten high strength bolts according to Research Council on Structural Connections' "Specifications for Structural Joints Using ASTM A325 or A490 Bolts" as indicated:
   1. Bolts: ASTM A325 high strength bolts, unless ASTM A490 Bolts indicated.
   2. Connection Type: Snug tightened, unless indicated as slip-critical, direct-tension or tensioned shear/bearing connections.

C. Weld Connections: Comply with AWS D1.1 for procedures, appearance, and quality of welds, and methods used in correcting welding work:
   1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.

2.06 SHOP FINISHING

A. General: Shop paint structural steel where not galvanized. Do not paint those members or portions of members to be embedded in concrete or mortar or scheduled to receive fireproofing. Paint embedded steel, which is partially exposed on exposed portions and initial 2" of embedded areas only.

B. Do not paint surfaces which are to be welded or high strength bolted with slip-critical connections.

C. Surface Preparation: After inspection and before shipping, clean structural steel to be painted or scheduled to receive fireproofing. Remove loose rust, mill scale and spatter, slag or flux deposits. Clean steel in accordance with SPC (The Society for Protective Coatings) Standards as follows:
   1. Hand clean steel surfaces to remove loose rust, mill scale, weld slag or flux deposits, dirt and other foreign matter. Hand clean in accordance with SSPC-SP2 "Hand-Tool Cleaning" or SP3 "Power Tool Cleaning". Remove oil and grease deposits with solvent in accordance with SSPC-SP1 "Solvent Cleaning".
   2. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide a uniform dry film thickness of not less than 1.5 mils. Use painting methods, which will result in full coverage of joints, corners, edges and exposed surfaces:
   3. Provide smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
   4. Galvanizing: For those items indicated for galvanizing, apply zinc-coating by the hot-dip process complying with the following requirements:
      a. ASTM A 153 for galvanizing iron and steel hardware.
      b. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed and forged shapes, plates, bars and strip 0.0299-inch thick and heavier.

PART 3: EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Do not start fabrication until all Shop Drawings are approved as noted.

B. Store all materials off the ground in a dry place until erection.
C. Before erecting steel, insure that all anchor bolts and beam pockets and other field conditions are ready to receive steel.
D. Coordinate with existing conditions.
E. Coordinate all steelwork with other trades.

3.02 ERECTION

A. Allow for erection loads. Provide temporary bracing as required until steel is set and permanently placed.
B. Field weld or bolt connections as per approved Shop Drawings.
C. Do not field cut or otherwise alter steel framing members unless written approval is given by the Engineer/Architect.
D. After steel is erected, prime all welds, abrasions, and other surfaces not primed.
E. Non-shrink grout under all base plates as noted.
F. All beams and columns to be level or plumb to within 1/8” 10”.

3.03 CLOSE OUT

A. Reference Section 01 30 00, Administrative Requirements.

END OF SECTION

SECTION 06 10 00: ROUGH CARPENTRY

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein and/or as shown per Contract Documents:
   1. Structural framing including but not limited to framing of walls, and roof, including built up beams and trusses as required.
   2. Wall and Roof sheathing.
   3. Infiltration barrier.
   4. Exterior Finish/and trim.
   5. Blocking and backing.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. Provide Shop Drawings for review and approval on the following items as requested by the Engineer/Architect or Owner.
   1. Engineered roof trusses.

1.04 QUALITY STANDARDS

A. Wood framing to conform to 2021 Michigan Building Code.
B. Plywood to conform to Engineered Wood Association (APA) specifications.
C. Engineered wood to conform to APA specifications.
D. All framing to conform to current codes.

1.05 Delivery, Storage and Handling

A. Keep all materials within the structure and protected throughout construction.
B. If materials are to be stored outside, they shall be kept off the ground, under cover and dry in accordance with industry standards and manufacturing requirements.
C. Coordinate with Owner areas available for outside storage purposes. This item will be discussed at the pre-construction meeting.
D. All materials are to be stored off the floor or ground, store on blocks or pallets as needed.

PART 2: PRODUCTS

2.01 FRAMING MATERIALS

A. Studs: Stud grade Douglas Fir.
B. Blocking and miscellaneous framing and furring: No. 3 Douglas Fir or Hem-Fir.
C. Wood in contact with concrete; pressure treated No. 2 Southern Yellow Pine, Grade 40.
D. If wood is noted to be in contact with earth, pressure treated wood shall be used as noted above, fully covered and sealed where in direct contact with earth. Light gauge aluminum or continuous membrane flashing shall be used. Seal watertight all joints in aluminum or membrane flashing.

2.02 SHEATHING AND DECKING MATERIALS: ALL PLYWOOD TO BE DOUGLAS FIR, EXTERIOR GRADE.

A. Exterior wall sheathing: CDX plywood or OSB, thickness as noted on construction documents.
B. Interior continuous blocking: nominal 2x lumber.

2.03 EXTERIOR TRIM:

A. Refer to Section 07 46 43.13 Engineered Wood Siding.

2.04 BUILDING PAPERS:

A. Infiltration barrier at exterior walls: Tyvek with all accessories or acceptable alternate.

2.05 ACCESSORIES:

A. Nails and screws to be shiny or adhesive coated, U.N.O.
B. Framing connectors and joist hangers to be sized according to manufacturer's recommendations. All connectors and joists hangers to be hot dipped galvanized, manufactured by Simpson or USP.
C. Exposed exterior framing anchors and fasteners to be stainless steel or hot dipped galvanized.

PART 3: EXECUTION

3.01 FRAMING:

A. Set all structural members level, plumb, and square.
B. Provide adequate bracing during construction so that walls stay plumb, square, and straight.
C. No plate members shall be shorter than 6' except in walls that are shorter than 6'.
D. All top plates shall be lapped at corners.
E. Solid block with wood around all openings or as recommended by door and window manufacturer.
F. Carefully coordinate joist and rafter layout with site conditions. Do not cut or header any structural member without prior, written approval.
G. Provide continuous blocking where called for per Contract Documents and where needed by any trade.
H. If dimension lumber is used with engineered beams or steel flitch plates, hold these members 1" below surface of dimensional framing to allow for shrinkage.

3.02 SHEATHING:

A. Install all sheathing so that ends are staggered from sheet to sheet and the ends bear fully on framing members. Use clips at edges on plywood or OSB roof sheathing less than 5/8" thick or on rafters/trusses spaced more than 16' on center (o.c.) or as noted.
B. Nail wall sheathing as per nailing schedule per local and state codes.
C. Space plywood sheathing 1/8" apart for expansion.

3.03 TOLERANCES AND QUALITY ASSURANCES:

A. Before insulation is installed or framing otherwise covered, remove and replace all joists, and any other framing members that have bowed, twisted, or warped out of tolerance after their initial installation.
B. Replace any plywood that has delaminated prior to installation of finish surfaces.

END OF SECTION

DAVID ARTHUR CONSULTANTS, INC.

SECTION 06 16 13: INSULATING SHEATHING (ZIP System R Sheathing)

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating wall sheathing with integral water-resistive barrier and air barrier.

1.2 REFERENCES

A. American Society of Mechanical Engineers (ASME): www.asme.org
   1. ASME B18.6.1 - Wood Screws (Inch Series)

B. ASTM International (ASTM): www.astm.org
   1. ASTM A153/A153M - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
   2. ASTM C1289 - Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
   3. ASTM D779 - Test Method for Water Resistance of Paper, Paperboard, and Other Sheet Materials by the Dry Indicator Method
   4. ASTM D1621 - Test Method for Compressive Properties Of Rigid Cellular Plastics
   5. ASTM D2247 - Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
   6. ASTM E96/E 96M - Test Methods for Water Vapor Transmission of Materials
   7. ASTM E331 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
   8. ASTM E2357 - Test Method for Determining Air Leakage of Air Barrier Assemblies
   9. ASTM F1667 - Specification for Driven Fasteners: Nails, Spikes, and Staples
   10. ASTM G154 - Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

C. US Department of Commerce (DOC): http://gsi.nist.gov/global/index.cfm/L1-5/l2-44/A-355
   1. DOC PS 2 - Performance Standard for Wood-Based Structural Panels

D. International Code Council (ICC): www.iccsafe.org
   1. ICC IBC - International Building Code
   2. ICC IRC - International Residential Code for One and Two-Family Dwellings

E. ICC Evaluation Service, Inc. (ICC-ES): www.icc-es.org
   1. ICC-ES AC12 - Acceptance Criteria For Foam Plastic Insulation
   2. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers
   3. ICC-ES AC116 - Acceptance Criteria for Nails and Spikes
   4. ICC-ES AC148 - Acceptance Criteria For Flexible Flashing Materials
   5. ICC-ES AC201 - Acceptance Criteria for Staples
   6. ICC-ES AC269 - Acceptance Criteria for Racking Shear Evaluation of Proprietary Sheathing Materials attached to Light-Frame Wall Construction or Code-Complying Sheathing Attached to Light-Framed Walls with Proprietary Fasteners
   7. ICC-ES AC310 - Acceptance Criteria for Water-Resistive Membranes Factory-bonded to Wood-based Structural Sheathing, Used as Water-Resistive Barriers
   8. ICC-ES ESR-1539 - Power Driven Staples and Nails for Use in Engineered and Non-Engineered Connections
   9. ICC-ES NER-272 - Power Driven Staples and Nails for Use in All Types of Building Construction.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of sheathing product specified.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: From ICC-ES, for wood sheathing and seam tape.
B. Product Certifications: From manufacturer, indicating that sheathing products comply with ICC-ES AC269 and ICC-ES AC310.

1.5 CLOSEOUT SUBMITTALS

A. Warranty: Executed copy of manufacturer special warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide wood products from manufacturer certified by SFI, FSC, or comparable sustainable forestry program acceptable to Architect.
B. Provide wall sheathing products meeting requirements for water-resistive barrier in accordance with ICC-ES AC310.
C. Provide wall sheathing products meeting requirements of ICC-ES AC269.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's written instructions for protection of sheathing products from weather prior to installation.

1.8 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which sheathing manufacturer agrees to repair or replace sheathing products that demonstrate deterioration or failure under normal use due to manufacturing defects within warranty period specified, when installed according to manufacturer's instructions.
   1. Warranty Period for Sheathing Products: [30] years following date of Substantial Completion.
   2. Warranty Conditions: Special warranties exclude deterioration or failure due to structural movement resulting in stresses on sheathing products exceeding manufacturer's written specifications, or due to air or moisture infiltration resulting from cladding failure or mechanical damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Provide sheathing products manufactured by Huber Engineered Woods LLC, Charlotte NC; Phone: (800) 933-9220; Website: www.zipsystem.com.

2.2 PERFORMANCE REQUIREMENTS

A. Air-Barrier Assembly Air Leakage: Less than 0.04 cfm/sq. ft. at 1.57 lbf/sq. ft. (0.2 L/s x sq. m at 75 Pa), per ASTM E2375.
B. Water-Vapor Permeance, Facer: Minimum 12 perms (689 ng/Pa x s x sq. m), ASTM E96/E96M.
C. Weather Exposure: Manufacturer warranty applies for maximum allowable exposure period of 180 days.

2.3 MATERIALS

A. Oriented Strand Board: DOC PS 2, made with binder containing no added urea formaldehyde.
B. Rigid Foam Plastic Insulating Board: Rigid polyisocyanurate foam core complying with ASTM C1289 Type II, Class 2, and ICC-ES AC12, with coated glass fiber facers on both sides, with the following characteristics:
   1. Nominal Density: 2.0 pcf (32 kg/cu. m).
   2. Compressive Strength, ASTM D1621: Not less than 20 psi (150 kPa).
   3. Vapor Permeance, ASTM E96/E96M: Less than 1.0 perm.
   4. Edge Configuration: Square finished.

2.4 COMPOSITE INSULATING WALL SHEATHING

A. Composite Insulating Wall Sheathing: Oriented-strand-board Exposure 1 sheathing 7/16 inch (11.1 mm) thick, with factory-laminated water-resistive barrier exterior facer, and with rigid foam plastic insulating board laminated to interior face.
   1. Basis-of-Design Product: Provide **Huber Engineered Woods LLC; ZIP System R Sheathing**.
   2. Span Rating and Performance Category of Sheathing Layer: Not less than 24/16; 7/16 Performance Category.
   3. Thickness: (25 mm) (38 mm).
   4. Thermal Resistivity (R Value): R-12, deg F x h x sq. ft./Btu x in. at 75 deg F.
   5. Edge Profile: Square edge.
   6. Exterior Facer: Medium-density, phenolic-impregnated polymer-modified sheet material meeting requirements for ASTM D779 Grade D weather-resistive barrier in accordance with ICC AC38 and AC310, with fastener spacing symbols on exterior facer for 16-inch (406 mm) and 24-inch (610 mm) on center spacing, with the following characteristics
      a. Water Resistance of Coatings, ASTM D2247: Pass 14 day exposure test.
      b. Moisture Vapor Transmission, ASTM E96: Not less than 12 perms.
      c. Water Penetration, ASTM E331: Pass at 2.86 lbf/sq. ft. (137 Pa).
      d. Wind Driven Rain, TAS-100: Pass.
      e. Accelerated Weathering, ASTM G154: Pass.

2.5 FASTENERS

A. Fasteners, General: Size and type complying with manufacturer's written instructions for Project conditions and requirements of authorities having jurisdiction.
   1. Corrosion Resistance: Hot-dip zinc coating, ASTM A153/A 153M.
B. Nails, Brads, and Staples: ICC AC116 and ICC AC201.
C. Power-Driven Fasteners: ICC-ES-1539 or NER-272.
D. Wood Screws: ASME B18.6.1.

2.6 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIAL

A. Self-Adhering Seam and Flashing Tape: Pressure-sensitive, self-adhering, cold-applied, seam tape consisting of polyolefin film with acrylic adhesive, meeting ICC AC148.
   1. Basis-of-Design Product: Provide **Huber Engineered Woods; ZIP System Tape**.
   2. Thickness: 0.012 inch (0.3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing spacing and alignment to determine if work is ready to receive sheathing. Proceed with sheathing work once conditions meet requirements.

3.2 SHEATHING INSTALLATION

A. Install sheathing panels in accordance with manufacturer's written instructions, requirements of applicable Evaluation Reports, and requirements of authorities having jurisdiction.
B. Air and Moisture Barrier: Coordinate sheathing installation with flashing and joint sealant installation and with adjacent building air and moisture barrier components to provide complete, continuous air- and moisture- barrier.
C. Do not bridge expansion joints; allow joint spacing equal to spacing of structural supports.
D. Install panels with laminated facer to exterior. Stagger end joints of adjacent panel runs.
E. Attach sheathing panels securely to substrate with manufacturer-approved fasteners in compliance with the following:
   1. ICC-ES ESR-1539 or ICC-NES NER-272 for power-driven fasteners.
   2. IBC: Table 2304.9.1 Fastening Schedule.
F. Apply seam tape at all panel seams, penetrations, and facer defects or cracks to form continuous weathertight surface. Apply tape according to manufacturer's written instructions and requirements of ICC-ES applicable to tape application.

END OF SECTION

SECTION 06 20 00: FINISH CARPENTRY

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the Scope of Work described herein and/or as shown on per Contract Documents:
B. Supply and installation of all interior standing and running trim and moldings.
C. Installation of cabinets, countertops, casework and fiberglass reinforced plastic (FRP).

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. Submit samples of each type board for approval prior to purchasing trim.
B. Provide in-place mock-up of each type of trim as requested by the Engineer/Architect.
C. Product Data: Submit manufacturer's catalog for reference.
D. Product Samples to be submitted for approval: (1 each):
   1. 2 – 12” long pieces.

1.04 QUALITY ASSURANCES

A. Use only qualified finish carpenters with five (5) years successful experience with AWI quality standards and guidelines.
B. All scope of work shall be manufactured and installed according to Architectural Woodwork Institute (AWI) Quality Standards.
   1. Single source: All trim to be manufactured and furnished by a single company.
C. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled production staff to produce high quality product, and shall meet the following minimum requirements:
   1. Minimum of ten (10) year’s experience in the manufacturing.
   2. Ten installations of equal or larger size.
   3. Must be financially stable.
D. Installer qualifications: Certified by the manufacturer or if manufacturer does not certify installers, installer shall have a minimum of five (5) years successful experience with similar scope of projects.

PART 2: PRODUCTS

2.01 MATERIALS

A. Trim
   1. Yellow pine ¾” minimal thickness.
   2. Paint grade.
   3. Maximum possible length.
   4. Painted U.N.O.
B. Wainscot Paneling – FRP Pebbled
   1. 4’x8’x0.09” sheets.
      a. In restroom walls
   2. Factory colored.

PART 3: EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Before proceeding with purchasing and installing scope of work in this section, obtain approvals for all samples, and mock-ups.
B. Field verify all measurements on Shop Drawings with actual conditions.
C. As scope of work proceeds, cull out all boards and other materials that do not comply with the grades specified or the samples approved.
D. Have all primers, stains, and polyurethanes on-site and ready for use prior to starting scope of work.
E. Inspect and sign-off on all sub-surfaces and blocking prior to starting scope of work.
F. Before starting interior trim, building shall be fully covered.

3.02 INSTALLATION:

A. Install all work in accordance with AWI custom quality standard.
B. All components shall be set true, plumb, flush to wall and level.
C. Scribe work abutting other components with a maximum gap of 1/32". Use of additional overlay trim to conceal larger gaps shall not be allowed, unless approved by the Engineer/Architect or as noted per Contract Documents.
D. All trim shall be installed with galvanized or stainless steel finish nails.
E. All joints are to be coplanar.
F. All finish nails shall be countersunk and hidden from view.
G. Shim trim at all fastening points to provide flat trim – wavy trim not permitted.

3.03 PREPARATION FOR FINISHING

A. Prior to shop or field priming/finishing, all trim shall be sanded free of all planner marks where smooth finish is called for.
B. Set all nails and fasteners.
C. Clean any glue from joints as Scope of Work is being done.
D. Coordinate with finish product's manufacturer's recommendation for material preparation.

3.04 FINISHING

A. All wood installed under this section is to be back primed or sealed with finished surface white-washed.
B. Wood is to be stained per Section 09 90 00.
C. Painting per Section 09 90 00.

3.05 PROTECTION AND CLOSE OUT

A. Protect all finished trim work from damage before, during. and after installation. Replace any work that is damaged beyond repair.
B. At job closeout, check all trim for defects. Repair or replace as required.

END OF SECTION

SECTION 06 41 16: PLASTIC LAMINATE CASEWORK

1.GENERAL

1.1. SUMMARY

A. Section Includes:
   1. Plastic laminate casework
   2. Hardware typically furnished by the casework manufacturer
   3. Structural supports incorporated into wood casework
B. Excluding:
   1. Metal support brackets and fittings that are part of the building structure
   2. Plumbing, electrical fixtures, and telephone equipment
C. Related sections:
   1. Countertops, Section 12 36 61.16.
   2. Rough carpentry: Wood blocking or grounds inside finished walls or above finished ceilings
   3. Plumbing: Fixtures and fittings installed in countertops

1.2. REFERENCES

A. The *North American Architectural Woodwork Standards (NAAWS),* latest edition. Jointly published by Woodwork Institute and the Architectural Woodwork Manufacturers Association of Canada.

1.3. SUBMITTALS

A. Shop drawings:
   1. Submit shop drawings in conformance with the requirements of the *North American Architectural Woodwork Standards*.
   2. Submit in accordance with Section 01 30 00 Administrative Requirements.
B. Samples:
   1. Submit four finished samples of each species and cut of wood to be used. Lumber samples to be minimum 6 inches by 18 inches, and sheet product samples to be minimum 12 inches square. Samples shall represent the range of color and grain expected to be provided.
   2. Submit four unfinished samples of each product to be provided for job-site painting or finishing. Lumber samples to be minimum 6 inches by 18 inches, and sheet goods to be 12 inches square.
   3. Submit a sample in the specified finish of each hardware item that will be visible at exposed surfaces when the job is complete.

1.4. QUALITY ASSURANCE

A. Work shall be in accordance with the Grade or Grades specified of the *North American Architectural Woodwork Standards*.
B. Qualification:
   1. A Woodwork Institute Accredited Millwork Company in good standing.
   2. Firm (woodwork manufacturer) with no less than five years of successful production experience similar to a specific project, whose qualifications indicate the ability to comply with the requirements of this section.
   3. The woodwork manufacturer must have at least one project in the past five years where the value of the woodwork was within 20 percent of the cost of woodwork for this project.
C. Single source responsibility: A single manufacturer shall provide and install the work of described in this section.

1.5. DELIVERY STORAGE AND HANDLING

A. Deliver materials only when the project is ready for installation and the general contractor has provided a clean storage area.
   1. Delivery of architectural millwork shall be made only when the area of operation is enclosed, all plaster and concrete work is dry and the area broom clean.
   2. Maintain indoor temperature and humidity within the range recommended by the *North American Architectural Woodwork Standards* for the location of the project.

1.6. SCHEDULING

A. Coordinate fabrication, delivery, and installation with the general contractor and other applicable trades.

2. PRODUCTS

2.1. COMPONENTS

A. Lumber: In accordance with the *North American Architectural Woodwork Standards* Grade specified for the product being fabricated. Moisture Content: 6% to 12% for boards up to 2-inch (50.8 mm) nominal thickness, and shall not exceed 19% for thicker pieces.
B. Veneer core plywood: A nontelegraphing hardwood manufactured with exterior glue.
C. Plastic laminate: Meeting the requirements of the *North American Architectural Woodwork Standards* for its use.
D. Edgeband: High-pressure decorative laminate of the same pattern and color as the exposed surfaces.
E. Adhesives: Type I, fully waterproof
   1. Hinges: Concealed European style Grade II hinges minimum 120 degree opening.
   2. Shelf supports: Bored hole system with metal supports.

2.2. FABRICATION

A. Grade: *NAAWS* Custom Grade.

B. Exposed exterior surfaces: High-pressure decorative laminate. Color and pattern as selected by the architect.
C. Exposed interior surfaces: High-pressure laminate matching exposed surfaces.
D. Semi-exposed surfaces: Laminate matching exposed surfaces.
E. Cabinet construction type: Frameless.
F. Door Interface Style:
    1. Flush overlay
    2. Door and drawer face: recessed panel
G. Edgeband: PVC, matching the color and pattern of the exposed laminate.
    1. Edgeband at doors, drawer fronts, and false fronts: 3mm PVC
H. Drawers:
    1. Sides: Seven-ply hardwood plywood with no internal voids
    2. Bottoms: Hardwood plywood of the same species and cut as the drawer sides. Bottoms shall be fully housed into drawer sides, backs, and subfronts, and securely glued.
    3. Joinery: Dovetails

3. EXECUTION

3.1. EXAMINATION

A. Verify the adequacy and proper location of any required backing or support framing.
B. Verify that mechanical, electrical, plumbing, and other building components affecting work in this section are in place and ready.

3.2. INSTALLATION

A. Install all work in conformance with the *North American Architectural Woodwork Standards*, latest edition.
    1. Installation shall conform to the *NAAWS* grade of the items being installed.
B. All work shall be secured in place, square, plumb, and level.
C. All work abutting other building components shall be properly scribed.
D. Mechanical fasteners used at exposed and semi-exposed surfaces, excluding installation attachment screws and those securing cabinets end to end, shall be countersunk.
E. Equipment cutouts shown on plans shall be cut by the installer.

3.3. ADJUSTING AND TOUCH UP

A. Before completing installation, the installer shall adjust all moving and operating parts to function smoothly and correctly.
B. All nicks, chips, and scratches in the finish shall be filled and retouched. Damaged items that cannot be repaired shall be replaced.

3.4. CLEANUP

A. Upon completion of installation, the installer shall clean all installed items of pencil and ink marks and broom clean the area of operation, depositing debris in containers provided by the general contractor.

END OF SECTION

SECTION 07 21 19: FOAMED-IN-PLACE INSULATION

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the Scope of Work described herein and/or as shown on the Contract Documents:
B. Rigid insulation.
C. Foam Insulation.
D. Closed-cell spray polyurethane foam insulation.
E. Accessories.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 STANDARDS AND QUALITY CONTROL

A. Thermal insulation products and installation to comply with local and state energy codes.
B. Sound insulation to comply with tested STC rated assemblies per manufacturer's printed literature.

PART 2: PRODUCTS

2.01 INSULATION

A. Fiberglass:
1. Kraft or foil faced.
2. Flame spread index – maximum 25.
3. Smoke developed index – maximum 450.
4. Minimum Insulation values as noted on drawings.

B. Blown Cellulose thermal and sound insulation:
1. Manufacturer: Nu-Wool:
2. Materials:
a. 85% recycled content.
b. Boric acid & sodium polyborate treated for flame resistance, mold resistant, non-toxic and non-corrosive.
c. Low odor during and after installation.
3. Thermal performance: R = 3.8 per inch:
4. Standards:
a. CPSC standard 16 CFR parts 1209 + 1404
b. ASTM C-739, E-84, E-119, CL 723.
c. Flame spread: 15
d. Smoke developed: 5

C. Rigid Insulation:
1. Below grade insulation is to be extruded polystyrene, Styrofoam, or acceptable alternate:
2. Insulation value R=5 minimum per inch
3. Insulation thickness:
a. Below slab: 2" rigid insulation – see Contract Documents.

D. Closed-cell Spray Polyurethane Foam Insulation

1. Closed-Cell Spray Polyurethane Foam: ASTM C1029, Type II, minimum density of 1.5 lv/cu. Ft (24 kg/cu. M) and minimum aged R-value at 1-inch (25.4-mm) thickness of 6.2 deg F x h x sq. ft./Btu at 75 deg F (43 K x sq.m/W at 24 deg C).
2. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    a. Flame-Spread Index: 25 or less.
    b. Smoke-Developed Index: 450 or less.

E. Accessories: Primer – Material recommended by insulation manufacturer where required for adhesion of insulation to substrates.

PART 3: EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Do not start insulation until all inspections have been made and all systems approved.
B. Do not install over wet or damp framing or material.
C. Verify that all substrates are clean, dry, and free of substances that are harmful to insulation.
D. Verify with manufacturer acceptable conditions to begin installation.
E. Priming: Prime substrates where recommended by insulation manufacturer. Apply primer to comply with insulation manufacturer's written instructions. Confine primers to areas to be insulated; do not allow spillage or migration onto adjoining surfaces.

3.02 INSTALLATION

A. Typical Locations unless noted otherwise:
1. Batt Insulation: Where blown cellulose is not accessible on the building shell.
2. Rigid Insulation: At foundation underground or exterior walls.
3. Blown cellulose – where noted.
4. Spray Foam Insulation: Around all doors and windows, inside all hollow metal frames, ancillary space around penetration which are not required to be fire stopped, attic walls and ceiling, roof/rafters.
    a. Comply with insulation manufacturer's written instructions applicable to products and applications.
    b. Spray insulation to envelop entire area to be insulated and fill voids.
    c. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.
    d. Framed Construction: Install into cavities formed by framing members to achieve thickness indicated on drawings.
    e. Cavity walls: Install into cavities to fully fill voids.
    f. Miscellaneous voids: Apply according to manufacturer's written instructions.
    g. Apply barrier coatings in accordance with manufacturer's written instructions and to comply with requirements for listing and labeling for fire-propagation characteristics and surface burning characteristics specified.
        1) Use equipment and techniques best suited for substrate and type of material applied as recommended by coating manufacturer.
        2) Apply coatings to prepared surfaces as soon as practical after preparation and before subsequent surface soiling or deterioration.
        3) Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Produce sharp lines and color breaks.
5. Install all insulation per manufacturer's directions.

6. Carefully install all insulation to provide full fit of insulation between framing members.

B. Install 2” rigid insulation on the foundation wall from top of slab to top of footers as shown per Contract Documents.

C. Do not cover until insulation has been inspected and approved.

D. Install insulation full height of wall, solid, without voids or gaps.

3.03 FIELD QUALITY CONTROL

A. Manufacturer’s Field Service: Engage a factory-authorized service representative to test and inspect spray foam insulation installation, including accessories. Report results in writing.

B. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

END OF SECTION

SECTION 07 25 00: WEATHER BARRIERS

PART 1: GENERAL

1.01 SCOPE

A. Scope of work for this section includes but is not limited to furnishing and installing air infiltration barriers on exterior side of exterior wall sheathing per Contract Documents.

1.02 RELATED SCOPE OF WORK:

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. Refer to Section 01 30 00 Administration Requirements.

PART 2: PRODUCTS

2.01 MANUFACTURER

A. Approved Manufacturer: DuPont, Wilmington, DE, Phone: 800-448-9835, or acceptable alternate.

2.02 WATER RESISTANT BARRIER

A. Tyvek - Commercial Building Wrap by DuPont Company, Wilmington, DE.
B. Non-woven, Non-perforated.
C. Performance Characteristics:
D. ASTM E-1677 Type 1 Air Retarder:
   1. Air leakage at 25 mph (75 Pa) wind pressure of less than .06 cfm/ft²
   2. Water Vapor Transmission of greater than 20 perms in accordance with ASTM E-96, Method B.
   3. Water penetration resistance of 200 cm minimum in accordance with AATCC-127.

2.03 SEALING TAPE/FASTENERS

A. Approved Tape Manufacturers:
   1. DuPont Contractor Tape, by DuPont Company, Wilmington, DE.
B. Recommended Fasteners for Wood:
   1. Nails with plastic washer heads.
C. Recommended Fasteners for Steel Frame Construction:
   1. Screws with washers.
D. Recommended fastening to masonry:
   1. Polyurethane or elastomeric adhesives.

PART 3: EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Do not start work of this section until manufacturer's installation details are on the job for reference.
B. Keep all products stored off the ground, clean, and dry.

C. Inspect substrate for a smooth surface, removing any sharp objects, burs, or uneven surface changes. Repair substrate as needed prior to installing barrier.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instruction for appropriate substrate. Seal joints and penetrations through air infiltration barrier with specified tape and fasteners prior to installation of finish material. Air infiltration barrier shall be air-tight and free from holes, tears, and punctures. All window and door penetrations are to be taped per manufacturer instructions.
B. Protect the barrier from damage after installation.
   1. If damage occurs after installation, replace or repair per manufacturer recommendations.
C. Overlap sheets, as per manufacturer's requirements.
D. Seal all seams with seam tape per manufacturer's requirements.
E. Any tears or cuts to be sealed with seam tape per manufacturer's requirements.

3.03 CLOSE OUT

A. Leave one (1) copy of the manufacturer warranty signed by a factory representative.
   1. The representative shall review completed installation and verify that the products and installation comply with manufacturer requirements.

END OF SECTION

SECTION 07 41 13: METAL ROOF PANELS

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein and/or as shown per Contract Documents:
   1. Metal roofing and flashing.
   2. Gutters and downspouts at metal roofing.
   3. All fasteners and accessories required for install of metal roof, gutter systems, and downspouts.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 REFERENCES:

A. American Iron and Steel Institute (AISI), Specification for the Design of Cold-Formed Steel Structural Members, current edition.
B. American Institute of Steel Construction (AISC) Manual of Steel Construction (Current Edition).
C. American Society for Testing and Materials (ASTM):
   1. ASTM A792: Specification for Sheet Steel, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
   2. ASTM E283-91: Test Method for Rate of Air Leakage over Solid Substrate.
   3. ASTM E331-93: Test Method for Rate of Water Penetration over Solid Substrate.
   4. ASTM E1680-95: Test Method for Rate of Air Leakage over Open Framed Structure.
   5. ASTM E1646-95: Test Method for Rate of Water Penetration over Open Framed Structure.
   6. ASTM E1592-95: Standard Test Method for Structural Performance of Sheet Metal and Siding Systems by Uniform Static Air Pressure Difference.
D. Underwriter's Laboratory (UL) Roofing Materials and Systems Directory:
   1. Roofing Materials and Systems Directory listings and classifications of Underwriter's Laboratory roofing construction assemblies.

1.04 SUBMITTALS

A. Provide Shop Drawings on metal roof including layout of panels, all flashing profile, gauge, edge and fastening details, and details on gutter system.
B. Provide complete manufacturer’s product literature and warranty information.
C. Provide samples of the following items for approval:
   1. Metal roofing showing layout, edge details, and fastening method for approval. In place sample of gutter system including test for water tightness. System shall be tested for standing water and water migration.
   2. Color Samples.
D. Shop drawings must be submitted and returned acceptable prior to the beginning of product production.

1.05 QUALITY ASSURANCE

A. Scope of work shall be performed in accordance with the latest recommendations of Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).

B. Qualification of installers:
   1. Competent and skilled sheet metal applicators familiar with metal roof panel products, standard details and recommendations. Applicator shall have at least five (5) years experience applying these types of materials with successful completion of projects with similar scope and is an approved installer with company-issued documentation accordingly.
   2. Installers shall be thoroughly trained and experienced in the necessary crafts and who are completely familiar with and comply to the recommendations and details of the manufacturer and the ‐Architectural Sheet Metal Manualll published by SMACNA.
   3. Installers shall follow the manufacturers' installation details without exception unless written authorization from the manufacturer and architect are provided on an installation detail revision. Detail revision authorization must be made in advance of product installation.

C. Qualification of the product manufacturer:
   1. Manufacturer shall be a company specializing in Architectural Sheet Metal Products with at least ten (10) years experience. Being listed as a prequalified manufacturer does not release manufacturer from providing complete, current and acceptable test data for each performance, thermal, and wind load requirement specified for specific profile proposed.
   2. Manufacturer shall operate a permanent, full-time, manufacturing facility where the metal roof panels are produced on fixed based multi-station roll forming machines that are included in the Underwriter's Laboratory field inspection services. These facilities must be currently under inspection at least four times per year by Underwriter's Laboratory personnel to verify compliance that the products fabricated are in accordance with the specifications of the products which were originally tested.

1.06 WARRANTIES

A. Furnish manufacturer's Standard Twenty (20) Year Warranty stating the architectural fluorocarbon coating will:
   1. Not crack, chip, peel or exhibit any other mechanical failure of paint to adhere to the substrate.
   2. Not exhibit fading or color change in excess of five (5) hunter delta E units as determined by ASTM D2244-79.
   3. Not chalk in excess of a numerical rating of eight (8) as determined by ASTM D4214-98

B. Furnish manufacturer's Standard Watertightness Warranty for a period of twenty (20) years after the date of substantial completion. Entire source of material and labor shall be the sole responsibility of one subcontractor.
   1. Warranty shall be limited to the value of the metal roofing system, installed and is non-prorated.
   2. Warranty shall be signed by the manufacturer of the metal roof system and his authorized installer, agreeing at their option to replace or repair defective materials and workmanship as required to maintain the metal roof system in watertight condition.
   3. Warranty shall not exclude any conditions such as flashing, valleys, penetrations, etc. that are an integral part of the roof system.
   4. The manufacturer of the metal roof system shall review installation details and

perform on site inspections as required to certify proper watertight roofing material installation.

PART 2: PRODUCTS

2.01 SYSTEM DESCRIPTION:

A. Design Requirements:
1. Continuous, one-piece, preformed, prefinished single length roof panels with central stiffening rib.
2. Panels, clips, and other components required for specific project conditions.
3. Manufacturer is responsible for providing evidence acceptable to Architect that manufacturer's specified roof system is capable of meeting thermal, wind uplift, and performance requirements specified.

B. Thermal Movement:
1. Complete metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes In temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.
2. Interface between panel and expansion clip shall provide for applicable thermal movement in each direction along longitudinal direction.

C. Performance Requirements:
1. Underwriter's Laboratories, Inc. (UL) Wind Uplift Resistance Classification for Roof Assembly shall be Class 90, as installed. Certified statements from manufacturer without proper UL classification will not be acceptable.
2. Complete metal roof system shall have maximum static pressure air infiltration of 0.046 cfm / square foot with 1.57 psf air pressure differential when tested in accordance with ASTM E283-91 or 0.014 cfm / square foot with 1.57 psf air pressure differential when tested in accordance with ASTM E1680-95.
3. Complete metal roof system shall have no uncontrolled water penetration (dynamic water pressure), other than condensation, when exposed to dynamic rain at 6.24 psf differential static pressure when tested for not less than fifteen (15) minutes in duration in accordance with ASTM E331-93 or ASTM E1646-95.
4. Entire roofing system (metal panels, flashing, expansion joints, and penetrations), are to be detailed to provide watertight roof under peak weather conditions.

2.02 MANUFACTURER

A. Jackson Architectural Metals, 1421 South Cooper Street, Jackson, MI 49203.
B. Or approved alternative.

2.03 SHEET MATERIALS

A. FOR KYNAR® COLOR COATED - Prefinished base sheet material shall be 24 Gauge (.024") Galvalume Aluminum-Zinc Alloy Coated Steel Grade C Meeting ASTM A792.
B. Finish shall be 70% Kynar® 500 or Hylar® 5000 Fluorocarbon coating, applied on a continuous coil coating line, with top side dry film thickness of I.I +/-.01 mil dry film thickness and on the reverse side a wash coat and primer of .04 +/- .01 mil total dry film thickness.
C. Finish color shall be selected by the Architect/Owner from the manufacturer's current standard 26 standard colors on their color selection guide. Unless otherwise noted all products shall be of the same finish and color.

D. Strippable film shall be applied to the topside of the painted coil to protect the finish during fabrication, shipping and field handling. This strippable film must be removed during installation.

2.04 PREFORMED METAL ROOFING SYSTEM

A. Preformed Metal Panels:
   1. System Name: JA-1.5ME (1.5" Mechanical seam panel).
   2. Seam Height: 1½"
   3. Seam On-center: 16"
   4. Metal roofing panels to have dual bead rib stiffener profile. Mechanically fasten, non-adhesive, non-penetrating, snow brakes/bars shall be provided at walkways and doorways. Color to match roofing color. Type to be in accordance with roofing manufacturer's recommendations without affecting any warranty.
   5. DMI DL1.5 roofing can be an approved alternative.
   6. Pac-Clad Snap Lock roofing will not be considered as an alternative.

B. Standing seams shall incorporate a continuous mechanically seamed connection with concealed anchor clips that prevents the entrance of water passage.

C. Standing seams shall contain factory injected non-curing sealant that runs continuously throughout the panel length as job conditions dictate.

D. Fasteners:
   1. Exposed screw fasteners shall be 300 series alloy stainless steel with integrally bonded neoprene washers or Zinc Aluminum Cast head covers with integral neoprene gaskets.
   2. Exposed pop rivets shall be stainless steel, rivet and mandrel, self plugging type #44 - 1/8" diameter 1/4" grip range minimum. Exposed pop rivets shall be painted to match the metal roof system.
   3. Concealed fasteners for anchor clips shall be # 10-13- 1" or # 10-16 – 1" long pancake head #2 Phillips drive screw as required to meet the performance criteria in this specification.
   4. Concealed fasteners for flashing attachment shall be # 10-13- 1" or # 10-16- 1" long truss head #2 Phillips drive screw as required to meet the performance criteria in this specification.
   5. There shall be no exposed fasteners except to fasten flashing at fixing points, or for panel attachment as dictated by warranty requirements for longitudinal thermal expansion and contraction, or as indicated on the shop drawings.

E. Closures:
   1. Hip and ridge closures shall be factory fabricated from similar material to the roof panels. Hip and ridge closures shall be field cut to fit properly between the panel seams.

F. Sealant:
   1. Factory-applied seam sealant shall be non-curing butyl designed for metal to metal connection in concealed joints, if specified.
   2. Field applied sealant and/or butyl tape shall be as recommended by the manufacturer of the metal roof system.

G. Underlayment:
   1. Install approved polypropylene sheet material in 10 square rolls equal to the product listed, applied in shingle-like application in continuous coverage from eave to ridge per roof area with approved mechanical attachment procedures.See –Part 3— Execution.
      a. High Performance Synthetic Underlayment

2. Consult DMI for self-adhering ice and water underlayment approval for use in critical areas such as valleys, aprons, rakes, rake walls, and penetrations, particularly as they apply to watertight warranty requirements. See –Part 3, Execution.

2.05 FABRICATION

A. Panels shall be fabricated in permanent fabrication facilities in continuous lengths as required and indicated previously. No horizontal end lap joints will be accepted, unless panels exceed 90' in length or jobsite conditions dictate.
B. Panel design shall incorporate concealed clips and fasteners. Exposed fasteners in roofing panels will not be accepted.
C. Standing seam design shall prevent water infiltration by utilizing a capillary break to prevent siphoning.
D. Fabricate roofing and related sheet metal work in accordance with approved shop drawings and applicable standards set forth in the Sheet Metal and Air Conditioning Contractors National Association - Architectural Sheet Metal Manual (current edition).
E. All roofing and sheet metal flashing shall be fabricated in minimum 10'-0" lengths except as noted otherwise. All flashing shall have a minimum ¾” hemmed edges in exposed locations. Provide field fabricated miters for components that change direction on the project.
F. All gutter to be in continuous lengths up to 50 feet per the listed product in this paragraph. Expansion joints are to be utilized so as not to have lapped gutter joints.
   1. 6” Continuous Gutter

PART 3: EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Examine alignment and placement of building roof structure before proceeding with installation of preformed metal roofing.
B. Examine metal roof deck before starting installation. Deck must be clear, clean and smooth, free of depressions, waves, or projections, dry and must remain dry and free of ice and snow, after roofing application commences. Deck flutes must be clean and dry.
C. Field check dimensions and check support alignment with taut string or wire. Support misalignment may cause additional stresses in the panels and contribute to oil canning.
D. Do not proceed with installation until conditions are satisfactory. Notify the architect in writing of unsatisfactory conditions.
E. Underlayment Installation:
   1. Verify that underlayment has been installed over solid substrate.
   2. Ensure underlayment is installed horizontally, starting at the eave working to the ridge with a 6" minimum overlap as described in paragraph 2.03.I.
   3. Ensure that all fasteners are totally flush with the substrate.
F. Verify that all roof penetrations, fascia, and roof trim are complete before starting respective roofing.
G. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for preformed metal roofing systems.
H. Protection;
I. Provide protection or avoid traffic on completed roof surfaces.
J. Do not overload roof with stored materials.
K. Support no roof-mounted equipment directly on roofing system.

3.02 DELIVERY, STORAGE AND HANDLING

A. Deliver roof system components to project site in manufacturer's unopened original containers.
B. Protect roof system components during shipment, storage, handling and erection from mechanical abuse, stains, discoloration and corrosion.
C. Provide strippable plastic film on all painted surfaces between contact areas to prevent abrasion during shipping, storage and handling.
D. Store materials off the ground, providing for drainage, under protective cover which allows for air circulation and protection from foreign material contamination, mechanical damage, cement, lime, or other corrosive materials
E. Handle materials to prevent damage to surfaces, edges and ends of roofing components. Damaged material shall be rejected and removed from site.
F. Examine materials upon delivery to jobsite. Reject and remove physically damaged, stained or marred material from project site.
G. Metal roof components with strippable film must not be stored with exposure to direct sunlight.
H. Stack material to prevent damage and allow for adequate ventilation and drainage.
I. After work is installed, protect as necessary to keep work from being damaged.

3.03 INSTALLATION

A. General Requirements:
   1. Install roofing and flashing in accordance with approved shop drawings and manufacturer's product data, within specified tolerances.
   2. Isolate dissimilar metals, masonry and concrete from metal roof system with bituminous coating.
   3. Anchorage shall allow for thermal expansion and contraction without stress or elongation of panels, clips or anchors.
   4. Coordinate flashing and sheet metal work to provide watertight conditions at roof terminations. Fabricate and install in accordance with standards set forth in the SMACNA Manual using continuous cleats at all exposed edges.
B. Underlayment:
   1. Install proper protection to finished substrate to prevent moisture infiltration to roofing assembly prior to placement of panels. Cover complete roof area to receive metal roof panels with a self adhered ice and water underlayment membrane or a combination of DMI DynaClad® and self adhered ice and water underlayment at the eaves, valleys, rake walls, rake edges, and around all penetrations as described in this weekend.
C. Preformed Metal Panels:
   1. Fasten anchor clips with fasteners as recommended by the manufacturer as required to meet the performance criteria specified.
   2. Install starter and edge trim before installing roof panels.
   3. Remove strippable plastic film prior to installation of roof panels.
   4. Erect metal roofing with lines, planes, rises and angles sharp and true, and plane surfaces free from objectionable warp, dents, buckle or other physical defects.
   5. Do not allow traffic on completed roof.
   6. Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.
   7. Remove and replace any panels or flashing components that are damaged beyond successful repair.

D. Flashing:
1. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for installation work where the manufacturer's approved shop drawings do not define a specific detail.
2. Conceal fasteners and expansion provisions wherever possible.
3. Hem all exposed edges of sheet metal flashing that are exposed with at least 3/4‖ fold under.
4. Insert metal flashing into reglets, anchor with wedges and seal all joints.
5. Set sheet metal items level, true to line and plumb.
6. Secure all metal flashing to wood nailers with screws as indicated on the approved shop drawings.
7. Use cleats to keep flashing end laps closed when face width exceeds eight (8) inches.

3.04 FIELD QUALITY CONTROL

A. Tolerances:
1. Applicable erection tolerances: Maximum variation from true planes or lies shall be 1/4" in 20'-0" or 3/8" in 40'-0".
2. Metal roof systems can not correct any previously installed support or wood nailer problems that do not meet the above tolerances.

B. Manufacturer's Field Service:
1. Manufacturer's representative shall inspect all Watertight Warranted projects during the installation of the metal roof system.
2. Inspections shall be scheduled as required by the manufacturer of the roofing system.
3. Two mandatory visits are required:
a. Inspection of proper panel and flashing installation.
b. Final inspection upon completion of the metal roof installation.
4. Upon final inspection a report will be issued to the installer of any discrepancies and requirements for additional work. If additional work required the manufacturer will provide another final inspection to verify acceptance of completed work.

3.05 CLEANING

A. Clean exposed surfaces of work promptly after completion of installation. To prevent rust from staining the painted finish, immediately remove filings produced by drilling or cutting.
B. Clean roof in accordance with manufacturer's recommendations.
C. Touch up minor abrasions and scratches in finish with manufacturer’s supplied Kynar® touch up paint.
D. Remove all scrap and construction debris from the site.

3.06 CLOSE OUT

A. Provide a copy of manufacturer's warranty signed by a factory representative. Representative shall review completed installation and verify that the products and installation comply with requirements for a 20-year warranty on installation and finish.
B. Provide detailed written instructions on maintenance of gutters and roof with Owner for inclusion in Owner's Manual.

END OF SECTION

SECTION 07 46 43.13: ENGINEERED WOOD SIDING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Engineered wood siding.
      a. Panel and lap siding.
      b. Shake siding.
      c. Vertical siding.
      d. Trim and fascia.
      e. Soffit.
   2. Accessories.

B. Related Requirements:
   1. Section 04 20 00 "Unit Masonry" for CMU substrate support framing.
   2. Section 06 10 00 "Rough Carpentry" for wood stud substrate support framing.
   3. Section 06 16 30 “Insulated Sheathing”
   4. Section 07 25 00 "Weather Barriers" for water-resistive barriers.
   5. Section 07 92 00 "Joint Sealants" for sealants at edges and transitions between composite composition siding system and exterior cladding.

1.02 DEFINITIONS

A. Treated Engineered Wood: Engineered wood products manufactured for exterior use treated with manufacturer's proprietary process to resist fungal decay and termite damage.

1.03 COORDINATION

A. Coordinate engineered wood siding installation with flashings, trim, and construction of other adjoining work to ensure proper sequencing, construction progress, and to provide a leakproof, secure, and noncorrosive installation.

1.04 PREINSTALLATION MEETINGS

A. Coordinate with Section 01 30 00 "Administrative Requirements."

B. Preinstallation Conference: Conduct conference at 165 Vannest Street, Dundee, MI 48131.
   1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, to attend the meeting. Advise Architect and Owner's Representative of scheduled meeting dates and times a minimum of 14 days prior to meeting.
   2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
      a. Schedule.
      b. Responsibilities
      c. Critical path items.
      d. Submittals.

1.05 ACTION SUBMITTALS

A. Product Data: For each type of product and component included in engineered wood siding system. Include the following:

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product and accessory included in siding system.
2. Installation methods, including nailing patterns.
3. Siding manufacturer's requirements for products to be installed by others.
4. Maintenance and periodic inspection recommendations.

B. Shop Drawings: For engineered wood siding.
1. Include plans, elevations, sections, and attachment details.
2. Detail expansion joints, material joints, angle changes, flashings, and abutment to adjacent Work.

C. Samples for Initial Selection: For engineered wood siding, including related accessories.

D. Samples for Verification: For each type, color, texture, and pattern required.
1. 6-inch- (152-mm-) long Sample of engineered wood siding and trim.

1.06 INFORMATIONAL SUBMITTALS

A. Installer Qualifications.

B. Product Test Reports: For each product, APA tests performed by a qualified testing agency.

C. Evaluation Reports: For engineered wood siding system, from ICC-ES in compliance with AC321.

D. Sample warranties.

1.07 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

1.08 QUALITY ASSURANCE

A. Installer Qualifications: Installers trained by siding manufacturer.

B. Panel to comply with HUD-UM-40c - HUD Building Product Standards and Certification Program for Plywood and Other Performance Rated Wood-Based Structural-Use Panels.

1.09 MOCKUPS

A. As requested by Owner, build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
1. Build mockup 4’x4’ of typical wall area as directed by Owner or Architect including corner, trim, fascia, supports, attachments, and accessories, as directed.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

B. Deliver components and other manufactured items so as not to be damaged or deformed. Package components for protection during transportation and handling with manufacturer's name and identification of products.

C. Unload, store, and erect components in a manner to prevent bending, warping, twisting, and surface damage. Maintain slip sheet until piece is being prepared for installation.

D. Store components on flat surfaces clear of the ground. Store under roof or covered with suitable weathertight and ventilated covering, and in accordance with manufacturers' written instructions.

1.11 WARRANTY

A. Manufacturer's Trim and Siding Limited Warranty: Manufacturer agrees to repair or replace components of engineered wood siding against substrate damage within specified warranty period.
   1. Substrate damage is defined as deterioration, buckling, and overlay issues caused by manufacturing defects or termite damage.
   2. Hail damage is defined as a crack or chip in the surface overlay, or product substrate dents exceeding 3/8 inch (10 mm) in length or diameter and is caused by hail.
   3. Limited Warranty Period: 50 years from date of installation and written to Owner on date of Substantial Completion.

B. Manufacturer's Trim and Siding Prefinish Limited Warranty: Manufacturer agrees to repair or replace components of prefinished engineered wood siding against finish and substrate damage within specified warranty period.
   1. Substrate damage is defined as deterioration, buckling, or overlay issues caused by manufacturing defects or termite damage.
   2. Hail damage is defined as cracks or chips in the surface overlay or dent in the substrate of the product that exceeds 3/8 inch (10 mm) in length or diameter, and is caused by hail.
   3. Finish damage is defined as, under normal conditions and use, discoloring due to chalking, peeling, blisters, cracks; erosion to the extent of exposing the substrate; or yellowing or color fade change from light exposure not to exceed 5 Delta E CMC (2:1).
   4. Limited Warranty Period for Substrate: 50 years from date of installation and communicated to Owner on date of Substantial Completion.
   5. Limited Warranty Period for Finish: 15 years from date of installation and communicated to Owner on date of Substantial Completion.

C. Manufacturer's Accessories and Non-Standard Applications Limited Warranty: Manufacturer agrees to repair or replace components of manufacturer's accessories and when used in approved non-standard applications against substrate and finish damage within specified warranty period.
   1. Substrate damage is defined as deterioration, buckling, or overlay issues caused by manufacturing defects or termite damage.
   2. Hail damage is defined as cracks or chips in the surface overlay or dent in the substrate of the product that exceeds 3/8 inch (10 mm) in length or diameter, and is caused by hail.
   3. Finish damage is defined as, under normal conditions and use, discoloring due to chalking, peeling, blisters, cracks; erosion to the extent of exposing the substrate; or yellowing or color fade change from light exposure not to exceed 5 Delta E CMC (2:1).
   4. Limited Warranty Period for Substrate and Finish: 10 years from date of installation and communicated to Owner on date of Substantial Completion.

PART 2 - PRODUCTS

2.01 SOURCE LIMITATIONS

A. Provide components and materials specified in this Section from single manufacturer for a complete and compatible assembly.

2.02 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide engineered wood siding system tested to APA PS2 and PRP 108, in compliance with IBC Section 2308.9.3, Table 2308.9.3(5), and certified to be without permanent deformation or failure of structural members in accordance with design wind velocities for Project geographic location and probability of occurrence based on data from wind velocity maps provided in ASCE 7 and as approved by authorities having jurisdiction (AHJ).
   1. Design Loads: As indicated on Drawings.

B. Structural: Test in accordance with FL TAS 202 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Minimum test duration in accordance with FL TAS 202 is 10 seconds, which is historically U.S. practice.
4. Test Durations: As required by design wind velocity, but not less than 10 seconds.

C. Thermal Movement Performance: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

D. Composite Wood Products: Products to be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or made with no added formaldehyde.

E. Composite Wood Products: Products to be made without added urea formaldehyde.

2.03 ENGINEERED WOOD SIDING

A. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Trim & Siding and ExpertFinish Trim & Siding or comparable product by one of the following:
1. Allura.
2. James Hardie.

B. Treated Engineered Wood Lap Siding: Exterior-grade, resin-saturated, paper overlay laminated to EPA-registered zinc-borate-treated engineered wood siding. Exposed edges sealed for moisture resistance. Manufacturer's acrylic finish.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Lap Siding and ExpertFinish Lap & Siding, 76 Series or comparable product.
2. Thickness: 0.418 inch (10.6 mm) total thickness.
3. Width: 5.84 inches (148 mm).
4. Length: 16 ft. (4.9 m).
5. Color: As selected by Owner from manufacturer's full range.
6. Texture: Cedar texture.

C. Treated Engineered Wood Cedar Shake Siding: Exterior-grade, resin-saturated, paper overlay laminated to EPA-registered zinc-borate-treated engineered wood siding. Exposed edges beveled and sealed for moisture resistance. Manufacturer's acrylic finish.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Cedar Texture Shake Siding and LP SmartSide ExpertFinish Cedar Texture Shake Siding, 38 Series or comparable product.
2. Thickness: 0.354 inch (8.9 mm).
3. Width: 11.625 inches (295 mm).
4. Length: 48.63 inches (1.2 m).
5. Edges: Shiplap.
6. Color: As selected by Owner from manufacturer's full range.
7. Texture: Cedar texture with no knots; reversible staggered edge.

D. Treated Engineered Wood Soffit: Exterior-grade, resin-saturated, paper overlay laminated to EPA-registered zinc-borate-treated engineered wood siding. Exposed edges beveled and sealed for moisture resistance. Manufacturer's acrylic finish.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Soffit, 76 Series or comparable product.
2. Thickness: 8.9 mm, 0.418 inch (10.6 mm).
3. Width: 15.94 inches (405 mm), 23.94 inches (608 mm).
4. Length: 8 ft. (2.4 m).

5. Edges: Square.
6. Color: As selected by Owner from manufacturer's full range.
7. Texture: Smooth finish, vented.

E. Treated Engineered Wood Trim and Fascia: Provide manufacturer's standard trim, fascia board, angles, and similar components at corners, transitions, and rough openings meeting the performance requirements.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Trim, Fascia and LP SmartSide ExpertFinish Trim 540, Fascia 440 Series or comparable product.
2. Thickness: Facia 0.675 inch (17.1 mm), Trim 0.970 inch (24.6 mm) total thickness.
3. Width: 3.5 inches (89 mm), 5.50 inches (140 mm), 7.21 inches (183 mm).
4. Length: 16 ft. (4.9 m).
5. Edges: Square.
6. Color: As selected by Owner from manufacturer's full range.
7. Texture: Smooth finish.

2.04 ACCESSORIES

A. Fasteners: Hot-dipped galvanized nails, with 0.092-inch (2.3-mm) diameter shank, in length required to penetrate structural member a minimum of 1-1/2 inches (38 mm), as recommended in writing by composite siding system manufacturer suitable for and compatible with system materials. Larger diameter fasteners may be required depending on wind pressure, wind speed, and wind exposure category limitations for structures in product approvals PR-N124 or ESR-1301.

B. Sealant: ASTM C920, minimum Class 25 sealant.

C. Water-Resistive Barrier: ASTM D226 or other approved water-resistive barrier.

D. Air Barrier: ASTM E1677.
1. Seam Tape: Air barrier manufacturer's standard product.

E. Non-Compressible Drainable Housewrap:
1. Non-compressible type with a minimum 40-mil (1-mm) drainage gap not reduced by force of fastening during siding installation.
2. Drainable housewrap type that removes bulk water by creating a minimum 40-mil (1-mm) drainage gap (air gap) at individual measurement points between housewrap and back of siding.

F. Flashing:
1. Provide flashing at window and door heads and where indicated on Drawings. Refer to Division 07 for sheet metal flashing.
2. Material: Aluminum.
i. Finish: Siliconized polyester coating.
ii. Finish: High-performance organic finish.
iii. Finish: Factory-prime coating.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, engineered wood siding system supports, and other conditions affecting performance of the Work.
1. Examine wall framing to verify that support members and anchorage have been installed within alignment tolerances required by engineered wood siding manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by engineered wood siding manufacturer.

a. Verify that air and moisture barrier has been installed over sheathing substrate to prevent air infiltration and water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Install engineered wood siding in accordance with manufacturer's written instructions in orientation, sizes, and locations indicated. Anchor engineered wood siding and other components of the Work securely in place.
   1. Shim or otherwise plumb substrates receiving engineered wood siding system.
   2. Flash engineered wood siding at perimeter of all openings.
   3. Locate and space fastenings in uniform vertical and horizontal alignment.
   4. Seal engineered wood substrates exposed to weather to prevent moisture intrusion and water buildup.
      a. Seal around penetrations.
      b. Seal each exposed cut of siding and trim. It is not recommended to field spray-applied coatings on cuts.
      c. Seal each butt joint from weather by covering with joint moldings, sealant, or factory prefinished ends.
   5. Install flashing and trim as engineered wood siding work proceeds.
   6. Align bottoms of engineered wood siding.
   7. Provide weathertight escutcheons for pipe- and conduit-penetrating engineered wood siding system.

B. Metal Protection: Where dissimilar metal flashings contact each other or corrosive substrates, protect against galvanic action as recommended in writing by siding manufacturer.

C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that are permanently watertight.
   1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to achieve waterproof performance.

E. Replace engineered wood siding components that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 92 00: JOINT SEALANT

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the Scope of Work described herein and/or shown per Contract Documents:
B. Sealants and caulking.
C. Expansion joints in concrete.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 REFERENCES

ASTM C1193	(2013) Standard Guide for Use of Joint Sealants
ASTM C1311	(2014) Standard Specification for Solvent Release Agents
ASTM C1521	(2013) Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints
ASTM C509	(2006; R 2015) Elastomeric Cellular Preformed Gasket and Sealing Material
ASTM C734	(2015; R 2019) Low-Temperature Flexibility of Latex Sealants After Artificial Weathering
ASTM C834	(2017) Latex Sealants
ASTM C919	(2012; R 2017) Use of Sealants in Acoustical Applications
ASTM C920	(2018) Standard Specification for Elastomeric Joint Sealants
ASTM D1056	(2020) Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D1667	(2017) Standard Specification for Flexible Cellular Materials - Poly (Vinyl Chloride) Foam (Closed-Cell)
ASTM D217	(2019b) Cone Penetration of Lubricating Grease
ASTM D2452	(2015; R 2019) Standard Test Method for Extrudability of Oil- and Resin-Base Caulking Compounds
ASTM D2453	(2015; R 2020; E 2020) Standard Test Method for Shrinkage and Tenacity of Oil- and Resin-Base Caulking Compounds
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials

1.04 SUBMITTALS

A. Submit product data (including all test reports) for each joint sealant included in the project. Include storage requirements, shelf life, curing time, instructions for mixing and application, and accessories. Provide manufacturer's Material Safety Data Sheet (MSDS) for each solvent, primer and sealant material proposed.
B. Submit color samples of all exposed sealants for selection by Engineer.
C. If requested, install sample of sealants at each condition for Engineer's approval prior to proceeding with Scope of Work of this section. Sample shall show color and quality of workmanship.
D. Submit applicable warranties per general requirements.

1.05 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
B. Warranty Period: One (1) year from date of Substantial Completion.
C. Manufacturer's warranty: Minimum five (5) years.

1.06 QUALITY CONTROL

A. Use only workers with at least five (5) years successful experience in this type of Scope of Work.

1.07 DELIVERY AND STORAGE

A. Deliver materials to the jobsite in unopened manufacturers' sealed shipping containers, with brand name, date of manufacture, color, and material designation clearly marked thereon.
B. Label elastomeric sealant containers to identify type, class, grade, and use.
C. Handle and store materials in accordance with manufacturer's printed instructions.
D. Prevent exposure to foreign materials or subjection to sustained temperatures exceeding 90°F (32°C) or lower than 0°F (4°C).
E. Keep materials and containers closed and separated from absorptive materials such as wood and insulation.

1.08 QUALITY ASSURANCE

A. Compatibility with Substrate: Verify that each sealant is compatible for use with each joint substrate in accordance with sealant manufacturer's printed recommendations for each application.
B. Joint Tolerance: Provide joint tolerances in accordance with manufacturer's printed instructions.

PART 2: PRODUCTS

2.01 MATERIALS, GENERAL

A. Provide sealant products that have been tested, found suitable, and documented as such by the manufacturer for the particular substrates to which they will be applied.
B. Liquid-Applied Joint Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing

ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.

C. Stain-Test-Response Characteristics: Where sealants are specified to be non-staining to porous substrates. Provide products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for project.

D. Exterior Sealants: For joints in vertical surfaces, provide ASTM C920, Type S or M, Grade NS, Class 25, use NT. For joints in horizontal surfaces, provide ASTM C920, Type S or M, Grade P, Class 25, use T. Color as selected by Owner from manufacturer's full range of colors.

E. Interior sealants: provide ASTM C902, Type S or M, Grade NS, Class 12.5, use NT. Provide certification of indoor air quality for interior sealants. Color as selected by Owner from manufacturer's full range of colors.

F. Sealants to be by manufacturer as noted or other approved equal.

G. Silicone Joint Sealants

1. Neutral-Curing Silicone Joint Sealant SS-1: ASTM C920:
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) BASF Building Systems.
      2) Dow Corning Corporation.
      3) GE Advanced Materials – Silicones.
      4) May National Associates, Inc.
      5) Pecora Corporation.
      6) Polymeric Systems, Inc.
      7) Schnee-Morehead, Inc.
      8) Sika Corporation; Construction Products Division.
      9) Tremco Incorporated.
      10) Custom Building Products – Polyblend Siliconized Caulk, or
      11) Thiokol Coatings & Sealants.
   b. Type: Single component (s).
   c. Grade: Nonsag (NS).
   d. Class: 100/50.
   e. Uses Related to Exposure: Nontraffic (NT).
2. Acid-Curing Silicone Joint Sealant SS-2: ASTM C920.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) BASF Building Systems.
      2) Dow Corning Corporation.
      3) GE Advanced Materials – Silicones.
      4) May National Associates, Inc.
      5) Pecora Corporation.
      6) Polymeric Systems, Inc.
      7) Schnee-Morehead, Inc.
      8) Sika Corporation; Construction Products Division.
      9) Tremco Incorporated.
      10) Thiokol Coatings & Sealants.
   b. Type: Single Component (S).
   c. Grade: Nonsag (NS).
   d. Class: 100/50.
   e. Uses Related to Exposure: Nontraffic (NT).
3. Mildew-Resistant Silicone Joint Sealant SS-3: ASTM C920.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) BASF Building Systems.

2) Dow Corning Corporation.
3) GE Advanced Materials – Silicones.
4) May National Associates, Inc.
5) Pecora Corporation.
6) Polymeric Systems, Inc.
7) Schnee-Morehead, Inc.
8) Sika Corporation; Construction Products Division.
9) Tremco Incorporated.
10) Thiokol Coatings & Sealants.

b. Type: Single Component (S).
c. Grade: Nonsag (NS).
d. Class: 100/50.
e. Uses Related to Exposure: Nontraffic (NT).

H. Urethane Joint Sealants

1. Urethane Joint Sealant US 1: ASTM C920.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) BASF Building Systems.
      2) Bostik, Inc.
      3) Lymtal, International, Inc.
      4) May National Associates, Inc.
      5) Pacific Polymers International, Inc.
      6) Pecora Corporation.
      7) Polymeric Systems, Inc.
      8) Schnee-Morehead, Inc.
      9) Sika Corporation; Construction Products Division.
      10) Tremco Incorporated.
      11) Thiokol Coatings & Sealants.
   b. Type: Multi-Component (M).
   c. Grade: Pourable (P).
   d. Class: 50.
   e. Uses Related to Exposure: Traffic (T).

I. Latex Joint Sealants

1. Latex Joint Sealant LS-1: Acrylic latex or siliconized acrylic latex, ASTM C834, type OP, Grade NF.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) BASF Building Systems.
      2) Bostik, Inc.
      3) May National Associates, Inc.
      4) Pecora Corporation.
      5) Schnee-Morehead, Inc.
      6) Tremco Incorporated.
      7) Thiokol Coatings & Sealants.

2.02 PREFORMED SEALANTS

A. Preformed Sealant: Provide preformed sealants of polybutylene or isoprene-butylene based pressure sensitive weather resistant tape or bead sealants capable of sealing out moisture, air and dust when installed as recommended by the manufacturer. At temperatures from 30°F to plus 160°F (minus 34°C to plus 71°C, sealants must be non-bleeding and have no loss of adhesion. Type to be determined by cross section of opening.

2.03 PRIMERS

A. Non-staining, quick drying type and consistency as recommended by the sealant manufacturer for the particular application. Provide primers for interior applications that meet the indoor air quality requirements of the paragraph SEALANTS above.

2.04 BOND BREAKERS

A. Type and consistency as recommended by the sealant manufacturer to prevent adhesion of the sealant to the backing or to the bottom of the joint. Provide bond breakers for interior applications that meet the indoor air quality requirements of the paragraph, 2.01.E, Interior Sealants, above.

2.05 BACKSTOPS

A. Provide glass fiber roving, neoprene, butyl, polyurethane, or polyethylene foams free from oil or other staining elements as recommended by sealant manufacturer. Provide 25 to 33 percent oversized backing for closed cell and 40 to 50 percent oversized backing for open cell material, unless otherwise indicated. Provide backstop material that is compatible with sealant. Do not use oakum or other types of absorptive materials as backstops.
   1. Rubber: Provide in accordance with ASTM D1056, Type 1, open cell, Class A, round cross section for cellular rubber sponge backing.
   2. PVC: Provide in accordance with ASTM D1667, Grade VO 12, open-cell foam, round cross section for polyvinyl chloride (PVC) backing.
   3. Synthetic rubber: Provide in accordance with ASTM C509, Option I, Type I preformed rods for synthetic rubber backing.
   4. Butyl Rubber Based: Provide in accordance with ASTM C1311, from a single component, with solvent release. Color as selected from manufacturer's full range of color choices.

2.06 CAULKING

A. For interior use and only where there is little or no anticipated joint movement. Provide in accordance with ASTM D2452 and ASTM D2453, Type S for oil and resin-based caulking. Provide certification of indoor air quality for interior caulking.

2.07 CLEANING SOLVENTS

A. Provide type(s) recommended by the sealant manufacturer and in accordance with environmental requirements herein. Protect adjacent aluminum and bronze surfaces from solvents. Provide solvents for interior applications that meet the indoor air quality requirements of the paragraph SEALANTS above.

2.08 COLOR

A. All colors to match adjacent surface and shall be approved by the Engineer prior to installation.

PART 3: EXECUTION

3.01 PREPARATION

A. Surface cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instruction:
   1. Remove laitance and form-release agents from concrete.
   2. Clean non-porous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
   3. Remove temporary protective coatings from surfaces that will be in contact with sealant. When masking tape is used as a protective coating, remove tape and any residual adhesive prior to sealant application. For removing protective coatings and final cleaning, use non-staining solvents recommended by the manufacturer of the item(s) containing aluminum or bronze surfaces.
   4. Where surfaces have been treated with curing compounds, oil, or other such materials, remove materials by sandblasting or wire brushing. Remove laitance, efflorescence and loose mortar from the joint cavity. Remove resulting debris prior to sealant installation.
   5. Ensure wood surfaces that will be in contact with sealants are free of splinters, sawdust and other loose particles.

B. Priming: Prime substrates where recommended by joint sealant manufacturer or as indicated by pre-construction joint sealant substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

D. Perform a field adhesion test in accordance with manufacturer's instructions and ASTM C1193, Method A or ASTM C1521, Method A, Tail Procedure. Remove sealants that fail adhesion testing; clean substrates, reapply sealants, and re-test. Test sealants adjacent to failed sealants. Submit field adhesion test report indicating tests, locations, dates, results, and remedial actions taken.

E. Do not add liquids, solvents, or powders to sealants. Mix multicomponent elastomeric sealants in accordance with manufacturer's printed instructions

3.02 INSTALLATION

A. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability:
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

D. Sealants to be by the same manufacturer throughout the project where possible.
E. Sealants to be installed at full perimeter of all doors.
F. Sealants at concrete to be installed at all concrete expansion joints and reglets.
G. Install sealants using proven techniques that comply with the following, and at the same time backings are installed:
    1. Place sealants so they directly contact any full wet joint substrates.
    2. Completely fill recesses in each joint configuration.
    3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
H. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in sub-paragraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
    1. Remove excess sealant from surfaces adjacent to joints.
    2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces. Test approved tooling agents on the mock-up located on site prior to continuing use, subject to approval by Engineer.
    3. Provide concave joint profile per Figure 8A in ASTM C1193, unless otherwise indicated.
I. Clean off excess sealant or sealant smears adjacent to joints as the Scope of Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
J. Do not apply sealant if surfaces are wet or damp.
K. Do not start sealant work until colors of sealants have been tested and approved on in-place samples of workmanship.
L. Install all sealants exactly as per manufacturer's specifications and details. Keep a copy of the manufacturer's installation details on job site for reference for each type of product.
M. Unless otherwise noted, each trade shall provide and install the sealant for their work so that all Scope of Work is from one source.
N. Carefully coordinate sealant system with other systems so that all systems perform as a total waterproof system
O. Install all caulk joints carefully and professionally. Tape off surrounding areas to get clean, straight edges. Tool all joints carefully.
P. Use only workers with at least five (5) years successful experience in this type of Scope of Work.
Q. Do not install sealants in lieu of other required building enclosure weatherproofing components such as flashing, drainage components, and joint closure accessories, or to close gaps between walls, floors, roofs, windows, and doors, that exceed acceptable installation tolerances. Remove sealants that have been used in an unacceptable manner and correct building enclosure deficiencies to comply with contract documents requirements.

3.03 CLOSE OUT

A. Protect all sealants from damage and debris after installation.
B. Protection: Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled and no residual tape marks remain.
C. Clean all sealants from adjacent surfaces immediately after installation.
D. Remove all temporary protection and tape as soon as possible after installation.

E. Remove and reseal any joint or sealant which has shrunk, pulled away from substrate, loosened, discolored, been imbedded or contaminated by foreign materials prior to fully drying, or has not provided a seal per manufacturer's recommendations to each application.
F. Provide manufacturer's specification sheet with Closeout Manual.
G. Refer to Administrative Requirements 01 30 00.

END OF SECTION

SECTION 08 06 71: DOOR HARDWARE SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section references specification sections relating to commercial door hardware for the following:

1. Swinging doors.
2. Sliding Doors.
3. Other doors to the extent indicated.

B. Commercial door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical and access control door hardware.
3. Electromechanical and access control door hardware power supplies, back-ups and surge protection.
4. Automatic operators.
5. Cylinders specified for doors in other sections.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. Michigan Building Code 2015, Local Amendments.

D. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door

Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.

D. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 WARRANTY

A. General Warranty: Reference Division 01, Administrative Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1.6 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Refer to “PART 3 – EXECUTION” for required specification sections.

PART 3 - EXECUTION

3.1 DOOR HARDWARE SETS

A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RS - RITE Slide
4. SA - SARGENT
5. RU - Corbin Russwin
6. RO - Rockwood
7. RF - Rixson
8. NO - Norton
9. SU - Securitron
10. OT - Other

Hardware Sets

Set: 1.0

Doors: 105

2	Continuous Hinge	CFM__SLF-HD1-M		PE	087100
1	Removable Mullion	L980A	US28	SA	087100
1	Rim Exit Device, Exit Only	16 43 8810 EO	US32D	SA	087100
1	Rim Exit Device, Storeroom	16 43 8804 Less Pull	US32D	SA	087100
3	Mort. Cylinder	- to match Owner's existing key system	626	RU	087100
1	Rim Cylinder	- to match Owner's existing key system	626	RU	087100
2	Door Pull	RM3311-12 Mtg-Type 12XHD	US32D-316	RO	087100
2	Conc Overhead Stop	6-X36	630	RF	087100
2	Surface Closer	281 OZ/OZA x mounting plate to suit application	EN	SA	087100
1	Mullion Seal	5110BL - apply to removable mullion		PE	087100
1	Weatherstrip	- integral within construction of door and frame assembly		00	08 4113
2	Sweep	29326CNB x TKSP8		PE	087100
1	Threshold	1715AK MSES25SS		PE	087100
2	Position Switch	DPS-M-BK		SU	087100

Notes: Function: Doors normally closed and locked. Key outside active leaf retracts latch bolt. Exit devices equipped with keyed cylinder inside to control dogging of latch bolt (push / pull operation). Free egress always permitted.

Set: 2.0

Doors: 101A

1	Continuous Hinge	CFM__SLF-HD1-M		PE	087100
1	Rim Exit Device, Storeroom	16 43 8804 Less Pull	US32D	SA	087100
1	Mort. Cylinder	- to match Owner's existing key system	626	RU	087100
1	Rim Cylinder	- to match Owner's existing key system	626	RU	087100
1	Door Pull	RM3311-12 Mtg-Type 12XHD	US32D-316	RO	087100
1	Conc Overhead Stop	6-X36	630	RF	087100
1	Surface Closer	281 OZ/OZA x mounting plate to suit application	EN	SA	087100
1	Weatherstrip	- integral within construction of door and frame assembly		00	08 4113
1	Sweep	29326CNB x TKSP8		PE	087100
1	Threshold	1715AK MSES25SS		PE	087100
1	Position Switch	DPS-M-BK		SU	087100

Notes: Function: Key outside retracts latch bolt. Keyed cylinder inside controls latch bolt dogging. Free egress always permitted.

Set: 3.0

Doors: 101B, 101C

1	Continuous Hinge	CFM__HD1-M		PE	087100
1	Rim Exit Device, Classroom	43 8813 ETNJ	US32D	SA	087100
1	Mort. Cylinder	- to match Owner's existing key system	626	RU	087100
1	Surface Closer	281 CPS	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Weatherstrip	2891APK TKSP - head and jambs		PE	087100
1	Rain Guard	346C TKSP8		PE	087100
1	Sweep	345AV TKSP		PE	087100
1	Threshold	279x292AFGPK x MSES25SS		PE	087100
1	Position Switch	DPS-M-BK		SU	087100

Notes: Key outside locks or unlocks lever trim. Free egress always permitted.

Set: 4.0

Doors: 101D

3	Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK 087100
1	Rim Exit Device, Classroom	43 8813 ETNJ	US32D	SA 087100
1	Mort. Cylinder	- to match Owner's existing key system	626	RU 087100
1	Surface Closer	281 P10	EN	SA 087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1	Wall Stop	RM860	US32D	RO 087100
3	Silencer	608 / 609		RO 087100

Notes: Key outside locks or unlocks lever trim. Free egress always permitted.

Set: 5.0

Doors: 107

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK 087100
1	Storeroom Lock	8204 LNNJ	US26D	SA 087100
1	Mort. Cylinder	- to match Owner's existing key system	626	RU 087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
3	Silencer	608 / 609		RO 087100

Notes: Function: Latch bolt operated by key outside or lever inside. Outside lever always rigid. Inside lever always free for egress.

Set: 6.0

Doors: 108

6	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK 087100
1	Storeroom Lock	8204 LNNJ	US26D	SA 087100
1	Mort. Cylinder	- to match Owner's existing key system	626	RU 087100
2	Kick Plates	K1050 10" high CSK BEV	US32D	RO 087100
6	Silencer	608 / 609		RO 087100

Notes: Function: Latch bolt by lever either side unless outside lever is locked by key outside. Outside lever remains locked unless unlocked by key. Inside lever always free for egress.

Set: 7.0

Doors: 104, 106

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK 087100
1 Pull Plate	BF 111x70B	US32D	RO 087100
1 Push Plate	70F	US32D	RO 087100
1 Surface Closer	2800ST - pull side mount, stop arm closer	689	NO 087100
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
3 Silencer	608 / 609		RO 087100

END OF SECTION

DAVID ARTHUR CONSULTANTS, INC.

SECTION 08 11 13: HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 01 Section "Administrative Requirements".
2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
4. Division 08 Section "Door Hardware".
5. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.

13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:
1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:
1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40” above sill) or UL 10C.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
   1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
   1. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
      a. CECO Door Products (C).
      b. Curries Company (CU).
      c. Steelcraft (S).

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.

B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.
1. Design: Flush panel.
2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 “Laminated Core”.
    a. Provide 22-gauge steel stiffeners at 6 inches on-center internally welded at 5" on-center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.
    b. Thermal properties to rate at a fully operable minimum U-Factor 0.37 and R-Value 2.7, including insulated door, thermal-break frame and threshold.
    c. Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.38 and R-Value 2.6, including insulated door, kerf type frame, and threshold.
3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053 inch - 1.3-mm) thick steel, Model 2.
4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Manufacturers Basis of Design:

1. Curries Company (CU) - Energy Efficient - 777 Trio-E Series.

2.4 HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16” positive thermal break and integral vinyl weatherstripping.

C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
   1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
   2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
   3. Manufacturers Basis of Design:

      a. Curries Company (CU) – Thermal Break TQ Series.

D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

   1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
   2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
   3. Manufacturers Basis of Design:

      a. Curries Company (CU) - CM Series.
      b. Curries Company (CU) - M Series.

E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

   1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
   2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.7 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.8 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
    a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
        5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.9 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
   1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
   2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
   3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
   4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Standard Steel Doors:

a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.5 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION

SECTION 08 14 00: WOOD DOORS

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein and/or as shown per Contract Documents:
   1. Stock wood doors and frames.
   2. Wood and glass doors.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. Provide manufacturer's data on factory finishes.
B. Provide samples of finishes.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with National Wood Window and Door Association (NWWDA) for grade of door specified.
B. Perform work in accordance with Architectural Woodwork Institute (AWI) specifications for custom doors, Sections 1300, 1400, and 1500.
C. Where there is a conflict between these specifications and the AWI or NWWDA specifications, the stricter will govern.

1.05 WARRANTY

A. Interior doors are to be warranted for two (2) years against disassembly, warping beyond installation tolerances, and delamination.

PART 2: PRODUCTS

2.01 DOORS AND WOOD TYPES FOR DOORS

A. Approved manufacturers for stock doors:
   1. Graham or acceptable alternate.
B. Door types, sizes, and lite divides are shown per Contract Documents and door schedule.

2.02 DOOR CONSTRUCTION

A. All interior wood doors shall be of solid core construction.
B. Raised and flat panel doors to be manufactured as per Section 1400 of the AWI manual, custom quality. Stiles and rails to be of solid wood construction.
C. Glass doors to be manufactured as per Section 1400 of the AWI Manual - Custom Quality. Simulated divided light construction with spacer bars between the glass. Stiles and rails to be of solid wood construction unless otherwise noted on door schedule.
D. All glazing shall be tempered safety glass.
E. Weather-stripping shall be manufacturer's standard.

2.03 FRAME CONSTRUCTION

A. Wood Frames and Jambs:
1. All frames and jambs to be constructed per AWI Section 900, Custom Quality.
2. All wood frames to be solid wood with species matching door material, unless noted otherwise.
3. Frames and jambs to be shop set up and prepped for hardware.

B. Hollow metal frames:
1. Minimum gauges of hollow metal are specified below. Provide heavier gauge if required by details of specific condition. Entire frame shall be the same gauge:
   a. 16-gauge: Interior door frames and glazer opening frames.
   b. 14-gauge: Exterior door frames.
   c. 10-gauge: Hinge reinforcing.
   d. 12-gauge: Other hardware reinforcing.
2. Exterior frames are to be 14-gauge welded construction.
3. Doors are to be shop set-up.
4. Weld reinforcements for hinges are to be 10-gauge. Each door shall have three (3) hinges, unless noted otherwise.
5. Reinforcing for other hardware is to be 14-gauge.
6. Install silencers on frames.
7. Doors and frames shall be prepped for hardware.

2.04 FABRICATION

A. Doors shall be pre-hung at Contractor's option.
B. Doors shall be prepped for hardware on or off-site at Contractor's option.
C. Hardware is as per Section 08 71 00 and door and hardware schedule.
D. Doors shall be finished and glazed in shop.

2.05 FINISH

A. All door components shall be treated with wood preservative or conditioner prior to assembly.
B. Doors to be painted shall be shop primed. Doors to be stained shall be shop prepared and finished. Finish painting and staining shall be per section 09 90 00.

PART 3: EXECUTION

3.01 INSTALLATION

A. Doors shall be hung plumb and true with 1/8" space between the door and frame.
B. Doors shall be hung coplanar within 1/4" measured on the diagonal.
C. Door jambs shall be installed with screws. Holes shall be plugged.
D. Doors shall be re-primed or stained and finished after cutting or planing. All edges of doors shall be sealed when job is complete.
E. Install hardware as per Section 08 71 00.
F. Install doors as per manufacturer's instructions.
G. Interior doors shall be undercut per Engineer/Architect's instructions.

3.02 DELIVERY AND PROTECTION

A. Exterior doors shall be delivered to job after roof is on.
B. Doors shall be protected from damage throughout the course of the job.

C. Interior doors shall not be delivered to the job until HVAC system is in operation and gypsum board is installed and finished.
D. Doors shall be stored in a clean and dry environment until hung. Doors shall be stored in a way so that they will not warp.

3.03 SCHEDULE

A. See Door Schedule per Contract Documents for a complete list of doors for this project.

3.04 CLOSE OUT

A. At end of the job, check that all doors are within the tolerances noted above. Replace any door that has warped or is otherwise beyond acceptable tolerances.
B. Check that all doors swing freely and close easily. Adjust doors as required.
C. Check that all doors have proper clearances at floors, sills, carpets, and rugs.
D. Seal and touch-up doors that have been planed or cut.

END OF SECTION

SECTION 08 43 13: ALUMINUM FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes Tubelite aluminum storefront and all components and installation accessories supplied with the system.
   1. Tubelite 14000 Series Storefront systems: 2" x 4-1/2"
      a. T14000 Storefront (thermal)

1.02 RELATED PRODUCTS

A. Single Manufacture: All products in divisions listed below shall be supplied by a single manufacturer. To ensure consistency in quality, warranty, finish, and product compatibility, products supplied by different manufacturers are not acceptable.
   a. Division 08 42 13 - Aluminum Framed Entrances: Therml=Block Entrance Series

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.
B. Pre-installation Meeting:
   1. Attendees: Owner's Representative, Architect, General Contractor, Consultants, Storefront Installer.
   2. Agenda:
      a. Review and finalize construction schedule.
      b. Review code and project performance compliance documentation and testing requirements including product certification for energy (U-value, SHGC), condensation, ADA, acoustics, etc.
      c. Review product specific mockups and field testing requirements.
      d. Verify availability of materials, installer's personnel, equipment, and facilities required to maintain schedule.
      e. Review means and methods related to installation, including manufacturer's written instructions.
      f. Examine support conditions for compliance with requirements including alignment and attachment to structural members.
      g. Review flashings, membrane interface with storefront, wall penetrations, openings, and conditions of other construction affecting this Work.
      h. Review temporary protection requirements for during and after installation of this Work.

1.04 PERFORMANCE REQUIREMENTS

A. Design Wind Loads
   1. Provide aluminum storefront system with all structural components including but not limited to anchors and mullions based on the wind load design pressures noted on the drawings.
B. Air, Water and Structural Performance:
   1. Air Infiltration Performance:
      a. Shall not exceed 0.060 cfm/ft^2 at 6.24 psf static air pressure differential, when tested per ASTM 283.
   2. Water Infiltration Performance:
      a. Static: No uncontrolled water entry at a 10 psf static pressure differential with water applied at a minimum rate of 5 gal/ft^2 hr when tested per ASTM E 331.
      b. Dynamic: No uncontrolled water entry at 10 psf dynamic pressure with water applied at a minimum rate of 5 gal/ft^2hr when tested per AAMA 501.1.
   3. Structural Performance at design loads:
      a. System to withstand +/- 30 psf when tested per ASTM E330.
         i. Maximum allowable deflection of L/175 of the clear span for spans up to 13'-6" or L/240 of clear spans plus ¼" for spans greater than 13'-6" or an amount that restricts edge deflection of individual glazing lites of glass to ¾" whichever is smaller.

4. Structural Performance at 1.5x design loads:
    a. System to withstand +/- 45 psf when tested per ASTM E330.
        i. There shall be no permanent deformation of main frame members in excess of 0.2% of its clear span, glass breakage, or permanent damage to fasteners or anchors.
5. Interstory Differential Horizontal Movement per AAMA 501.4.
    a. 3 cycles: 0.75" left, back to zero, 0.75" right, back to zero (one complete cycle)
        i. There shall be no failure or gross permanent distortion of anchors, frame, glass, or panels. Glazing gaskets may not disengage and weather seals may not fail.
6. Seismic Horizontal Movement at 1.5X design displacement per AAMA 501.4.
    a. 3 cycles: 3" left, back to zero, 3" right, back to zero (one complete cycle).
        i. There shall be no glass breakage, permanent damage to frame members or anchors.

C. Acoustic Performance:
1. The system shall have a sound transmission class (STC) and an outdoor-indoor transmission class (OITC) rating when tested per ASTM E90 and ASTM E1332. Coordinate performance with 08 80 00 Glazing.
    a. 1" glazing: STC [32], OITC [26].
2. Test results using glass-only values are not acceptable.

D. Thermal Transmittance and Condensation Resistance Performance Requirements
1. Thermal transmittance (U-factor) for window system shall not exceed 0.32 BTU/hr-ft^{2-} ^{O}F per NFRC 100.
2. Solar Heat Gain Coefficient (SHGC) for the window area shall not exceed 0.40 as determined in accordance with NFRC 200.
3. Condensation Resistance Factor (CRF) shall meet or exceed 62CRF$_{frame}$ and 68 CRF$_{glass}$ as determined in accordance with AAMA 1503.

1.04 SUBMITTALS

A. Product Data:
1. Manufacturer's literature for each specified system.
2. Components within assembly, including material descriptions, component profiles, finishes, anchorage and fasteners, glazing, and internal drainage.

B. Shop Drawings:
1. Shop drawings must be prepared by a qualified engineering service under the employ of the window wall manufacturer.
2. Include system dimensions, framed opening requirements and tolerances, affected related Work, anchorage, expansion and contraction joint location and details, and field welding required.
3. Include scaled shop drawings showing detailed relationships with glazing, flashing, internal drainage, joinery, and provisions for thermal expansion.

C. Design Data: Submit framing member structural and physical characteristics, [engineering calculations], and [dimensional limitations].

D. Samples:
1. System components: Submit corner samples, anchors, fasteners, trim, and other materials as requested by the architect.
2. Finish: Submit [two] aluminum sheet stock samples [2" x 3"] for each finish type.

E. Warranty: Submit manufacturer sample warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least twenty years of documented experience.

B. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State that the Project is located.

C. Installer: Company approved by manufacturer and specializing in performing work of this section with at least 5 years of successful documented installation experience.

D. Source Limitations: Obtain the storefront and all products listed in Section 1.02 from a single manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Materials to be packed, loaded, shipped, unloaded, stored and protected in accordance with AAMA CW-10.
B. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of this Work to be performed according to manufacturer's installation instructions and warranty requirements.
B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before fabrication of storefront framing and indicate measurements on Shop Drawings.
C. Install sealant according to sealant manufacturer guidelines.
D. Coordinate installation with other applicable trades.

1.08 WARRANTY

A. Aluminum Storefront Framing Warranty:
   1. Manufacturer agrees to repair or replace defective storefront components for a period of 2 years from the date of shipment.
B. Finish Warranty:
   1. Warranty covers factory-applied organic and anodic finishes on exposed extruded aluminum surfaces without standing water accumulation, against peeling, checking, cracking, chalking and change of color, per applicable AAMA specifications.
      a. Anodized Coatings
         i. AAMA 611 Class I: 10 years
         ii. AAMA 611 Class II: 2 years

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Basis of Design: Aluminum Framed Storefront
   1. Tubelite Inc. E14000 Series Storefront: 2” x 4-1/2” non-thermal
   2. Tubelite Inc. T14000 Series Storefront: 2” x 4-1/2” thermally broken [thermally insulated] *<select>*
   3. Substitutions
      a. Manufacturer’s products that meet specified design requirements may be considered as a substitution. Substitution requests / submittals must include the following, and be submitted at least ten working days prior to the bid date.
         i. Submittal information must include test reports as specified in performance sections.
         ii. Copy of manufactures warranty
         iii. Any additional information as requested
         iv. System details / samples

2.02 ALUMINUM FRAMED STOREFRONT

A. Aluminum Framed Storefront: Factory or field fabricated, field glazed, factory finished aluminum, screw spline construction with infill and related flashings, anchorage and attachment devices.
   1. System dimensions: 2” x 4-1/2”
      a. Exterior face dimensions
         i. Primary mullions: 2”
         ii. Expansion mullion: 2-5/8”
      b. Depth: 4-1/2”

2. Glazing:
    a. Position: center of system
    b. Thickness: 1”
    c. Method: captured and retained with gaskets on all four sides
        i. outside glazed
3. T14000 thermal barriers:
    a. Standard: Thermally Broken
        i. Primary frames: pour-debridge
        ii. Vertical snap-in filler: polyamide strut
        iii. PVC filler at head and sill
    b. Optional: Thermally Insulated
        i. Primary frames: pour-debridge
        ii. Vertical snap-in filler: slotted filler

2.03 FINISHES

A. Finish all exposed areas of aluminum storefront components in accordance with applicable AAMA Voluntary Finish Guide Specification:

SPECIFICATION	DESCRIPTION	DESIGNATION	COLOR
AAMA 611	Class I - Color anodize coating, Eco-friendly etch (0.7 mils thick min)	AA-M10C21A44	Color as selected by Owner

A. Combination anodic oxide and transparent organic coatings as defined in AAMA 612 are not equivalent substitutions for the AAMA 611 anodized finishes shown above due to surface hardness disparities.
B. Applicator Qualifications: Certified by AAMA and listed on AAMA Verified Components List.
C. Verify accuracy of components, quantities, and sizes prior to application of finishes.
D. Applicator – PVDF Based Finishes:
    a. Use regenerative thermal oxidizer to destroy VOC’s.
    b. Utilize chrome-based five –stage pretreatment system applied in accordance with AAMA and ASTM standards. Use of a chrome-based five-stage system ensures long-term adhesion and an option for an extended warranty.
    c. Possess in-house blending capabilities, allow for only specific amount of paint needed for each project.
    d. Utilize automated rotary atomization spray bell application providing uniform coverage with manual spray reinforcement for coverage in areas unreachable by automation.
    e. Employ skilled professional field service division to repair warranty or application issues arising at Project site.
    f. Utilize documented quality control protocol in accordance with AAMA procedures.
E. Applicator – Anodize Finishes
    a. Offer both caustic (traditional) and eco-friendly (acid) etching technologies.
    b. Utilize fully automated, computer-controlled process lines for consistency through Project.
    c. Utilize documented quality control protocol in accordance with AAMA 611 procedures.
        i. Online quality assurance inspection:
            1. Random sample check for color uniformity, maximum difference of 5AE.
            2. Random coating thickness testing:
                a. Class I clear and color anodize – 0.7 mils (18 microns)
                b. Class II clear anodize – 0.4 mils (10 microns)

2.04 MATERIALS

A. Aluminum extrusions: Alloy 6063-T6 or 6063-T5 in accordance with ASTM B221, and extruded within commercial tolerances and free from defects that impair strength and/or durability.
    1. Optional recycled aluminum:

a. Provide EcoLuminum™ by Tubelite containing 70% recycled aluminum comprised of 55% pre-consumer and 15% post-consumer material.

B. Primary extruded framing members will be a minimum 0.075" thick.
C. Extruded or formed trim components will be a minimum 0.060" thick.
D. Structural Steel Reinforcement and anchors necessary to meet the performance requirements of 1.04.
   1. ASTM A36/A36M; galvanized per ASTM A123/A123M.
   2. Where galvanizing is not compatible with alloy of component parts, apply heavy coating of epoxy paint where necessary to prevent galvanic action with dissimilar materials.
E. Galvanizing Repair Paint: High zinc content paint for over welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight and in compliance with SSPC Paint 20.
F. Bituminous Paint: Cold applied asphalt mastic, containing no asbestos fibers.
G. Thermal Break:
   1. Pour and debridge thermal barrier shall be a two part chemically curing polyurethane casting resin poured in place. specified. Thermal barrier extrusion pour cavities shall be mechanically lanced or azo-braded to secure the thermal break material.
   2. Continuous extruded polyamide with 25% glass fiber reinforcing, mechanically crimped into cross-knurled cavities at vertical filler extrusion.
H. Glazing and Sealant material:
   1. Setting blocks and Edge Blocking: Provide in sizes and locations recommended by GANA Glazing Manual. Setting blocks used in conjunction with soft-coat low-e glass shall be silicone.
   2. Glazing gaskets shall be EPDM [silicone], weather-resistant, and compatible with all materials in contact.
   3. All sealants shall comply with applicable provisions of AAMA 800 and/or Federal Specifications FS-TT-001 and 002 Series.
   4. Frame joinery sealants shall be suitable for application specified and as tested and approved by the window wall manufacturer.

2.05 FABRICATION

A. Ensure joints and corners are flush, hairline and weatherproof, accurately fitted and secured.
   1. Prepare framework to receive anchors and hardware.
   2. Conceal fasteners and attachments from view.
   3. Reinforce framework as required for imposed loads.
B. Expansion and Contraction: Fabricate to allow for thermal movement of materials when subjected to project temperature differential requirements.
C. System Internal Drainage: Drain to exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   1. Fabricate drainage system so weeps and flashings are integral to system and others are not required.
D. Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
E. Provide for membrane interface as indicated on architectural drawings.

2.06 COMPONENTS

A. Glass
   1. Provide in accordance with Section 08 80 00.
B. Glazing
   1. Glazing method shall be in accordance with manufacturer installation instruction and the GANA Glazing Manual for specified glass type, or as approved by the glass fabricator.
   2. Refer to Section 08 80 00 for requirements.

PART 3 – EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of this Work.
B. Notify Contractor in writing, with a copy sent to Owner and Architect, of any conditions detrimental to proper and timely completion of this Work.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Start of this Work shall indicate acceptance of areas and conditions as satisfactory by the Installer.

3.02 INSTALLATION

A. Preparation: Coordinate and furnish anchors, concrete inserts, sleeves, anchor bolts, and other accessories to be embedded in concrete or masonry construction or welded to structural steel. Coordinate delivery of these items to project site.
B. Install aluminum storefront framing in accordance with manufacturer's installation instructions, reviewed product data, approved shop drawings, and as indicated on Drawings (per Professional Engineer review when applicable).
C. Do not install damaged components.
D. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
E. Provide alignment attachments and shims to permanently fasten system to building structure.
F. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, [aligning with adjacent work].
G. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
H. Coordinate attachment and seal of membrane materials per architectural drawings. Refer to section 07 25 00.
I. Install accessories with positive anchorage to building, weather tight mounting, provisions for thermal expansion, and coordinate installation with flashings and other components.
J. Install hardware using templates provided.
    1. Refer to Section 08 71 00 for hardware installation requirements.
K. Install glass in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.
L. Install perimeter sealant in accordance with Section 07 92 00.
M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.
N. Adjust operating hardware for smooth operation.
O. Tolerances:
    1. Maximum variation from plumb: 1/16” every 3’ non-cumulative, or 1/16” per 10’, whichever is least.
    2. Maximum Misalignment of two adjoining members abutting in plane: 1/32”.

3.03 CLEANING

A. Comply with AAMA 609 and 610 for methods, equipment, and materials to clean finished aluminum after installation and for subsequent periodic maintenance.
B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths.
C. Take care to remove dirt from corners, and wipe surfaces clean.
D. Remove excess sealant from glass and aluminum by method acceptable to sealant and finish manufacturer.

3.04 PROTECTION

A. Protect installed products from damage during subsequent construction.
B. Protect anodized finishes from prolonged exposure to alkaline, such as lime in masonry mortar, or acidic and other corrosive materials.

END OF SECTION

SECTION 08 50 00: WINDOWS

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the Scope of Work described herein and/or as shown on the Contract Documents:
B. Operable T fixed wood/vinyl clad windows.
C. Vinyl Glass Block.
D. Window screens.
E. Window operating hardware.

1.02 RELATED WORK

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. General: All submittals shall be in conformance with Section 01 30 00 Administrative Requirements.
B. Product Data: Submit manufacturer's product data and installation guides.
C. Shop Drawings: Provide drawings indicating direction of operable parts, typical jamb, head and sill conditions, and special mullion reinforcement details.
D. Color Samples: Submit selection and verification samples, including the following:
   1. Hardware: Submit samples indicating typical finish on window hardware.
   2. Cladding: Submit color samples of vinyl cladding.
E. Contract Closeout Submittals: Submit the following:
   1. Warranty documents specified herein.
   2. Owner's Manual: Bound manual clearly identified with project name, locations, and completion date. Identify type and size of units installed. Provide recommendations for periodic inspections, care, and maintenance. Identify common causes of damage with instructions for temporary repair.

1.04 QUALITY ASSURANCE

A. Perform Scope of Work in accordance with Architectural Woodwork Institute (AWI) specifications for premium windows and screens.
B. Installer Qualifications: Utilize an installer having demonstrated successful experience on projects of similar size and complexity.
C. Certifications:
   1. Insulating Glass Units: Provide insulating glass units permanently marked with certification label of Insulating Glass Certification Council (IGCC) indicating compliance with ASTM E2190.
   2. Insulating Glass Units: Provide insulating glass units permanently marked with certification label of Insulating Glass Manufacturers Association of Canada (IGMAC) indicating compliance with CAN/CGSB or ASTM E2190.

1.05 WARRANTY

A. Exterior windows are to be warranted for 10 years against delamination, disassembly, leaking, and warping beyond installation tolerances or any other physical defects.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard limited warranty document. Manufacturer's limited warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

PART 2: PRODUCTS

2.01 ANDERSEN WINDOWS

A. Double-Hung: Andersen Windows
1. Andersen Windows, Inc., 100 4th Ave. N., Bayport, MN 55003-1096, (800) 299-9029, email: technicalsupport@andersenwindows.com, www.andersenwindows.com

B. Manufactured Units
1. Proprietary Products/ Systems. Vinyl clad double-hung tilting wood windows, including the following:
   a. Andersen® 400 Series Tilt-Wash Double-Hung Windows, or equal.

C. Materials
1. Frame and Sash: Fabricated from wood species approved in WDMA Industry Standard I.S.2 and treated according to WDMA I.S.4.
2. Vinyl Cladding: Rigid vinyl (PVC) complying with requirements of ASTM D4216, in the following color: TBD
3. Weatherstripping:
   a. Head Weatherstripping: Dual flexible PVC bulb.
   b. Jamb Weatherstripping: Flexible PVC leaf and bulb.
   c. Check Rail Interlock Weatherstripping: Flexible PVC bulb, with gasket type covered foam between bottom rail and sill cover.
   d. Vertical Weatherstripping: Compressible PVC profiles installed in side jamb liners contacting sash edges with flexible fin assisting contact along lower sash edges. Provide fin-pile plug attached to jamb liner at check rail area of side jamb between sash runs. Seal lower jamb liner with 2 silicone closed sell foam plugs.
4. Hardware:
   a. Sliding Window Hardware:
      i. Sash Lock Mechanism Type and Material: Flush mounted rotating sash handle, Metro Style, injection molded plastic, color TBD.
      ii. Sash Lock Mechanism Type and Material: Flush mounted rotating sash handle, Estate Style, forged brass, color TBD.
      iii. Roller Type and Material: Dual djustable shoe, Teflon-impregnated glass fiber reinforced polymer.
      iv. Head and Sill Track Material and Color: Rigid vinyl, color TBD.

D. Glazing:
1. General: Insulating glass units certified through the Insulation Glass certification Council as conforming to the requirements of IGCC. Provide dual sealed units consisting of polyisobutylene primary seal and silicone secondary seal. Provide metal spacers with bent or soldered corners.
2. Low-E Glass, Argon Blend Filled Insulating Glass Units:
   a. Glass: Insulating glass units consisting of an outboard lite of clear annealed glass conforming to ASTM C1036, Type 1, Class 1, q3 and an inboard lite of clear heat strengthened glass conforming to ASTM C1048, Type 1, Class1, q3, Kind HS.
   b. Low-E Coating: Magnetron sputtering vapor deposition (MSVD) Low-E coating applied to No. 2 surface.
   c. Filling: Fill space between glass lites with argon gas blend.
   d. Protective removable polyolefin film applied to glass surfaces No. 1 and 4.

E. Joining Systems:
1. Wood Non-reinforced Joining: Machined LVL wood members treated with water repellent preservative after machining in accordance with WDMA I.S.4.
   a. Gusset Plates: Galvanized steel plates that attach to wood frame.
   b. Exterior Trim Strips: As recommended by window manufacturer for each joining method used.
   c. Color: Match window unit exterior color.

F. Accessories:
1. Grilles: Finelight™ Grilles: Provide contour profile aluminum muntin bars permanently mounted within insulation glass unit where indicated on Drawings.
   a. Grille Intersections: ABS concealed plastic connectors with nylon end keepers.
   b. Exterior and Interior Surface: To Be Determined
   c. Width: ¾ inch (19.1 mm)
   d. Pattern as indicated on Contract Documents.
2. Extension Jambs:
   a. Extension jamb for wall thickness noted on Contract Documents.
   b. Finish: Unfinished natural wood.
   c. Extension Jambs: Unfinished wood members machined from clear material where staining is specified or veneered finger joined material approved in ANSI/AAMA/NWWDA 101/I.S.2 where painting is specified. Pre-drill extension jambs for application.
3. Exterior Trim:
   a. Exterior Trim and Casing: Where indicated on Contract Drawings, provide 1-½ inch aluminum sheathed pine.
      i. Color: To Be Determined.
4. Support Mullion Trim: Provide 2 inch wide wood filler and vinyl trim strip where indicated on Contract Documents.
   a. Treat wood members with water repellent preservative after machining in accordance with WDMA I.S.4.
   b. Provide exterior vinyl trim strip in color matching window exterior.
   c. Provide 6 inch long sheet vinyl head flashing in color matching window exterior at mullion head.
5. Insect Screens: Provide venting sash with an insect screen, including attachment hardware.
   a. Frames: 0.024 inch rolled aluminum frame with chromate conversion coating. Provide matching corner locks and latch retainers.
   b. Insect Screen Cloth: 18 by 16 aluminum mesh, gunmetal finish.
   c. Frame Finish: High-bake polyester finish in the following color:
      i. Frame Finish: To Be Determined.
6. Sash Lifts: Injection molded PVC composite in the following color:
   a. Color Finish: To Be Determined.

G. Fabrication
1. Preservative Treatment: Treat wood sash and frame members after machining with water repellent preservative per WDMA I.S.4.
2. Vinyl Cladding of Frame Units: Finish frame units with preformed rigid vinyl to provide a joint-free cover. Bond sheathing to wood frame with vinyl-to-wood adhesive.
   a. Provide vinyl sheathing with 0.040 inch integral flanges for installation.
      i. Color: To Be Determined.
3. Interior Finish: Unfinished pine.
4. Sash: Treat sash members with preservative, water repellent, conductive solution in accordance with WDMA I.S.4.

a. Stabilizer Coating: Apply minimum 1.5 mil dry thickness stabilizer to all surfaces to be top coated.

5. Factory-apply weatherstripping.

H. Performance Requirements: Provide products/systems that have been manufactured, fabricated, and installed to the following performance criteria:

1. Comply with ANSI/AAMA/NWWDA 101/I.S.2.
2. Performance Grade: R
3. U-Factor (NFRC 100): 0.28
4. Solar Heat Gain Coefficient (SHGC) (NFRC 200): 0.38
5. Outdoor-Indoor Transmission Class (OITC) (ASTM E90): 23
6. Sound Transmission Class (STC) (ASTM E90): 26

2.02 WINDOW CONSTRUCTION

A. Windows to be manufactured as per Section 1000 of the AWI Manual, Premium Quality. Stiles and rails to be of solid wood construction.
B. Windows are to be simulated divided light construction, fine lite internal grilles.
C. Window types and sizes are noted on the Contract Documents.

2.03 ACCESSORIES AND GLAZING

A. Glazing shall be tinted, insulated, and Low-E. Coordinate with manufacturer's standard options. Coordinate with Engineer if any discrepancies are discovered.
B. Operating hardware per Owner; selection color – To Be Determined.
C. Fiberglass screen, color – To Be Determined.
D. Muntins: None

2.04 FINISH

A. Exterior of windows are to be vinyl clad.
B. All window parts shall be treated in wood preservative prior to assembly.
C. Interior of window to be painted, color selected by Owner.
D. All jambs and trim shall be back primed prior to installation.

2.05 FABRICATION

A. Windows are to be completely assembled and mulled together, where applicable, at the factory.
B. Windows are to be fully weather-stripped at the factory unless otherwise noted.
C. Ship windows with temporary handles for use during construction. Ship permanent handles and hardware boxed and labeled separately.
D. Windows shall be glazed in shop.
E. Exterior trim is to be field applied.
F. Coordinate sill construction with trim details on Contract Documents. Interior extension jambs are to be field applied.
G. Design wind loads are as noted on the Contract Documents.

PART 3: EXECUTION

3.01 INSTALLATION

A. Site Verification of Conditions: Verify that site conditions are acceptable for installation of units, including:

1. Masonry openings are square and dimensions are correct.
2. Rough openings are square and dimensions are correct.

3. Sill plates are level.
4. Wood frame walls are dry, clean, sound, and well nailed or glued, free of voids and without offsets at joints.
5. Nail heads are driven flush with surfaces in openings and within 3 inches of rough opening.

B. Do not proceed with installation of units until unacceptable conditions are corrected.
C. Windows shall be installed true, level, plumb, and coplanar with opening.
D. Windows shall be hung with screws. Holes to be plugged.
E. Windows shall be installed as per manufacturer's details and Contract Documents.
F. Do not install window until all openings are properly flashed and otherwise prepared.
G. General:
1. Remove unit components, parts, accessories, and installation guides from carton.
2. Inspect unit components and verify that components are not damaged and that parts are included before disposing of carton.
3. Shop-assemble multiple units before installation in accordance with manufacturer's installation guides.

H. Interface With Other Work:
1. Perform installation in accordance with Manufacturer's instructions.
2. Install units level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
3. Install insulation in shim space around unit perimeter to maintain continuity of building insulation. Do not overfill.
4. Hold back exterior siding or other finish materials from edge of unit to allow for expansion and contraction and installation of proper joint sealant with backing materials. Seal perimeter of unit after exterior finish is applied per requirements of Section 07 90 00 Joint Protection.
5. Finish interior units per requirements specified in related sections. Refer to, and comply with, additional requirements in manufacturer's installation guides.
6. Install optional hardware and unit accessories after cleaning.

I. Site Tolerances:
1. Adjust operation, insect screens, hardware, and accessories for a tight fit at contact points and weatherstripping for smooth operation and weathertight closure.

3.02 DELIVERY AND PROTECTION

A. Windows shall be delivered to the job after the roof is on.
B. Windows shall be protected from damage throughout the course of the job.
C. Windows shall be stored in a clean and dry environment until hung. Windows shall be stored in a way so that they will not warp or be damaged.
D. Protect installed work from damage due to subsequent construction activity on the site.

3.03 SCHEDULE

See Windows Schedule on Contract Documents for a complete list of windows for this job.

3.04 CLOSE OUT

A. Remove all tape, protection, and labels. Clean all windows and glass at the end of the job.
B. Clean all woodwork around windows.

C. Touch-up or other wise re-finish any paint or wood on windows damaged during construction.
D. Clean units using cleaning material and methods specifically6 recommended by window manufacturer.
E. Remove excess sealants, glazing materials, dirt, and other substances.
F. Avoid damaging protective coatings and finishes.
G. Protect unit surfaces from masonry cleaning solution that could damage insulation glass panels or hardware.
H. Remove debris from work site and properly dispose of debris.
I. Protect installed work from damage due to subsequent construction activity on the site.

END OF SECTION

SECTION 08 80 00: GLAZING

PART 1: GENERAL

1.01 SUMMARY

A. Scope for this section includes providing all labor and material required to perform the scope of work described herein and/or as shown on the Contract Documents:
   1. Provide glass and glazing as referenced from other sections of these specifications.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. Submit literature on glazing compounds.
B. Submit manufacturer's literature on mastic for mirrors.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with GANA Glazing Manual.

1.05 WARRANTY

A. Provide a five (5) year warranty for replacement of insulating glass units and mirrors due to defects caused by their manufacturer or installation.

PART 2: PRODUCTS

2.01 INTERIOR SEALED INSULATION/GLASS MATERIALS

A. Insulating glass unit: 1/8" outer and inner glass with 5/8" aluminum spacer at perimeter.
B. Glazing to be clear.

2.02 EXTERIOR SEALED INSULATION/GLASS MATERIALS

A. All exterior glazing to have a light tint.
   1. Contractor to submit samples for tint options.

2.03 SEALED INSULATING GLASS MATERIALS

A. Insulating Glass Unit, Northern Low-E for Manufactured Windows: 1/8" outer and inner glass with 5/8" aluminum spacer at perimeter, white. Low-E film on inner surface of outer glass.
B. Insulating Glass Unit, Tempered: 1/8" tempered float glass on outer and inner glass with 5/8" aluminum spacer at perimeter, white. Provide written verification of tempering.
C. Insulating units to have spacer bars to match grid work of muntins on windows and doors.
D. Insulating units to be manufactured per ASTM E774 and E773.

2.04 GLAZING COMPOUNDS

A. Polyurethane sealant, single component, chemical curing, non-bleeding, and non-staining. Color to be selected by samples.
B. Silicone sealant, single component, chemical curing, non-bleeding, and non-staining.

2.05 ADHESIVES

A. Mirror adhesives to be Mirro-Mastic by Palmer Products Corporation, 800-431-6151. Ensure that product is compatible with backing of mirror.
B. Primer for mirror backing to be Mirro-Bac, if backing is not compatible with mastic.

PART 3: EXECUTION

3.01 INSTALLATION: FACTORY GLAZED UNITS

A. Factory glazed units are to be glazed as per the manufacturer's standards and per approved Shop Drawings or literature.

3.02 INSTALLATION: FIELD GLAZED INTERIOR MILLWORK

A. Glass for interior millwork doors and panels is to be dry glazed unless otherwise noted per Contract Documents.

3.03 DELIVERY AND PROTECTION

A. Glass shall be delivered to job in crates and remain protected until set.
B. Reject any glass that arrives on the job chipped or cracked or gets chipped or cracked before, during, or after installation.
C. Protect all glass from damage or breakage after installation.

3.04 CLEANING

A. Remove labels after work is complete.
B. Remove all dirt and construction debris from glass and mirrors.
C. Remove all sealants and glazing material from glass and mirrors to sight lines at stops of glass.

3.05 SCHEDULE

A. See door schedule, window schedule, and millwork details on Contract Documents for location of types of glass and mirrors needed for this job.

END OF SECTION

SECTION 09 21 16: GYPSUM BOARD ASSEMBLIES

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein and/or as shown per Contract Documents:
   1 Gypsum board, joint treatment, and accessories.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

PART 2: PRODUCTS

2.01 GYPSUM BOARD SYSTEM

A. Use only those materials that are compatible with gypsum board system as described by the manufacturer and that will not void warranties or Underwriter's Listings (UL).
B. Gypsum board shall be manufactured by United States Gypsum or approved acceptable alternate.
C. Wood/metal studs and track may be used for framing and furring and shall be of gauge appropriate for length of studs and spacing. Deflection is to be L/360.
D. Information on metal studs can be obtained from: Technical Information by Unimast Incorporated 1-800-969-4110.
E. Gypsum board shall be of maximum lengths available and practical for the job. Ends shall be square cut and edges tapered. Thickness shall be 5/8" unless noted otherwise. The following types of gypsum board are required for this job:
   1. 5/8" thick, 48" wide Sheetrock brand, regular Gypsum panels, lengths as required. per Contract Documents.
   2. 5/8" thick, 48" wide sheetrock brand, water resistant gypsum panels, lengths as required. per Contract Documents.
   3. 5/8" thick, 48" wide sheetrock brand, abuse resistant gypsum lengths as required. per Contract Documents.
   4. Moisture resistant, gypsum board in damp areas, and lavatory walls.

2.03 ACCESSORIES

A. Gypsum Board Systems:
   1. Fasteners:
      a. Framing – type S or S-12.
      b. Drywall – type S or S-12.
   2. Coating: Corrosion resistant in moisture areas.
   3. Tape: Sheetrock Joint Tape.
   4. Taping compound: Sheetrock Taping Joint Compound, ready mixed.
   5. Topping compound: Sheetrock Topping Joint Compound, ready mixed.
   6. Acoustic Sealant: USG, Sheetrock Acoustic Sealant.
   7. ¾" cold rolled galvanized channel.
   8. Corner reinforcement Dur-a-Bead Corner Bead, No.103.

PART 3: EXECUTION

3.01 INSTALLATION - GYPSUM BOARD

A. All toilet rooms to have moisture resistant walls and ceilings.
B. Apply gypsum panels perpendicular to studs. Position all ends over studs. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition.
C. Screw spacing that follows is for non-rated construction. For fire-rated construction, obtain screw spacing from fire test reports.
   1 Space screws 16” on center (o.c.) in field and along abutting end joints.
   2 Wood substrates attach to ceilings with type W screws at 12” o.c. maximum in field along end joints.
   3 Metal substrates attach to metal studs with type “S” screws at 16” o.c. in field along end joint.
D. Verify location of all toilet room accessories, wall mounted fixtures and accessories or window treatments for placement of blocking.
E. Abuse resistant gypsum to be installed in the truck bay on walls and meeting/training room walls. Standard gypsum board may be used on the ceiling.

3.02 ACCESSORY APPLICATION

A. Joint System – finish all face panel joints and internal angles with a United States Gypsum Company Joint System installed according to manufacturer’s directions. Spot coat exposed fasteners on face layers and finish corner bead, control joints, and trim as required, with at least three (3) coats of joint compound, feathered out onto panel faces and sanded smooth.
B. Corner Bead – Reinforce all vertical and horizontal exterior corners with corner bead fastened with 1/16” galvanized staples 9” o.c. or fasteners as recommended by manufacturer on both flanges along entire length of bead.
C. Screws – Power-drive at least 3/8” from edges or ends of panel to provide uniform dimple 1/32” deep.

3.03 INSTALLATION - GENERAL

A. Prior to stocking job with gypsum board, building shall be enclosed and protected from freezing. Building shall be capable of being heated evenly to a temperature of 55° F.
B. Prior to hanging gypsum board, subcontractor shall inspect framing to ensure that the framing is ready to receive gypsum board.
C. Do not start gypsum board installation until framing is complete and all rough inspections have been made. Joints between ceiling and walls to be sealed with acoustical sealant.
D. Compounds shall be stored in areas protected from freezing.
E. Job shall be kept clean and neat during installation of gypsum board. All scraps shall be removed each night. During taping and finishing, all spillage of compound shall be removed from the floor as work proceeds.
F. During installation and after completion, all walls shall be adequately protected from damage.

END OF SECTION

SECTION 09 53 00: ACOUSTICAL CEILING SUSPENSION ASSEMBLIES

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes all material required to perform the scope of work described herein and/or as shown on the Contract Documents.
   1. Suspended acoustical panels and exposed suspension systems for ceilings.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 DEFINITIONS

A. AC: Articulation Class.
B. CAC: Ceiling Articulation Class.
C. LR: Light Reflectance.
D. NRC: Noise Reduction Coefficient.

1.04 SUBMITTALS

A. Samples - Submit representative sample of color and finish of all exposed materials.
B. Shop Drawings:
   1. Reflected ceiling plans - If requested, Contractor shall submit a layout arrangement of ceiling design, dimensions, and locations of related integrated lighting and air distribution components.
   2. Installation drawings - Detail complete installation including suspension system, installation of related lighting and air distribution components, access requirements, sound absorption requirements, and fire rating requirements when applicable.
   3. Manufacturer's data - Submit manufacturers catalog cut sheets or standard drawings showing details of system with project conditions clearly identified and manufacturer's recommended installation instructions.
C. Maintenance materials - Submit 2% of amount of ceiling components installed, minimum of four (4) tiles.
D. Warranty - Manufacturer's standard warranty or extent of conditions allowable and duration of warranty.

1.05 DELIVERY AND STORAGE OF MATERIALS

A. All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements.
B. Storage time of materials at the jobsite should be as short as possible and environmental conditions should be as near as possible to those specified for occupancy (see no.1.6 below). Excess humidity during storage can cause expansion of material and possible warp, sag, or pouch after installation. Chemical changes in the mat and/or coatings can be aggravated by excess humidity and cause discoloration during storage, even in unopened cartons. Cartons should be removed from pallets and stringers to prevent distortion of material. Long-term (6-12 months) storage under uncontrolled environmental conditions should be avoided.
C. Damaged deteriorated materials should be removed from the premises immediately before installation. To stabilize tile and panels, store them at a location where

temperature and humidity conditions duplicate those ambient during installation and anticipated for occupant.

1.06 ENVIRONMENTAL CONDITIONS

A. Installation of acoustical panels shall not begin until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from plaster and concrete scope of work has dissipated.
B. Do not use ceiling panels in extreme or continuous high humidity or areas exposed directly to weather or water. Ceiling panels are sized and designed for use within the standard occupancy range of temperature and humidity, 65-85°F (18-29°C), no more than 70% relative humidity (RH). Humidity can greatly affect product dimensional stability and sag resistance. Sag can become noticeable during periods of high humidity lasting only a few hours.
C. Allow time for dimensional changes in ceiling panels stored at temperature/RH conditions well outside of those recommended for service. With increase in temperature/RH, these products expand up to 1/64 in/ft. (4.3mm/m) at 85°F (29°C/90%RH) and may not fit into a fixed grid. Conversely, with decreases, these products will be undersized, but expand to normal when standard ambient conditions return.
D. For some pattern edge details, if perimeter panels must be cut smaller, the cut edge must be field-rabetted, or the wall angle must be lowered by reveal depth.

1.07 QUALITY ASSURANCE

A. Single source responsibility to obtain either lifetime ceiling system warranty or 15 year ceiling system warranty; also to obtain color match or ceiling panel and suspension system comparability. All acoustical panel and suspension system components shall be produced and supplied by one (1) manufacturer. Material supplied by more than one (1) manufacturer is not acceptable.
B. Subcontractor qualifications: Installer shall have successful experience in the installation of suspended ceiling systems on projects with requirements similar to the requirements specified.
C. Source quality control:
    1. Test reports: Manufacturers will provide test certification for minimum requirements as tested in accordance with applicable industry standards and/or to meet performance standards specified by various agencies.
    2. Changes from system: System performance following any substitution of materials or change in assembly design must be certified by the manufacturer.

1.08 PROJECT CONDITIONS

A. Environmental requirements for interior installation: Building shall be enclosed with windows and exterior doors in place and glazed and roof watertight before installation of ceiling system and related ceiling components. Climate condition range of 60-85°F (16-29°C) with a max 75%RH.
B. Coordination with other scope of work:
    1. Mechanical scope of work: Ductwork above ceiling shall be complete and permanent heating and cooling systems operating to climate conditions prior to installation of ceiling components.
    2. Electrical scope of work: Installation of conduit above ceiling shall be complete before installation of ceiling components.
C. Protection: Protect completed work above ceiling system from damage during installation of ceiling components.

1.09 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Acoustical Ceiling Panels: Full-size panels acceptable alternate to 2% of quantity installed, minimum of four (4) tiles.
   2. Suspension System Components: Quantity of each exposed component acceptable alternate to 2% of quantity installed.
   3. Hold-Down Clips: Acceptable alternate to 2% of amount installed.

PART 2: PRODUCTS

2.01 MANUFACTURER

A. Ceiling panels as manufactured by USG Interiors, Inc. Ceilings Division, Chicago, Illinois, USA, or acceptable alternate.
B. Panels:
   1. Astro Climaplus.
   2. 2' x 2' x 5/8", Class A.
   3. Edge: SLT.
   4. .55 NRC
   5. 35 CAC
   6. Color: White.
C. Grid:
   1. USG Dx.
   2. Color: White.
D. Accessories:
   1. All accessories shall be according to manufacturer recommendations.

PART 3: EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Examine areas to receive ceiling panels for conditions that will adversely affect installation. Provide written report of discrepancies.
B. Do not start work until unsatisfactory conditions are corrected.
C. Scope of work to be concealed: Verify work above ceiling is complete and installed in manner that will not affect layout and installation of ceiling panels.
D. Beginning of installation shall signify acceptance of conditions in areas to receive ceiling panels.
E. Field dimensions must be verified prior to installation.

3.02 INSTALLATION

A. Standard Reference: Install in accordance with ASTM C636, Ceilings Interior Systems Construction Association (CISCA) and any applicable building code requirement.
B. Manufacturer's reference: Install ceiling panels in exposed grid systems, supported on all edges, in accordance with manufacturer's current printed recommendations.
C. Drawing reference: Install ceiling panels in accordance with approved shop drawings and Contract Documents.

3.03 CLOSE OUT

A. Repair or replace any damaged panels prior to close-out.
B. Clean all panels to remove any dust or dirt, which accumulated during construction.
C. Leave the required additional panels for the Owner's future use.
D. Remove all scraps and left over pieces from the building.
E. Paint or touchup any marks left on walls, tiles, or grid as needed.

END OF SECTION

SECTION 09 65 19.23: RESILIENT TILE FLOORING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   A. Flooring and accessories as shown on the drawings and schedules and as indicated by the requirements of this section.
   B. Drawings and General Provisions of the Contract that apply to the work of this section.

1.02 RELATED SECTIONS

A. All related sections incorporated within Contract Documents.
B. Division 9 sections for floor finishes related to this section but not the work of this section
C. Division 3 Concrete; no work in this section
D. Division 6 Wood and Plastics; not the work of this section
E. Division 7 Thermal and Moisture Protection; not the work of this section

1.03 REFERENCES

A. Armstrong Flooring Technical Manuals
Armstrong Flooring Guaranteed Installation Systems instructions.

B. ASTM International:
   1. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
   2. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
   3. ASTM F 1700 Standard Specification for Solid Vinyl Tile
   4. ASTM F 1861 Standard Specification for Resilient Wall Base
   5. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
   6. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

1.04 SYSTEM DESCRIPTION

A. Performance Requirements: Provide flooring which has been manufactured, fabricated, and installed to performance criteria certified by manufacturer without defects, damage, or failure.
B. Administrative Requirements
   1. Pre-installation Meeting: Conduct an on-site pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.
C. Sequencing and Scheduling
   1. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.
   2. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test.

1.05 SUBMITTALS

A. Submit shop drawings, seaming plan, coving details, and manufacturer's technical data, installation, and maintenance instructions (latest edition of Armstrong Flooring Guaranteed Installation Systems instructions for flooring and accessories.
B. Submit the manufacturer's standard samples showing the required colors for flooring and applicable accessories.
C. Submit Safety Data Sheets (SDS) available for adhesives, moisture mitigation systems, primers, patching/leveling compounds, floor finishes (polishes) and cleaning agents and Material Information Sheets for flooring products.
D. If required, submit the manufacturer's certification that the flooring has been tested by an independent laboratory and complies with the required fire tests.
E. Closeout Submittals: Submit the following:
    1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
    2. Warranty: Warranty documents specified herein.

1.06 QUALITY ASSURANCE

A. Single-Source Responsibility: provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.
B. Select an installer who is experienced and competent in the installation of Armstrong resilient solid vinyl tile flooring and the use of Armstrong Flooring subfloor preparation products.
    1. Engage installers certified as Armstrong Commercial Flooring Certified Installers
    2. Confirm installer's certification by requesting their credentials

1.07 DELIVERY, STORAGE AND HANDLING

A. Comply with Division 1 Product Requirements Sections.
B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
C. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.
D. Store materials in a clean, dry, enclosed space off the ground, protected from harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer. Protect adhesives from freezing. Store flooring, adhesives, and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

1.08 PROJECT CONDITIONS

A. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65ºF (18ºC) and a maximum temperature of 85ºF (29ºC) for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55ºF (13ºC) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances. Refer to the Armstrong Flooring Guaranteed Installations Systems instructions for a complete guide on project conditions.

1.09 LIMITED WARRANTY

A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.
B. Limited Warranty Period: 20 years for Parallel® USA Luxury Flooring.
C. The Limited Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.
D. For the Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

1.10 EXTENDED SYSTEM LIMITED WARRANTY

A. Resilient Flooring System: Submit a written warranty executed by the manufacturer, agreeing to repair or replace system (subfloor preparation products, adhesive, and floor covering) that fails within the warranty period.
B. Limited Warranty Period: 10 years on top of the Resilient Flooring Limited Warranty.
C. S-463 Level Strong™ cement based self-leveling compound, S-466 Patch Strong™ flexible patching and smoothing compound, S-464 Prime Strong™ acrylic primer for porous substrates, S-465 NP Prime Strong™ acrylic primer for non-porous substrates, S-462 Seal Strong™ two-part moisture mitigation system.
D. The installation of an Armstrong Flooring product along with the recommended Armstrong Flooring adhesive, as well as any one of the Strong System subfloor preparation products listed above, provides 10 additional years of limited warranty coverage. The Strong System limited warranty covers the installation integrity for the length of the flooring product warranty plus 10 years. To qualify for the Strong System Warranty, any subfloor preparation product needed for an installation must be an Armstrong Flooring product.
E. For the System Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.
F. When Armstrong Flooring Strong System subfloor preparation products are used with other manufacturers' floor coverings, adhesives, or other subfloor preparation products, Armstrong Flooring warrants our products to be free from manufacturing defects from the date of purchase through the limited warranty period of 15 years.

1.11 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials from same production run as products installed. Packaged with protective covering for storage and identified with appropriate labels.
    1. Quantity: Furnish quantity of flooring units equal to 5% of amount installed.
    2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage, and protection of extra material.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Resilient tile flooring, wall base, adhesives and subfloor preparation products and accessories:

    1. Armstrong Flooring Inc., 1770 Hempstead Road, Lancaster, PA 17605, armstrongflooring.com/commercial. Used as example of required quality of product.
    2. Material manufacturer must have a headquarters in the United States of America.

2.02 RESILIENT TILE FLOORING MATERIALS

A. Provide Parallel® USA Luxury Flooring manufactured by Armstrong Flooring Inc.
   1. Description: A layered construction consisting of a tough, clear, rigid vinyl wear layer protecting a high-fidelity print layer on a solid vinyl backing. Protected by a diamond-infused UV-cured polyurethane finish, the wear surface is embossed with different textures to enhance each of the printed visuals. Colors are insoluble in water and resistant to cleaning agents and light.
   2. Reference specification - ASTM F 1700, “Standard Specification for Solid Vinyl Tile", Class III, Type B – Embossed Surface. Meets requirements for size, squareness, thickness, thickness of wear layer, residual indentation, resistance to chemicals, resistance to light and resistance to heat.
   3. Pattern and Color: color selected from the range currently available from Armstrong Flooring Inc.
   4. Size: 6 in. x 48 in. (152 mm x 1219 mm).
   5. Wear layer thickness: Parallel USA 20 - 0.020 in. (0.5 mm).
   6. Thickness: Parallel USA 20 - 0.100 in. (2.5 mm).

2.03 PRODUCT SUBSTITUTION

A. Substitutions:
   1. Substitutions permitted and must comply with the specific attributes listed in Section 2.02.
   2. Substitutions permitted prior to submitting a bid, reference Section 00 21 13, Instructions to Bidders, Article 3.3.3

2.04 WALL BASE MATERIALS

A. For top set wall base: Provide 1/8 in. (3.18 mm) thick, 4 in. and 6 in. high Armstrong Flooring Wall Base with a matte finish, conforming to ASTM F 1861, Type TP - Rubber, Thermoplastic, Group 1 - Solid, Style B – Cove.

2.05 ADHESIVES

A. Provide Armstrong S-995 Flooring Adhesive under the flooring and Armstrong S-725 Wall Base Adhesive at the wall base as recommended by the flooring manufacturer.
B. Provide Armstrong S-319 Adhesive for field areas and S-725 Wall Base Adhesive at the wall base as recommended by the flooring manufacturer.
C. Provide Armstrong S-1000 Flooring Adhesive under the flooring and Armstrong S-725 Wall Base Adhesive at the wall base as recommended by the flooring manufacturer.

2.06 ACCESSORIES

A. For patching, smoothing, and leveling monolithic subfloors (concrete, terrazzo, quarry tile, ceramic tile, and certain metals), provide Armstrong S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive, S-463 Level Strong™ cement based self-leveling compound, S-466 Patch Strong™ flexible patching and smoothing compound.

B. For priming porous substrates to aid in adhesive bond strength and reducing subfloor porosity, provide S-464 Prime Strong™ acrylic primer for porous substrates. For non-porous substrates, provide S-465 NP Prime Strong™ acrylic primer for non-porous substrates.

C. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.
D. Provide transition/reducing strips tapered to meet abutting materials.
E. Provide threshold of thickness and width as shown on the drawings.
F. Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl, or rubber composition, tapered or bullnose edge, with color to match or contrast with the flooring, or as selected by the Architect from standard colors available.
G. Provide metal edge strips of width shown on the drawings and of required thickness to protect exposed edges of the flooring. Provide units of maximum available length to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog, installation instructions, and product carton instructions for installation and maintenance procedures as needed.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions (i.e., moisture tests, bond test, pH test, etc.).
B. Visually inspect flooring materials, adhesives, and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim.
C. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
D. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
E. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
F. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.03 PREPARATION

A. Subfloor Preparation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with Armstrong Flooring S-184 Fast-Setting Cement-Based Patch and Underlayment, S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive, S-463 Level Strong™ cement based self-leveling compound, S-466 Patch Strong™ flexible patching and smoothing compound, S-464 Prime Strong™ acrylic primer for porous substrates, or S-465 NP Prime Strong™ acrylic primer for non-porous substrates] as recommended by the flooring manufacturer. Refer to Armstrong Flooring Guaranteed

Installation Systems instructions and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.].

B. Subfloor Preparation Moisture Mitigation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, mitigate moisture and other defects with Armstrong Flooring S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive, S-463 Level Strong™ cement based self-leveling compound, S-466 Patch Strong™ flexible patching and smoothing compound, S-462 Seal Strong™ two-part moisture mitigation system, S-464 Prime Strong™ acrylic primer for porous substrates, or S-465 NP Prime Strong™ acrylic primer for non-porous substrates as recommended by the flooring manufacturer. Refer to Armstrong Flooring Guaranteed Installation Systems instructions and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.].

C. Subfloor Cleaning: The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers, and other foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents. Spray paints, permanent markers and other indelible ink markers must not be used to write on the back of the flooring material or used to mark the concrete slab as they could bleed through, telegraphing up to the surface and permanently staining the flooring material. If these contaminants are present on the substrate, they must be mechanically removed prior to the installation of the flooring material. Refer to the Armstrong Flooring Guaranteed Installation Systems instructions and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.

D. When using S-995 Adhesive, perform subfloor moisture testing in accordance with ASTM F 2170, “Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes” and Bond Tests as described in publication instructions "Armstrong Flooring Guaranteed Installation System," to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Internal relative humidity of the concrete shall not exceed 99%. On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

E. When using S-319 Adhesive, perform subfloor moisture testing in accordance with ASTM F 2170, “Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes” and Bond Tests as described in "Armstrong Flooring Guaranteed Installation System," instructions to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Internal relative humidity of the concrete shall not exceed 99%. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

F. When using S-1000 Adhesive, perform subfloor moisture testing in accordance with [ASTM F 2170, “Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes” and Bond Tests as described in "Armstrong Flooring Guaranteed Installation System" instructions to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. MVER shall not exceed 14 lbs./1000 sq. ft./24 hrs. On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained].

G. Contractor to determine necessity of pH Testing: pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained.

3.04 INSTALLATION OF FLOORING

A. Install flooring in strict accordance with the latest edition of Armstrong Flooring Guaranteed Installation Systems instructions. Failure to comply may result in voiding the manufacturer's warranty listed in Section 1.08.
B. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
C. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.
D. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
E. Roll with a 100-lb. (45.36 kilogram) roller in the field areas. Refer to specific rolling instructions of the flooring manufacturer.
F. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

3.05 INSTALLATION OF ACCESSORIES

A. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths if practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.
B. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
C. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.
D. Apply [butt-type] [overlap] metal edge strips where shown on the drawings, [before] [after] flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations.

3.06 CLEANING

A. Perform initial and on-going maintenance according to the latest edition of the maintenance recommendations for Parallel® USA.

3.07 PROTECTION

A. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings. (See Finishing the Job in the latest edition of Armstrong Flooring Guaranteed Installation Systems instructions.

END OF SECTION

SECTION 09 90 00: PAINTS AND COATINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Exterior paint and coating systems including surface preparation.

1.2 RELATED SECTIONS

A. All related sections incorporated within Contract Documents.

1.3 REFERENCES

A. Material Safety Data Sheets / Environmental Data Sheets: Per manufacturer's MSDS/EDS for specific VOCs (calculated per 40 CFR 59.406). VOCs may vary by base and sheen.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administration Requirements.
B. Product Data: For each paint system indicated, including.
   1. Product characteristics.
   2. Surface preparation instructions and recommendations.
   3. Primer requirements and finish specification.
   4. Storage and handling requirements and recommendations.
   5. Application methods.
   6. Cautions for storage, handling and installation.
C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's products, colors and sheens available.
D. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.
E. Coating Maintenance Manual: Upon conclusion of project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams, "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.
F. Only submit complying products based on project requirements. One must also comply with the regulations regarding VOCs (CARB, OTC, SCAQMD, LADCO). To ensure compliance with district regulations and other rules, businesses that perform coating activities should contact the local district in each area where the coating will be used.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
B. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard products, colors and sheens available.
C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.
D. Mock-Up, if requested: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish surfaces for verification of products, colors and sheens.
2. Finish area designated by Architect.
3. Provide samples that designate primer and finish coats.
4. Compatibility and Adhesion: Check after one week of drying and curing by testing in accordance with ASTM D3359; Adhesion by tape test. If coating system is incompatible, additional surface preparation up to and including complete removal may be required.
5. Do not proceed with remaining work until the Architect approves the mock-up.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information.
   1. Product name, and type (description).
   2. Application and use instructions.
   3. Surface preparation.
   4. VOC content.
   5. Environmental handling.
   6. Batch date.
   7. Color number.

B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.

D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

B. Furnish Owner with an additional one percent of each material and color, but not less than 1 gal (3.8 l) or 1 case, as appropriate.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Sherwin-Williams, which is located at: 101 Prospect Ave.; Cleveland, OH 44115; ASD Toll Free Tel: 800-524-5979; Tel: 216-566-2000; Fax: 440-826-1989; Email: request.infospecifications@sherwin.com. Web:www.swspecs.com.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 30 00 – Part 1: General, 1.21.M.

2.2 APPLICATIONS/SCOPE

A. Exterior Paint and Coating Systems:
   1. Concrete: Cementitious siding and trim.
   2. Masonry: Concrete masonry units, cinder or concrete block.
   3. Metal: Miscellaneous metal, ferrous metal.
   4. Wood: Siding, trim, sash, and miscellaneous hardboard.

2.3 PAINT MATERIALS - GENERAL

A. Paints and Coatings:
   1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions and as required for this project.
   2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color. Or follow manufactures product instructions for optimal color conformance.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.

D. Color: Refer to Finish Schedule for paint colors, and as selected.

2.4 INTERIOR PAINT AND COATING COMMERCIAL SYSTEMS

A. CMU: Previously Painted
   1. Latex Systems:
      a. Eg-Shel Finish:
         1) 1st Coat: S-W Loxon Concrete and Masonry Primer Sealer, LX02 Series
         2) 2nd Coat: S-W ProMar 200 Zero VOC Latex Eg-Shel, B20 Series.
         3) 3rd Coat: S-W ProMar 200 Zero VOC Latex Eg-Shel, B20 Series.
   2. Epoxy Systems; Waterbased:
      a. Eg-Shel Finish:
         1) 1st Coat: S-W Loxon Concrete and Masonry Primer Sealer, LX02 Series
         2) 2nd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K45 Series.
         3) 3rd Coat: S-W Pro Industrial Pre-Catalyzed Water based Epoxy, K45 Series.

B. CMU: Bare
   1. Latex Systems:
      a. Eg-Shel Finish:
         1) 1st Coat: S-W PrepRite Block Filler, B25 Series.
         2) 2nd Coat: S-W ProMar 200 Zero VOC Latex Eg-Shel, B20 Series.
         3) 3rd Coat: S-W ProMar 200 Zero VOC Latex Eg-Shel, B20 Series.
   2. Epoxy Systems; Waterbased:
      a. Eg-Shel Finish:
         1) 1st Coat: S-W PrepRite Block Filler, B25 Series.
         2) 2nd Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy, B73 Series.
         3) 3rd Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy, B73 Series.

C. Drywall: Bare and previously painted
   1. Latex Systems:
      a. Eg-Shel Finish:
         1) 1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28 Series.

2) 2nd Coat: S-W ProMar 200 Zero VOC Latex Eg-Shel, B20 Series.
3) 3rd Coat: S-W ProMar 200 Zero VOC Latex Eg-Shel, B20 Series.

2. Epoxy Systems; Waterbased:
   a. Eg-Shel Finish:
      1) 1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28 Series.
      2) 2nd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K45 Series.
      3) 3rd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K45 Series.

D. Wood: Trim and wainscoting
   1. Waterbased Urethane Systems:
      a. Semi Gloss Finish:
         1) 1st Coat: S-W Premium Wall and Wood Interior Latex Primer, B28 Series
         2) 2nd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss, B53 Series
         3) 3rd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss, B53 Series

E. Interior Timber Wood: satin finish
   1. Stain: Minwax Performance Series Tintable Wood Stain 250 VOC
   2. First Clear Coat: Minwax Water-based Oil-Modified Polyurethane
   3. Second Clear Coat: Minwax Water-based Oil-Modified Polyurethane

2.5 EXTERIOR PAINT AND COATING SYSTEMS

A. Metal: Insulated Doors and Frames
   a. Alkyd Systems; Waterbased:
      1) Semi-Gloss Finish: 1) 1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series (5.0 mils wet, 2.0 mils dry).
      2) 2nd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss, B53-1150 Series.
      3) 3rd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel Semi-

B. Engineered Wood: Trim and Siding
   a. Satin Finish:
      1) 1st Coat: S-W Exterior Latex Wood Primer, B42 Series.
      2) 2nd Coat: S-W Duration Exterior Acrylic Satin, K33 Series.
      3) 3rd Coat: S-W Duration Exterior Acrylic Satin, K33 Series.

C. Wood: Brackets and TimbersStain; Water Reducible Systems: Solid Color:
      1) 1st Coat: S-W WoodScapes Exterior Acrylic Solid Color Stain, A15 Series.
      2) 2nd Coat: S-W WoodScapes Exterior Acrylic Solid Color Stain, A15

2.6 Concrete Sealant

1. H&C, ClariShield Water-Based Clear Sealer, natural look
   a. Allow new concrete to cure at least 28 days.
   b. Prep: All concrete must be clean, dry and free of grease, oil, paint, sealers, etc. Must pass a porosity test to ensure proper application
   c. First Coat: ClariShield Water-Based Clear Sealer
   d. Second Coat: ClariShield Water-Based Clear Sealer,
   e. Optional Third Coat may be needed with natural look finish for uniform appearance.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared; notify Architect of unsatisfactory conditions before proceeding. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
B. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.
C. Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead based paints, notify Architect immediately if lead based paints are encountered.

3.2 SURFACE PREPARATION

A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
    1. Prior to attempting to remove mildew, it is recommended to test any cleaner on a small, inconspicuous area prior to use. Bleach and bleaching type cleaners may damage or discolor existing paint films. Bleach alternative cleaning solutions are advised.
    2. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply solution and scrub the mildewed area. Allow solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow surface to dry before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
    3. Remove items including but not limited to thermostats, electrical outlets, switch covers and similar items prior to painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
    4. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions.
B. Block (Cinder and Concrete): Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F (24 degrees C). The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.
C. Concrete, SSPC-SP13 or NACE 6: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
D. Cement Composition Siding/Panels: Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments.

E. Exterior Composition Board (Hardboard): Some composition boards may exude a waxy material that must be removed with a solvent prior to coating. Whether factory primed or unprimed, exterior composition board siding (hardboard) must be cleaned thoroughly and primed with an alkyd primer.

F. Steel: Structural, Plate, And Similar Items: Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.

1. Solvent Cleaning, SSPC-SP1: Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
2. Hand Tool Cleaning, SSPC-SP2: Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
3. Power Tool Cleaning, SSPC-SP3: Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
4. White Metal Blast Cleaning, SSPC-SP5 or NACE 1: A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
5. Commercial Blast Cleaning, SSPC-SP6 or NACE 3: A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
6. Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4: A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.
7. Power Tool Cleaning to Bare Metal, SSPC-SP11: Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.
8. Near-White Blast Cleaning, SSPC-SP10 or NACE 2: A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor

discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

9. High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials: SSPC-SP12 or NACE 5: This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.
10. Water Blasting, SSPC-SP12/NACE No. 5: Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.

G. Wood: Must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

3.3 INSTALLATION

A. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
B. Do not apply to wet or damp surfaces. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days. Test new concrete for moisture content. Wait until wood is fully dry after rain or morning fog or dew.
C. Apply coatings using methods recommended by manufacturer.
D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
E. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
F. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
G. Inspection: The coated surface must be inspected and approved by the manufacturer’s representative or certified installer just prior to the application of each coat.

3.4 PROTECTION

A. Protect finished coatings from damage until completion of project.
B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION

SECTION 10 14 00: SIGNAGE - DOOR AND ROOM SIGNS

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein and/or as shown on the Contract Documents:
   1. Door Signs.
   2. Room Signs.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

PART 2: PRODUCTS

2.01 MANUFACTURERS

A. Acceptable sign manufacturer: Rowmark of Findlay, Ohio or acceptable alternate.
B. Unless otherwise specified for an individual product or material, supply all products specified in this section from the same manufacturer.
C. Acrylic Graphic Braille Signs:
   1. Ultra Matte and Reverse engravable:
      a. Material: Laminated impact acrylic.
      b. Finish: Matte, non-glare.
      c. Thickness: 2-ply, 1/16".
      d. Interior installation.
      e. UV stable.
   2. Colors: Selected by Owner and Engineer/Architect from manufacturer's full range of available colors.
   3. Sign Sizes: Industry standard sizes for each appropriate sign.
   4. Graphics: International symbols for indicated information.
   5. Lettering: 5/8" high, raised 1/32", with Number 2 Braille coding.
   6. Sign Frames: 1/8" aluminum, satin finish with 3/8" radius at corners. Non-magnetic backing.
D. Accessible Entry or Exit: Standard door/window sticker.

PART 3: EXECUTION

3.01 EXAMINATION

A. Verify that surfaces to receive signs have been finished, and that finishes are dry and correctly cured.

3.02 INSTALLATION

A. Install room and door signs in accordance with manufacturer's printed installation instructions.
B. Locate signs in accordance with approved Contract Documents and Americans with Disabilities Act (ADA) requirements.

3.03 SCHEDULE

A. Colors:
   1. Exterior Accessibility Door Signs: Standard white and blue.
   2. Emergency Notification Signs: As required by regulatory authorities having jurisdiction.
   3. Other Signs: To be selected by Owner, and providing contrasting colors per ADA requirements.

B. Sign Schedule: See Contract Documents.

END OF SECTION

SECTION 10 21 00: COMPARTMENTS AND CUBICLES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Compartments and Cubicles of the Following Types:
   1. High-density polymer compartments and cubicles.

1.2 RELATED SECTIONS

A. Section 10 28 00 – Toilet Room Accessories.
B. Section 22 00 00 – Plumbing.

1.3 REFERENCES

A. ADA - Americans with Disabilities (ADA) Standards for Accessible Design.
B. ANSI A117.1 - American National Standard for Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People.
C. ANSI A208.1 - Mat Formed Wood Particleboard.
D. ASTM International (ASTM)
   1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   2. ASTM A666 - Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   3. ASTM A526 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
E. NEMA LD-3 - High Pressure Decorative Laminates.
F. UFAS - Uniform Federal Accessibility Standards.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Literature indicating typical panel, pilaster, door, hardware and fastening.
   2. Preparation instructions and recommendations. Storage and handling requirements and recommendations.
   3. Installation methods. Maintenance instructions.
C. Shop Drawings: Dimensioned plans indicating layout of toilet partitions. Dimensioned elevations indicating heights of doors, pilasters, separation partitions, and other components; indicate locations and sizes of openings in compartment separation partitions for toilet and bath accessories to be installed in partitions; indicate floor and ceiling clearances. Details indicating anchoring components (bolt layouts) and methods for project conditions; indicate components required for installation, but not supplied by compartment and cubicle manufacturer.
D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, texture and pattern.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.
B. Lay cartons flat, with adequate support to ensure flatness and to prevent damage to pre- finished surfaces. Do not store where ambient temperature exceeds 120 degrees F (49 degrees C).

1.6 PROJECT CONDITIONS

A. Do not deliver materials or begin installation until building is enclosed, with complete protection from outside weather, and building temperature maintained at a minimum of 60 degrees F (15.6 degrees C).

1.7 QUALITY ASSURANCE

A. Products and installation shall comply with the following: ADA Standards, ANSI A117.1, UFAS as applicable to the Project.
B. Coordinate Work with placement of support framing and anchors in walls and ceilings.

1.8 WARRANTY

A. Manufacturer's Warranty for Partitions: Provide manufacturer's standard limited warranty and as follows.
   1. High Density Polymer Partitions: 25 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: General Partitions Mfg. Corp., which is located at: 1702 Peninsula Dr. P. O. Box 8370; Erie, PA 16505; Tel: 814-833-1154; Fax: 814-838-3473; Email: request Info (info@generalpartitions.com); Web:https://www.generalpartitions.com
B. Substitutions: Permitted if approved in accordance with Section 00 21 13, Instruction to Bidders, Article 3.3.3.

2.2 HIGH DENSITY POLYMER (HDP) UNITS

A. Construction:
   1. High density polymer panels and doors, molded under pressure from high density polymer resin with uniform color throughout.
   2. Absorption: Resistant to delamination, water, steam, corrosion, soaps, detergents, and mildew. Material shall not absorb odors.
   3. Graffiti Resistance: Self-lubricating surface that is graffiti resistant to markings from pen, pencil, marker, and paint.
   4. Edges: Machine radius eliminating sharp edges.
   5. Surface texture: Orange peel.
   6. Heat Sincs: Provide 1/8 inch (3 mm) aluminum strips integral to bottom edges of panels and doors to protect panel from being ignited by vandals.

2.3 HARDWARE

A. Combination Latch Keeper and Door Stop with Rubber Bumper: Extruded aluminum. cast alloy, chrome plated or Cast Stainless

PART 3 EXECUTION

3.1 INSTALLATION

A. Examine existing conditions prior to installation. Do not begin installation until installation conditions and substrates have been properly prepared.
B. Install compartments and cubicles in accordance with manufacturer's instructions and approved submittals. Pilasters intersecting adjacent walls shall extend to finished floor. Attach panels and pilasters to brackets with sheet metal screws.
C. Door Installation: Hang doors from pilasters. Equip each door with the following:

1. Door latch.
2. Door strike and keeper.

D. Erection Tolerances: Maximum variation from true position: 1/4 inch (6 mm). Maximum variation from plumb: 1/8 inch (3 mm).

3.2 ADJUSTING AND CLEANING

A. Carefully remove and dispose all protective vinyl from partitions.
B. Adjust hinges and align hardware to uniform clearance at vertical edge of doors.
C. Clean surfaces and wash with mild soap. Do not use abrasives.

END OF SECTION

SECTION 10 28 00: TOILET ROOM ACCESSORIES

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein and/or as shown on the Contract Documents:
   1. Toilet and bath accessories, installation.
   2. Grab bars, installation.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. Provide manufacturer's literature on each type of accessory for approval prior to ordering and include construction details, material description, dimensions, mounting instructions, options, and finishes.

1.04 QUALITY ASSURANCE

A. Provide all accessories from the same manufacturer where all in view of the same area.
B. Any deviation from the specified accessories must go through the approval process for alternates prior to ordering.

1.05 PROJECT CONDITIONS

A. Coordinate all accessories with other adjacent scope of work for compatibility, clearances, and installation requirements.
B. Do not install any accessory until substrate material is finished.
C. Confirm all required blocking was installed during rough carpentry per manufacturer requirements.

PART 2: PRODUCTS

2.01 MANUFACTURER

1. Bobrick, or acceptable alternate.

2.02 ACCESSORIES

A. Accessories listed below, are the accessories to be installed under this section. See Contract Documents for quantities, model numbers, and locations.
   1. Toilet paper holders.
   2. Paper towel dispenser.
   3. Mirrors.
   4. Grab bars.
   5. Soap dispensers.
B. Horizontal Baby Changing Station
   1. Acceptable Product/Manufacturer: Horizontal Baby Changing Station is manufactured by Koala Corporation, Denver CO, (800-985-6252), or acceptable alternate.

2. Baby Changing Stations: Horizontal and vertical baby stations and associated accessories for use in commercial toilet facilities.
3. Composition: Injection-molded polypropylene with Microban Antimicrobial.
4. Capacity/size: 535 sq. in., protruding not more than 4" (102 mm) when closed.
5. Operation:
   a. Pneumatic gas spring mechanism for safe open/close motions.
   b. Reinforced full-length steel-on-steel hinge mechanism.
   c. Mounting: Multiple 10-gauge steel mounting supports.
   d. Special features:
      1) Molded graphic instructions in four (4) languages.
      2) Integral sanitary liner dispenser.
      3) Identifying door plaque.
6. Built-in diaper bag hooks.
7. Code compliance: ANSI A117.1 or local code if more stringent for handicapped accessibility.
8. Color: TBD.

2.03 MISCELLANEOUS ITEMS

A. All accessories shall be provided with their own mounting brackets as provided by the manufacturer.

PART 3: EXECUTION

3.01 GENERAL INSTALLATION

A. Confirm all areas for any accessory is prepped and ready for installation. Notify the general Contractor and the Engineer/Architect if conditions do not meet manufacturer's requirements.
B. Prior to installing accessories, coordinate exact location of all accessories with Engineer/Architect and Owner.
C. Accessories are to be installed as per the manufacturer's instructions and per all ADA requirements.
D. Accessories are to be installed level, plumb, and true. Accessories are to align with grout joints in block and other exact placing as coordinated with Engineer/Architect and shown on Contract Documents.
E. All grab bars and other handicap accessible equipment are to be installed exactly as per Americans with Disabilities Act (ADA) standards and Contract Documents.
F. Use concealed fasteners whenever and wherever possible.

3.02 CLOSE OUT

A. Adjust all accessories to be plumb, true, level, and tightly in place.
B. Remove all temporary and protective coatings.
C. Clean accessories thoroughly.
D. Provide Owner with cut-sheets on all accessories to be included in Owner's Manual. Cut-sheets shall include cleaning, maintenance, and filling instructions.
E. Provide Owner with Allen wrenches and spare set screws for each type of set screw needed for accessories. Show Owner how to tighten loose set screws on accessories.

END OF SECTION

SECTION 12 36 61.16: SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid surface material countertops.
2. Solid surface material backsplashes.
3. Solid surface material end splashes.
4. Solid surface adhesives and sealants.

B. Related Requirements:

1. All related sections incorporated within Contract Documents.

1.3 ACTION SUBMITTALS

A. Product Data: For countertop materials including manufacturer's technical data sheets, and published written instructions.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, terminations, and cutouts.

1. Show locations and details of joints.
2. Show direction of directional pattern, if any.

C. Samples for Initial Selection: For each type of material exposed to view.

D. Samples for Verification: For the following products:

1. Countertop material, 6 inches (150 mm) square.
2. One full-size solid surface material countertop, with front edge and backsplash, 8 by 10 inches (200 by 250 mm), of construction and in configuration specified.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and fabricator.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: ISO 9001 quality management system certification for manufacturing facility(ies).

B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

1. Manufacturer-certified fabricator.

C. Installer Qualifications: Manufacturer certified fabricator of countertops.

D. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and installation.

1. Build mockup of typical countertop if requested by Architect or Owner.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.8 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer and installer agree to repair or replace sheet material not free from defects in materials, fabrication, or workmanship within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP AND WALL MATERIALS

A. Composition Solid-Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Wilsonart LLC; 051 or a comparable product by one of the following:

    a. Affinity Surfaces; a brand of Domain Industries, Inc.
    b. Avonite Surfaces.
    c. Formica Corporation.
    d. LG Chemical, Ltd.
    e. Meganite Inc.
    f. Samsung Chemical USA, Inc.
    g. Swan Corporation (The).

2. Thickness: 0.490 inch (12.4 mm).
3. Panel Weight: 4.4 lb/sq. ft. (21.5 kg/sq. m).
4. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

    a. Flame-Spread Index: 25 or less.
    b. Smoke-Developed Index: 450 or less.
5. Colors and Patterns: As selected by Architect from manufacturer's full range.

B. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 COUNTERTOP FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Grade: Custom.

B. Configuration:

1. Front: 1-1/2” build-up with drip groove.
2. Backsplash: Straight, slightly eased at corner.
3. End Splash: Matching backsplash.

C. Countertops: 1/2-inch (12.7-mm) thick, solid surface material with front edge built up with same material.

D. Backsplashes: 3/4-inch (19-mm) thick, solid surface material.

E. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

1. Fabricate with loose back and end splashes for field assembly.

F. Joints: Fabricate countertops without joints.

G. Cutouts and Holes:

1. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
2. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

1. Adhesives shall have a VOC content of 70 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m), 1/4 inch (6 mm) maximum. Do not exceed 1/64-inch (0.4-mm) difference between planes of adjacent units.

B. Fasten countertops by adhering with 100-percent silicone material in dab format (not bead format) to base units into underside of countertop at 18 to 24 inches (457 to 610 mm) o.c. Shim as needed to align ops in a level plane.

C. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

1. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

D. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

E. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

END OF SECTION

SECTION 22 00 00: PLUMBING

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein and/or as shown on the Contract Documents.
B. Rough and finish plumbing.
C. Supply, installation, and coordination of plumbing fixtures and fittings.
D. Pipe insulation.
E. Saw cutting of existing concrete slabs.
F. Toilet rooms and piping
G. Kitchen and piping

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. Submit three (3) copies of manufacturer's literature on all fixtures and fittings.
B. At closeout of job, submit operating and maintenance instructions for all fixtures, pumps, and other equipment provided under this section.

1.04 TESTS AND REPORTS REQUIRED

A. Test all water service piping under hydrostatic pressure of 150 psi for not less than two (2) hours.
B. Air test gas piping per building code. Local inspector to approve piping prior to appliance hook-up.

1.05 FEES

A. The Contractor shall include permit fees and any other costs involved with installation of the plumbing system, including all materials and supplies needed for a complete system.

PART 2: PRODUCTS

2.01 PIPING

A. Sewerage piping:
   1. Below grade, PVC Schedule 40 Sewer Pipe.
   2. Above grade, Schedule 40 PVC, D2729 with glue welded joints.
B. Water piping:
   1. Below grade, Type K copper soft piping.
   2. Below grade service piping, PVC AWWA C 902.
   3. Below grade: HDPE
   4. Above grade, Type L copper, ASTM B 88.
   5. Above grade, Cross linked polyethylene (PEX).
   6. Fittings; Cast brass or wrought copper.
   7. Solder; Grade 95TA.

2.02 MISCELLANEOUS ITEMS

A. Sill cocks to be freeze-proof type, with brass finish and integral backflow preventer.
B. Provide water hammer arrestors at each faucet or quick-close fixture. These are to be a 24" high-capped riser pipe running vertically above the piping or pre-manufactured hammer arrestor.
C. Exposed shut-offs and tail pieces to match finish of fittings used in that room.
D. Insulation to be ½" foam Armaflex or acceptable alternate on all water piping and fittings.
E. Hangers for copper piping shall be clevis or split-ring type to accommodate insulation.
F. Hangers for PEX piping to be plastic talon type and per manufacturer's requirements.
G. Floor drains to be 4" round with polished chrome strainer, adjustable, and with trap seal.

2.03 FIXTURES AND FITTINGS

A. To be supplied and installed by Contractor per schedule on Contract Documents.
B. Concealed and exposed shut-offs to be supplied by Contractor.

2.04 EXISTING MATERIALS

A. Contractor to verify condition and routing of existing water and sanitary lines. If maintenance or replacement is needed, the Contractor is to notify the Engineer/Architect immediately, prior to proceeding with any connections.
B. During connection of new system to the existing, coordinate with the Owner and the Engineer/Architect for any shut-down time. Service disruption shall be kept to a minimum.
C. Existing vents through the roof shall be utilized for the new plumbing system if possible. If additional vents through the roof are required, the Plumbing Contractor shall be fully responsible for the roof penetration, roof boot, sealing, and providing a water tight condition at the new vent.
D. Plumbing Contractor to provide any and all concrete saw cutting for installation of proposed sanitary piping.

PART 3: EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Prior to start of any rough-in work noted below, a pre-construction meeting is to be scheduled between the Owner, Contractor and Engineer/Architect and review the layout of fixtures, cleanouts, vents, and all other rough-in elements. If the layout was not previously approved by the Owner and/or Engineer/Architect any relocations of any plumbing shall be done at the Contractor's expense.
B. Review layout of piping with Engineer/Architect and other mechanical trades to coordinate use of space prior to starting work.

3.02 INSTALLATION OF PIPING

A. Contractor to be responsible for all piping inside the building and within 5' of the building perimeter and Plumbing Contractor shall take all water supply from the meter into the building.
B. All piping shall be run parallel or at right angles to framing both vertically and horizontally.
C. All piping shall be as shown on Contract Documents. Walls are not to be furred out to enclose piping in chases unless approved by Engineer/Architect in advance.

D. Drainage lines are to be pitched a minimum of 1/8”/ft. minimum for pipes 3” diameter and larger and 1/4”/ft. minimum for pipes 3” diameter and smaller.
E. Provide shut-off valves at each fixture and at the start of each branch line, all shut-off valves are to be accessible.
F. Install all cleanouts as required by codes. Do not put cleanouts in finished spaces unless approved by Engineer/Architect.
G. Provide access panels or doors for all concealed cleanout and valves. Coordinate all access panel locations with Engineer/Architect.
H. Install all water piping so that it is pitched to drain to a drain valve. Provide additional drain valves at low points as required.
I. Bore all holes in framing so as not to compromise structural integrity. Do not cut any structural framing without the written approval of the Engineer/Architect.
J. Exterior water piping to be covered with not less than 4’ of soil.
K. All pipes penetrating the shell of the building shall be painted to match the adjacent surface. Coordinate final color with Architect/Engineer.

3.03 INSULATION INSTALLATION

A. Note: Insulation is meant to keep cold water pipes from forming condensation and to keep hot water pipes from losing heat. It is not intended to keep pipes from freezing.
1. Install insulation on all water piping continuous from supply source to fixture. Continue through walls, floors, ceilings, and hangers. Stop insulation at all rated wall penetrations per code. Applicable penetration protection to be installed.
2. Install all insulation in accordance with manufacturer’s recommendations. Insulation shall be continuous and tight at elbow, tees, and other fittings.

3.04 FIXTURE INSTALLATION

A. Fixtures and fittings are to be roughed-in and installed exactly as per manufacturer’s specifications.
B. Location of fixtures and fittings to be verified with Engineer/Architect and coordinated with millwork installation before final rough-in is completed.
C. Adjust all fixtures and fittings for proper water flow after installation.
D. Verify that all fittings are working properly upon installation. Replace any defective fixtures or parts immediately.

3.05 CLOSE OUT

A. Check all fixtures and valves for proper operation and to be sure they are free of leaks.
B. Check all fittings and trim to be sure it is adjusted properly and working as specified. Remove, clean, and replace filters and flow restrictors at all faucets and showerheads.
C. Tag all shut-off valves, noting areas or fixtures served by valve.
D. Remove all labels, tags, and other temporary markings from all fixtures.
E. Clean all fixtures.
F. Clean all trim and fittings and remove all water spots.
G. Remove all excess pipe and other debris from the job.
H. Provide three (3) copies of all maintenance instructions and warranties for Owner’s Manual.

END OF SECTION

SECTION 23 00 00: HVAC

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein and/or as shown on the Contract Documents. The HVAC system for this building addition consists of 3 (three) zones and will be the responsibility of the Contractor for the final design and building of the systems. Contract Documents show an example of a typical system but since each HVAC unit has its own uniqueness, the Contractor will be ultimately responsible for balance and proper climate control:
   1. Heating, ventilating, and air-conditioning equipment.
   2. Exhaust fans and ducting in toilet room(s).
   3. All ducting and insulation of ducts including all hangers and supports.
   4. All controls and control wiring for equipment of this Section.
   5. All condensate piping, pumps, and pans as needed.
   6. All refrigerant piping.
   7. All flues.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. Submit three (3) copies of manufacturer's literature on all equipment, ducts, and insulation systems.
B. Shop drawings showing ducts and equipment to scale and cubic feet per minute (CFM) at all grilles and registers.
C. Cut-sheets on all registers and grilles.
D. Samples of all registers and grille types, if requested by the Engineer/Architect.
E. Submit at close-out of job:
   1. Operating and maintenance instructions for all fixtures, pumps, and other equipment provided under this Section.
   2. Air balance test results, from an outside, separate testing firm.

PART 2: PRODUCTS

2.01 PIPING

A. Condensate piping to be schedule 40 PVC, with solvent welded joints. Use Type L copper if PVC is not permitted by code.
B. Hydronic water piping:
   1. Below grade; Type K copper piping.
   2. Above grade; Type L copper.
   3. Fittings; cast brass or wrought copper.
   4. Solder; Grade 95TA.
C. Gas piping: 40 black iron pipe with threaded connections or flexible with appropriate fittings. No concealed fittings are permitted for any gas line.
D. Refrigerant piping using Type M copper tubing with silver solder brazed joints. Sized as per manufacturer's requirements.

2.02 SLEEVES

A. Pipe sleeves shall be PVC or other material compatible with pipe and surrounding material.

2.03 HVAC EQUIPMENT

A. System is to be a design/build system meeting Code performance standards, and to include any equipment noted either below or on the Contract Documents. Separate stamped and signed plans are not required. The system is to be designed to work with the type of grilles and registers selected by the Owner and Engineer/Architect. Additionally system shall include the following:
   1. HVAC system (number of zones as required for job).
   2. Gas fired hot air furnaces and air handlers.
   3. Condensing units.
   4. Thermostats.
   5. Vent ducting for furnaces.
   6. All necessary dampers and other equipment required by manufacturer and codes for a complete system.
   7. ERV – make-up air units.

B. Each system is to be described fully in the Proposal, including rooms served and all equipment, controls, and accessories required. Each system shall include all thermostats, controls, gas piping, ducting, condensate piping, and all required equipment for a complete system. All insulation to be included to stop any “sweating” due to condensation around ducts and diffusers.

2.04 EXHAUST FANS

A. Exhaust fans are to be in-line type by Greenheck, Broan, or Penn Zephyr, size as required for room and exhaust fan schedule.

B. Exhaust fans will each serve one (1) toilet room. The exhaust fan shall be interconnected with the room light, unless noted otherwise.

2.05 REGISTERS AND GRILLES

A. Registers and grilles are to be sized by HVAC Contractor to accommodate the CFM’s required.

B. Diffusers are to be adjustable drop-ins by Titus or acceptable alternate for suspended or gypsum ceilings. Supply grilles to have integral, opposed blade dampers.

C. Recessed grilles and diffusers to be used at gypsum ceilings and walls. Contractor to include all mounting hardware and trim requirements.

D. Registers and grilles are to be located as per the Engineer/Architect’s instructions.

2.06 SHEET METAL

A. All sheet metal and straps shall be fabricated from hot-dipped galvanized steel in accordance with American Society for Testing and Materials (ASTM) A90 and ASTM 653.

B. Duct sizes are to be as per approved Shop Drawings.

C. All dimensions shown on Shop Drawings shall be inside dimensions after deducting for liner.

D. Sheet metal fasteners are to be rivets or sheet metal screws.

E. Straps may be sheer metal straps.

F. Where hangers are required use threaded rods.

2.07 INSULATION MATERIALS

A. All insulation shall have a fire rating of not more than 25, and a smoke rating of not more than 50.
B. All insulation accessories shall have same ratings as insulation.
C. Exterior duct insulation shall be fiberglass laminated to a foil-scrim-Kraft paper facing as well as chemically treated and fire resistant.
D. Interior duct insulation shall be fiberglass with matte finish surfaces, such as Johns-Manville Linacoustic or approved acceptable alternate.
E. Insulation R-Values are as listed in the Contract Documents.

PART 3: EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Prior to the start of any rough-in work noted below, a pre-construction meeting is to be scheduled between the Owner, Contractor, and Engineer/Architect to review the layout of all HVAC units, supply and return ducts, diffusers, and thermostats. If the layout was not previously approved by the Owner and/or Engineer/Architect, any relocation of any HVAC element shall be done at the Contractor's expense.
B. Coordinate duct layout with framing. Do not cut or alter any structural element without written approval from Engineer/Architect.
C. Review layout of all registers and grilles with Engineer/Architect prior to fabricating or running any ductwork. All register, grill, and exterior louver locations are to be coordinated with architectural interior elevations, trim, and millwork layouts.
D. Coordinate size and exact location of the concrete pad for each piece of equipment with the appropriate Contractor. It is the responsibility of the Mechanical Contractor to ensure that the pad location is correct prior to the pads being poured.

3.02 INSTALLATION OF DUCTWORK

A. All ductwork shall be run parallel or at right angles to framing both vertically and horizontally. Ductwork shall be designed in accordance with the latest American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) standards.
B. All ducts shall be concealed in framing. Walls are not to be furred out to enclose ducts unless approved by Engineer/Architect in advance.
C. Ductwork shall include all ducts, connections, hangers, dampers, fire dampers, and any other work necessary for a complete duct system.
D. All turns and bends in ductwork at rectangular elbows shall have internal turning veins.
E. All dampers shall be accessible for adjusting. Provide access panels as required. Airflow shall be balanced by dampers in the ducts. Balancing shall not be achieved by adjusting flow at register dampers.
F. No pipes, structural members, or electrical conduits shall pass through ductwork.
G. All ductwork shall be of a gauge and construction in accordance with the latest standards issued by the SMACNA.
H. Ductwork collars shall be designed to accommodate the registers and grilles specified for the job. Registers and grilles shall be connected to ductwork in a way that does not interfere with the performance of the ductwork. No damper frame may protrude into the main or branch duct.
I. Ducts shall be of the following materials:
    1. Supply and return air ducts: Galvanized steel.
    2. Exhaust fan ducts: Galvanized steel.

J. Supply ducts serving a single ceiling may be flexible if the duct is 12" in diameter or less. Flexible ducts must be installed with no kinks or tight bends. No other flexible ducting is permitted.

K. Gradually increasing size of ducts. Maintain a maximum change of 15º, wherever possible. Note all size changes on Shop Drawings.

L. Branch ductwork shall be taken off main trunks at a 45° angle. Use rectangular to round transitions where round ducts are used. Attach all ducts with mechanical clamps and sheet metal screws.

M. After ductwork is assembled mechanically, tape all joints with duct tape and sealant to provide a complete seal.

N. Provide preliminary balancing tests prior to installing external insulation.

O. During construction, after the system is operational, provide filters taped over return air grilles to minimize dust and debris getting into the system. Change or clean these filters on a regular basis as required. Install insect screens over all the supply registers or openings on the floors or walls to minimize debris falling into the duct system. Ensure that these filters are maintained regularly.

3.03 INSULATION INSTALLATION

A. Install insulation on all supply ducts from supply source to diffuser and continue through walls, floors, ceiling, and hangers as permitted.

B. Install all insulation in accordance with manufacturer's recommendations.

C. Insulation shall be continuous and tight at elbows, tees, and other fittings.

D. Insulation on ductwork must be installed per manufacturer's specifications. Rigid boards must be mechanically fastened to the ductwork. All joints and fasteners must be sealed with pressure sensitive foil faced tape. At ducts that are 24" wide or wider, provide intermediate fastening to the bottom of ducts.

E. Line supply duct trunks with internal rigid insulation maintaining the free air flow, dimensions noted on drawings.

F. Insulate return air ducts externally while in unheated spaces or attics with 2" minimum external insulation. Return air ducts do not need to be insulated in heated spaces.

G. Insulate supply air ducts with a minimum 1" external insulation in heated spaces and a 2" minimum in attics and unheated spaces unless noted otherwise on Contract Documents for minimum R-values.

3.04 CONDENSATE PIPING

A. Condensate piping shall be run from fan coil units into the building's plumbing system. Pitch pipe a minimum of 1/8" per foot. Use 3/4" diameter piping. Piping may be PVC if permitted by code.

B. Use condensate pumps of an adequate size for equipment where gravity drainage is not possible. Pipe condensate from pump to building drainage system.

1. Where it is not permitted by code to run condensate into a sanitary sewer system, condensate shall be run to the building's storm sewer system.

3.05 CONDENSING UNITS AND REFRIGERANT PIPING

A. Locate condensing units as close as possible to fan coil units in order to minimize the length of refrigerant piping.

B. Mount condensing units on 4" concrete pads provided by Contractor.

C. Ensure that area is clear around units for proper operation and maintenance. Do not install in such a way as to restrict airflow in or out of units.

D. Install units exactly as per manufacturer's instructions.

E. If units are installed beyond the distance from the fan coil units recommended by the manufacturer, present factory recommendations for such an installation. Follow these instructions exactly and test for proper performance as required. The Contract Documents show the proposed location(s) of condensing units, so the bid should include any additional costs associated with this scope of work.

3.06 CONTROLS

A. Controls shall be provided and connected by the HVAC Contractor. Wiring shall be provided and run by a certified Electrician. HVAC Contractor shall coordinate this work with the Electrician to ensure that proper wire is run and that it is in the proper place.
B. Review location of all thermostats and other controls with Engineer/Architect prior to wiring.

3.07 CLOSE OUT

A. After all registers and grilles are in place and all units are operating, provide final balancing and report.
B. Clean all ducts of dust and debris.
C. Install new filters in all units. Clean inside of units as required to remove all construction dust and debris.
D. Paint all ductwork that is visible through grilles with a flat black paint.
E. After all interior painting is completed, check all registers and grilles and adjust to be level, plumb, and true as well as tight to the wall, ceiling, or floor surface.
F. Check that the entire system is in good working order and that all controls are working properly.
G. Provide copies of all manufacturers' maintenance instructions, guarantees, and operating manuals as part of the Owner's Manual.
H. Review each system with the Owner and show the Owner how to adjust thermostats, change the system from heating to cooling, change filters, and shut-off the system in case of an emergency.

END OF SECTION

SECTION 23 05 53: IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes all material required to perform the scope of work described herein and/or as shown on the Contract Drawings:
   1. Identification of mechanical products installed under Division 15- Mechanical.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 REFERENCES

A. American Society of Mechanical Engineers (ASME) A13.1 – Scheme for the Identification of Piping Systems.

1.04 SUBMITTALS

A. Submit list of wording, symbols, letter size, and color coding for mechanical identification.
B. Submit manufacturer's installation instructions.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Brady USA, Inc., Signmark Division, product: Brady B-915 Bradysnap-on pipe markers.
B. Seton Name Plate Company, product: Setmark Snap-on pipe markers.
C. Bunting Stamp Company, Inc., product: Wrap-Mark snap-on pipe markers.

2.02 MATERIALS

A. Color: Unless specified otherwise, conform with ASME A13.1.
B. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering.
C. Legend: Text height, conform with ASME A13.1. Minimum information indicating flow direction arrow and fluid being conveyed.

PART 3: EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.
B. Verify that piping has been finish painted per Section 09 91 00.
C. Beginning of installation means installer accepts existing surfaces.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Identify exposed piping, with plastic pipe markers. Identify service and flow direction.
C. Install in clear view and align with axis of piping. Locate identification - not to exceed 25' on straight runs including risers and drops, adjacent to each valve and tee fitting, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 26 00 00: ELECTRICAL

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein and/or as shown on the Contract Documents:
   1. Electrical wiring for outlets, switches, and lighting wiring, wire, devices, and trim.
   2. All permits required for electrical work.
   3. Coordination of work with Owner for any shutdowns.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 CODE AND STANDARDS

A. All work shall conform to the latest edition of the National Electric Code (NEC) and all other governing state and local codes.

1.04 MATERIALS AND WORKMANSHIP

A. All materials shall be new and of the quality specified unless existing devices noted to be revised, no existing wiring shall be part of any new work. Materials shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design. Electrical material and equipment used in the work shall meet the requirements as specified under paragraph three of this section, CODES AND STANDARDS.
B. All work installed under this Division of the Specifications shall be first class and complete in both effectiveness and appearance, whether finally concealed or exposed, and shall be executed by experienced technicians.

PART 2: PRODUCTS

2.01 WIRING AND WIRING DEVICES

A. Furnish and install outlet boxes, pull boxes, and conduit fittings as necessary for proposed work.
B. All wiring boxes shall be galvanized steel.
C. All conductors shall be 600 volt and shall be copper with THW or THHN insulation. No branch circuit wire shall be smaller than No. 12. Wire to be sized as required for the equipment served and per local and national codes governing this project.
D. All wiring to be in galvanized steel conduits or MC type cable.
E. Outlet boxes shall comply with the NEC for allowable fill.
F. Conductors shall be continuous from outlet to outlet and no splices shall be made except within outlet or junction boxes. Junction boxes may be used where required.

2.02 SLEEVES

A. Sleeves through concrete shall be PVC.
B. Sleeves shall be used to accommodate conduit or tubing where conduit or tubing passes through concrete slab foundation walls.

2.03 CONDUITS

A. All underground conduits are to be Schedule 40 PVC of a size as required for the wires being used.

2.04 OUTLETS AND SWITCHES

A. Light switches and receptacles shall be commercial grade by Leviton or acceptable alternate and suitable for the intended purpose.
B. Switch types are noted on the Contract Documents.
C. GFI receptacles are to be used where shown on Contract Documents and/or required by code.
D. All colors to be selected by Owner.

2.05 LIGHTS AND LIGHTING

A. Lights are noted on the Light Fixture Schedule.
B. All fixtures and equipment to be supplied and installed by Contractor unless noted otherwise.

2.06 BREAKERS

A. Breakers shall be furnished and installed for each noted circuit.
B. Green ground conductor shall be installed in each conduit.
C. Grounding and bonding of electrical circuit and equipment shall be accomplished as set forth in the NEC.

2.07 EXISTING EQUIPMENT

A. Any existing electrical equipment to be removed.

2.08 HVAC EQUIPMENT

A. Coordinate with Mechanical Contractor on exact location of outdoor condenser and/or packaged units for installation of WP GFI receptacle within 25' of equipment. Install in accessible location and per code. Additionally, consider the locations of multiple pieces of equipment and the possibility of some of them to share a single receptacle.

PART 3: EXECUTION

3.01 EXAMINATION AND PREPARATION

A. The Contractor shall verify the location of all existing utilities with the Owner and Utility Companies prior to commencing any work. All new or rerouted work must be in place before removal of existing work. All service outages must be scheduled with the Owner and be approved by the Owner. The drawings and survey data of the contract documents indicate the available information on the existing power and communication services, and on new services to be provided to the project by local utility companies. Accuracy of this information is not assured.
B. Prior to the start of any rough-in work as noted below, a pre-construction meeting is to be scheduled between the Owner, Engineer/Architect, and Contractor to review the layout of all lighting, switches, and all other rough-in boxes. Do not scale drawings for locations of electrical devices.

C. Coordinate wiring and fixture placement with framing. Do not cut or alter any structural element without written approval from the Engineer/Architect.
D. Review layout of the location of all device panels prior to starting rough wiring.

3.02 INSTALLATION METHODS

A. Conductors shall be installed in concealed raceways except as shown or specified otherwise on the Contract Documents. Exposed conduits and wires shall be installed parallel or perpendicular to all building surfaces. All conduits and wires installed in attic shall be considered exposed.
B. Electrical conduits shall not be hung on hangers with any other service foreign to the electrical systems, nor shall they be attached to other foreign services.
C. The lighting and power branch circuit conductors shall be installed in separate raceway systems unless specifically shown or noted otherwise.
D. Coordinate the locations and purchasing of equipment between other trades to ensure proper interfacement and placement of equipment requiring electrical power.
E. Coordinate other work of the different trades.
F. Conduits shall be installed concealed. Wiremold is not acceptable.
G. Rigid heavy wall (Schedule 40) PVC conduit may be used only for direct burial in earth and embedding in concrete. PVC conduit shall be installed as recommended by manufacturer.
H. Provide marking of conduit and junction boxes to indicate which distribution system they are serving. Concealed junction boxes shall be legibly marked with a magic marker to indicate the panel and circuit number that junction box serves.
I. Minimum conduit size to be ¾".

3.03 PROTECTION FROM WEATHER

A. Raceway stub ups shall be capped or otherwise protected from moisture and debris until such time that the conductors are pulled. Conductors shall not be installed in raceways until the building is protected from the weather, all concrete and plastering is completed and raceways in which moisture has collected have been swabbed or blown out.

3.04 INSTALLATION

A. All wiring shall be run in parallel or at right angles to framing both vertically and horizontally.
B. All wiring shall be concealed in walls. Walls are not to be furred out to enclose wiring or panels unless approved by Engineer/Architect in advance.
C. All rough-in boxes are to be located as per the dimensions and directions, on Contract Documents and as directed by the Engineer/Architect.
D. The number of wires for lighting and receptacle branch circuits is not shown on the drawings. The number of wires in any circuit shall be determined in accordance with the National Electrical Code, and wiring shall be provided to perform all functions of the devices being installed. Additionally, wires shall be provided as required by the contract documents, i.e. equipment grounds, etc. Provide the number of wires required for a complete and workable system.
E. Outlets shall be set plumb or horizontal and shall extend to the finished surface of the walls, ceiling or floor, as the case may be, without projecting beyond same.
F. Mounting heights.
    1. Mounting heights to center of box and above finished floor for the below-named items shall be as follows, unless otherwise shown. All other devices mounting heights shall be as shown on the drawings.
        a. General switches – 48"

b. Convenience outlets – 18" mounted vertically with ground prong slot at bottom.
c. Exit Sign, Emergency battery light – Wall – 87" above door.
d. Occupancy Sensor – 360 degrees – Ceiling.
e. Exterior W.P. convenience outlets – 24" above grade mounted vertically.

G. Contractor shall check all equipment layouts and verify exact mounting heights.

3.05 PAINTING, FINISHING

A. Painting of electrical work exposed in occupied spaces, interior and exterior, except attic.
B. Factory finishes, shop priming, and special protective coatings are specified in the individual equipment specifications sections.

3.06 WORKING IN EXISTING BUILDING

A. Where drawings indicate work to be done in the existing building, the Contractor shall carefully examine such areas to determine the nature and extent of work involved before submitting his bid. The Contractor shall be responsible for all damage to existing items and utilities due to the progress of his work, and shall repair all such items or replace same to an approved condition at his own expense.

3.07 REMOVAL WORK

A. All existing devices shown with cross-hatching and/or so noted shall be removed, relocated, remain or shall be abandoned as noted on the drawings.
B. Devices and accessories shall be completely removed from walls, ceiling/attic.
C. Conduits shall be completely removed from walls. Concealed conduits may be abandoned in walls that are to remain there. All conduits and boxes that are surface mounted and no longer require active circuits shall be removed.
D. The conductors for the devices noted to be removed shall be disconnected and removed back to the panel or back to the next device shown to remain as required by the actual existing circuiting. Continuity of circuiting shall be maintained for the existing devices shown to remain. Circuiting shall be extended from new or existing circuits as shown or as required.

3.08 CUTTING AND PATCHING

A. The Contractor shall be responsible for all cutting and patching of holes in the building which are required for the electrical work. Cutting, patching and painting shall conform to the requirements of the General Conditions of this specification.
B. Cutting of structural framing, walls, floors, decks and other members intended to withstand stress is not permitted.
C. All patching shall be finished and painted to match existing.

3.09 EXCAVATION AND BACKFILLING

A. Contractor shall perform all excavation and backfilling necessary to install the required electrical work. Coordinate the work with other excavating and backfilling and other work in the same area.
B. Landscape work, pavement, flooring and similar exposed finish work that is disturbed or damaged by excavation shall be repaired and restored to their original condition by the Contractor.

3.10 CLOSE OUT

A. Check to see that all plates are installed correctly. Plates should be level, plumb, and flush to the wall's surface.
B. Check that all switches and outlets are working correctly.
C. Install lamps in all fixtures.
D. Provide labels for all circuit breakers; to be neatly typed.
E. Check that entire system is in good working order and that all controls are working properly.
F. Provide copies of all manufacturers' maintenance instructions, guarantees, and operating manuals as part of the Owner's Manual.
G. Provide Architect with as-built of all installed devices and conduit routing with panel circuits noted for all devices.

END OF SECTION

SECTION 26 05 53: IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes all material required to perform the scope of work described herein and/or as shown on the Contract Documents.
B. Nameplates.
C. Wire and Cable markers.
D. Conduit Color Coding.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. Submit Shop Drawings under provisions of Section 01 30 00.
B. Include schedule for nameplates and tape labels.

PART 2: PRODUCTS

2.01 MATERIALS

A. Nameplates: Engraved 3-layer laminated plastic, black letters on a white background.
B. Wire and Cable Markers: Cloth markers, split sleeve or tubing style.

PART 3: EXECUTION

3.01 INSTALLATION

A. Degrease and clean surfaces to receive nameplates.
B. Install nameplates parallel to equipment lines.
C. Secure nameplates to equipment fronts including wall plates using screws, rivets, or adhesive. Secure nameplate to inside face of recessed panelboard doors in finished locations.
D. Embossed tape will not be permitted for any application.

3.02 WIRE IDENTIFICATION

A. Provide wire markers on each conductor in panelboard gutters, pull boxes, outlet and junction boxes, and at load connection. Identify with branch circuit or feeder number for power and lighting circuits, and with control wire number as indicated on equipment manufacturer's Shop Drawings for control wiring.

3.03 NAMEPLATE ENGRAVING SCHEDULE

A. Provide nameplates to identify all electrical distribution and control equipment, and loads served. Letter Height: 1/8"for individual switches and loads swerved, ¼" for distribution and control equipment identification.
B. Provide nameplates of minimum letter height as scheduled below.

C. Panelboards, Switchboards, and Motor Control Centers: ¼"; identify equipment designation. 1/8"; identify voltage rating and source.

D. Individual Circuit Breakers, Switches, and Motor Starters in Panelboards, Switchboards, and Motor Control Centers: 1/8"; identify circuit and load served, including location.

E. Individual Circuit Breakers, Enclosed Switches, and Motor Starters: 1/8"; identify load served.

F. Transformers: ¼"; identify equipment designation, 1/8"; identify primary and secondary voltages, primary source, and secondary load and location.

G. Receptacles and Wall plates: ¼"; identify circuit breaker.

3.04 CONDUIT COLOR CODING SCHEDULE

A. Conduit to be painted to match background color. All hangers and supporting devices to be painted to match.

END OF SECTION

SECTION 31 20 20: EARTHWORK, SITE CLEARING, AND GRADING

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor, material, and equipment required to perform the scope of work described herein and/or as shown per Contract Documents:
   1. Excavation – Building and Structures.
   2. Backfill and grading.
   3. Trenching and backfilling for Site Utilities.
   4. Finish grading (sidewalk; pavement and landscaping) and placement of topsoil.
   5. Sodding.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

PART 2: PRODUCTS

2.01 SOIL MATERIALS

A. Topsoil, if reused, to be clean and free of rocks larger than ¼" and free of any vegetation.
B. Imported topsoil, if required, shall be clean, free of rocks larger than ¼" and free of any vegetation.
C. Imported subsoil, if required, to be free of organic matter and debris, and graded to be free of lumps and rocks larger than 4" per approved submittals.
D. Subsoil, use stockpile excavated subsoil if acceptable.

2.02 FILL MATERIAL

A. Excavated material may be used for fill if it is free of organic matter and debris, is compactable to 95% relative and free of rocks larger than 3".
B. Contractor is responsible to determine location and amount of fill that is required.
C. Acceptable fill material:
   1. Buildings: Sand, Screenings, 21AA gravel.
   2. Pavement: Sand, Screenings, 21AA gravel.
   3. Sidewalks: Sand, Screenings – excavatable (22A).
D. Contract shall include placement of all backfill in contract price, whether used from stockpile on site or borrowed.

2.03 SCHEDULE FOR FILL

A. See Contract Documents for specific type and required depth.

PART 3: EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Prior to starting scope of work:
   1. CALL “MISS DIG” BEFORE YOU DIG. Ensure that all underground utilities have been identified, located, and carefully marked so that services are not interrupted. If services need to be interrupted (only by written permission from the Engineer/Architect and Owner) you must provide a minimum 48-hour notice to the Engineer/Architect and receive written notice to proceed prior to interrupting services.
   2. Coordinate excavation around existing foundation with Engineer/Architect and Owner Install silt fencing, erosion control, and protection fences as required by Site Plan codes and as stipulated on building permit.
   3. Carefully install wooden or plastic protection fencing around all trees to remain. Coordinate this with the Owner/Engineer/Architect.
   4. Install silt fencing, erosion control, and protection fences as required by codes and as stipulated on building permit.

B. When work has started, notify the Engineer/Architect immediately if unknown subsurface conditions are discovered. If such conditions are found, do not proceed with work in the affected area until notified to do so.

C. Before starting backfilling operations, verify that all foundation walls are adequately braced to support backfill.

D. Begin excavation after demolition, if any, is complete and all debris removed from site.

3.02 EXCAVATING

A. Excavate topsoil and stockpile on site. Separate and remove from the site all debris and roots from topsoil.

B. Do not excavate if topsoil is wet.

C. Cover any stockpiled soil to prevent erosion.

D. Excavate as required for building foundation, walks and other work noted on the Contract Documents. Stockpile for future use excavated materials deemed useable by Engineer/Architect.

E. Excavate only to grades shown on Contract Documents. Do not over excavate unless directed to do so by Engineer/Architect.

F. Correct unauthorized excavation at no extra cost to the Owner. Fill over-excavated areas as directed by Engineer/Architect.

G. If rock is encountered during the excavation notify the Architect/Engineer immediately for direction. Rock is determined to be material that cannot be removed by conventional heavy equipment without systematic drilling, blasting or ripping.

H. When foundation excavations have reached the required subgrade elevation, the Contractor shall contact the Engineer/Architect. The Contractor shall contact a geotechnical Engineer to schedule a field test to determine if bearing soils are suitable and bearing capacity is sufficient.

I. If unforeseen unsuitable soils are encountered in foundation/utility excavations, the Contractor shall notify the Engineer/Architect of the scheduled field test as soon as it is established. When the Engineer/Architect or geotechnical Engineer determines that unsuitable soils are present, the Contractor shall continue excavation by over excavating to suitable soils and replace with structural backfill as directed by Engineer/Architect. Unforeseen additional excavation fill material and placement shall be paid according to the unit price in initial bid.

1. Satisfactory soil materials are defined as those complying with ASTM D 2487 soil classification groups GW, GP, GM, SM, SW and SP, or a combination of these group symbols.
2. Unsatisfactory soil materials are defined as those complying with ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH and PT, or a combination of these group symbols.
3. Unsatisfactory soils also include satisfactory soils not maintained within 2% of optimum moisture content at time of compaction.
4. Cohesionless Soil Materials: Cohesionless soil materials include gravels, sand-gravel mixtures, sands and gravelly-sands.
5. Cohesive Soil Materials: Cohesive soil materials include clayey and silty gravels, sand-clay mixtures, gravel-silt mixtures, clayey and silty sands, sand-silt mixtures, clays, silts and very fine sands.

J. All excavated material becomes the property of the Contractor and is to be removed from site at Contractor's expense.

3.03 TRENCHING

A. Excavate for all utilities as noted on Contract Documents.
B. Trenches are to be cut to the depth, width and slope as required by codes and Contract Documents.
C. Remove all loose fill from trenches prior to setting pipes.
D. Adequately support pipes and conduits with sand or gravel prior to backfilling.
E. Backfill trenches to the required contours and elevations. Place and compact fill materials as for backfilling. For trenches that pass under drives, terraces, walks, or parking lot, structural backfill must be used and compacted to 95% relative in 8" lifts.
F. Remove large stones and sharp objects to avoid point loading.
G. Where encountering rock or other unyielding bearing surfaces, carry trench excavation 6" below invert elevation to receive pipe bedding.
H. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.
I. Prevent surface water and subsurface or groundwater from flowing into excavations, from ponding on prepared subgrades, and from flooding project site and surrounding area. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
   1. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
   2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.
J. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

3.04 BACKFILLING AND ROUGH GRADING

A. Do not use frozen or saturated materials.
B. Backfill as early as practical in the project to allow maximum time for natural settlement. Do not backfill over frozen, saturated, or spongy subgrade surfaces.
C. Compacting to be done with a plate compactor or vibratory roller for gravel or an earth tamper for soil. Do not attempt to compact with dozer or backhoe treads.

D. Place and compact backfill material in layers of loose fill not to exceed 12” in trenching and backfilling keep 8”.
E. Place and compact backfill in such a way as to not damage or disturb existing pavement, foundation walls, insulation, footing drains, utilities in trenches, or septic systems.
F. During backfill operations, maintain proper moisture content of fill for proper compaction.
G. The Contractor shall obtain any and all agency inspections or approval of installation prior to backfilling. Re-excavation of materials covered prior to approval shall be done at no cost to the Owner.
H. When backfilling against an unsupported foundation wall, backfill both sides simultaneously.
I. Unless noted otherwise, slope grade away from building a minimum of 2” in 10’.
J. Prepare subgrades for all walks, terraces, driveways, parking areas and other site work as shown on Contract Documents. Compact fill as noted above. Provide granular fill for finished work for each area as noted on Contract Documents.
K. Rough grading shall be within 1” of contours shown on Contract Documents.
L. Backfilled areas are to be proof-rolled with a loaded 10-ton truck to locate any unsuitable soils undercut; replace any unsuitable materials with approved backfill.
M. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2% of optimum moisture content.
    1. Do not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice.
    2. Remove and replace, or scarify and air-dry, unsatisfactory soil material that is too wet to compact to specified density.
    3. Stockpile or spread and dry removed wet satisfactory soil material. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.
N. Under lawn or unpaved areas, compact top 6” below subgrade and each layer of backfill or fill material at 90% maximum density.
O. Backfill disturbed or low area around proposed paved, poured or gravel areas and finish with topsoil to provide finish grades flush with top of paved, poured or graveled areas, seed and topsoil as per landscaping Section 32 92 00.

3.05 STORAGE OF SOIL MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile materials without intermixing. Place, grade and shape stockpiles to drain surface water. Cover or water stockpiles to prevent wind-blown dust. Stockpile materials away from edge of excavations. Do not store within drip-line of remaining trees.

3.06 PLACEMENT OF TOPSOIL

A. Loosen by raking, compacted sub soil before placement of topsoil.
B. Place topsoil in the areas and to the proper depth per industry standards.
C. Fine grade and rake topsoil to remove all debris and rocks over ½”.
D. Lightly compact topsoil by roller after raking.
E. Leave site clean and raked and ready for landscaping.
F. Topsoil soil is to be placed at a depth of at least 4” to bring up to finish grade.
G. Coordinate exact finish grade with Engineer/Architect and Owner.

3.07 TESTS

A. Compaction testing shall be at the discretion of the Owner and Engineer/Architect. The Contractor is to notify the Owner and Engineer/Architect while compaction is being done. Testing, if required will be determined at that time.
B. Soils and compaction tests will be provided by Owner and coordinated by Contractor as required. Engineer/Architect will determine when and if such tests are required.
C. The Owner is to pay for initial testing. If test results show inadequate installation, the Contractor shall burden all costs involved with fixing the problem, including additional testing, site inspections, removal of problem materials and reinstallation.
D. All approved test reports shall be sent directly to the Engineer/Architect for review.
E. All subbase excavating ready for base material / or pavement shall be proof-rolled with a loaded 10-ton truck. If proof rolling failed, undercut soft material and replace with compacted structural backfill. Engineer/Architect shall be notified.

3.08 TOLERANCES

A. Top of rough grading, plus or minus 1/10'.
B. Top of topsoil, plus or minus ½ inch.

END OF SECTION

SECTION 31 23 33: TRENCHING AND BACKFILLING

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor, material, and equipment required to perform the scope of work described herein and/or as shown per Contract Documents:
   1. Excavate trenches for private and municipal utilities.
   2. Compacted bedding around utilities.
   3. Backfilling and compaction to subgrade elevations of trench fill material.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 REFERENCES

A. ANSI/ASTM C136 – Method for Sieve Analysis of Fine and Coarse Aggregates.
B. ANSI/ASTM D1557 or D698 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures.
C. ASTM D2922 – Field Density Testing by Nuclear Method.
D. ASTM D2321 – Standard Practice for Installation of Thermoplastic Sewers and Other Gravity Flow Applications.

1.04 FIELD MEASUREMENTS

A. Verify that survey benchmark and intended elevations for the scope of work are as shown on Contract Documents.

PART 2: PRODUCTS

2.01 FILL MATERIALS (SEE DRAWING DETAILS FOR BEDDING AND BACKFILL)

A. Subsoil, reused.
B. Granular fill.

2.02 BEDDING MATERIALS (See Contract Documents for bedding and backfill for requirements of materials brought on-site).

A. Subsoil, reused.
B. Granular fill.
C. Coarse aggregate drain stone.
D. Filter Aggregate.

PART 3: EXECUTION

3.01 EXAMINATION

A. Verify acceptability of fill materials proposed to be reused based on bedding and backfill details.
B. Existing Utilities: Contractor shall contact the State Underground Utility Location Agency a minimum of three (3) working days prior to the start of construction for

location of existing utilities in the construction zone. Call Miss Dig at: 811 – "Know what's below. Call before you dig."

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.
B. Excavating and trenching operations shall at all times be conducted in a safe, orderly manner using methods and equipment designed and suited to the intended use by personnel experienced in the scope of work being performed.
C. None of the requirements or provisions specified herein or shown on the Contract Documents shall nullify or restrict any safety provisions required by any regulations or law governing the protection and/or safety of persons or property.
D. The use of mechanical equipment will be permitted except in locations where its operation would cause damage to trees, buildings, culverts, or other existing property utilities, or structures above or below ground; in all such locations, hand excavating tools and methods shall be used.
E. Mechanical equipment used for trench excavation shall be of a type, design, and construction, and shall be so operated that uniform trench widths and vertical side walls are obtained at least from an elevation 1' above the top of the pipe for pipes with diameters of 6" and larger (minimum 6" above top of pipe with less than 6" diameter) above top of the installed pipe to the bottom of the trench and that the trench alignment is such that the pipe when accurately laid to specific alignment will be centered in the trench with adequate clearance between the pipe and the side walls of the trench. Undercutting of the trench side wall to obtain clearance will not be permitted. Where necessary to reduce the earth load on trench banks to prevent sliding and caving, the banks may be cut back on slopes, which shall not extend lower than 1' above the top of the pipe.

3.03 EXCAVATION

A. Excavate subsoil required for all utility piping.
B. Cut trenches sufficiently wide to enable installation of utilities and allow inspection. The width of the trench shall be ample to permit the pipe to be properly laid and joined. And the pipe embedment material and backfill to be placed and compacted as specified. Trenches shall be of sufficient extra width, when required, as will permit the convenient placing of trench supports, sheeting, and bracing.
C. Excavations shall provide adequate clearance for installation and removal of concrete forms. Monolithic concrete manholes and other concrete structures, or parts thereof, which do not have footings that extend beyond the outside face of exterior walls may be poured directly against excavation faces without the use of outer forms, provided that such faces are stable, and also provided that a layer of polyethylene film is placed between the earth and concrete.
D. In order to limit excessive loads on the pipe, the maximum width of trench for pipe 36" and larger in diameter shall be not more than twice the inside diameter; for smaller sizes of pipe, the maximum width of trench shall be not more than 3' greater than the inside diameter of the pipe, except as otherwise specified or directed. These limiting restrictions on trench width apply from outside bottom of pipe to 2" above the outside top of pipe. Where the width of trench within these limits exceeds the maximum limit specified, the Contractor shall install a heavier class of pipe or use other means to provide additional load carrying capacity at no additional cost to the Owner. Any changes in class of pipe or other variation shall be approved in writing by the Engineer/Architect before the scope of work progresses.
E. When the trench width above the top of the pipe is appreciably greater than that which is reasonably required by project conditions in the judgment of the Engineer/Architect, any additional cost for backfill material, surface restoration, or

other items that are the result of such excess trench width, shall be the Contractor's responsibility.

F. The subgrade for the pipe and/or structures shall be firm, dense and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workmen. Trench bottoms or subgrade for concrete structures that are otherwise solid, but that become soft or spongy on top due to construction operations, shall be reinforced with crushed stone or gravel. The finished elevation of stabilized subgrade shall not be above the subgrade elevations specified. When the excavation at the pipe foundation grade is in undesirable soil, the Contractor shall excavate an additional 6" in depth and refill with approved materials thoroughly compacted to the established pipe foundation grade. This scope of work shall be incidental to the price bid for the laying of the pipe. The cost for excavating the additional depth and furnishing and placing up to 6" of approved stone or gravel, shall be included in the cost for installing the pipe or structure, and no additional payment will be made.

G. Excavation shall not interfere with normal loading influence plane of the foundations.

H. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

I. Remove lumped subsoil, boulders, and rock.

J. Correct unauthorized excavation at no cost to Owner.

K. Correct areas over excavated by error in accordance with Paragraph G of this section.

L. All excavated material shall be piled in such a manner that will not endanger the scope of work.

M. Building connections, water lines, gas lines, conduits, drains, etc., when encountered in the trench, shall be properly supported and protected across the excavation, unless otherwise shown on the Contract Documents or directed by the Engineer/Architect.

3.04 BACKFILLING

A. Backfill trenches 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 and compact material in continuous layers not exceeding 8" lifts, compacted to 95% of maximum density in accordance with ANSI/ASTM D1557 or 100% maximum density in accordance with ANSI/ASTM D698.

D. Employ a placement method that does not disturb or damage pipe in trench.

E. Maintain optimum moisture content of backfill materials to attain required compaction density.

3.05 TOLERANCES

A. Surface Grade of Backfilling: Plus or minus 1/10' with the intent of achieving the overall planned surface grade elevation.

3.06 FIELD QUALITY CONTROL

A. Owner or Engineer/Architect may check compaction of the backfill at any time.

B. For compacted earth and granular backfill in trenches, Owner may employ a testing laboratory to make test on-site and will pay all costs for the first set of tests performed per lift. If compaction fails to meet specifications, all succeeding tests for that lift shall be at expense of the Contractor.

3.07 PROTECTION OF EXISTING UTILITIES

A. Uncover and determine the elevation of existing underground utilities along the route of construction, as shown on the Contract Documents or marked at the time of construction by the utility owner.
B. Adequately support, shore up, or otherwise protect underground utilities whenever exposed in the trench. Extend supports a minimum of 12” into undisturbed earth each side of trench. Band or tie utility to bridging for its full length. Where bridging cannot be supported by a firm foundation, provide vertical support, including any lateral bracing necessary to provide firm support.
C. Above ground (aerial) utilities, including power, telephone and cable television, shall remain in service at all times. Any anticipated disruption of service shall be with the full knowledge of the utility company and required advance notice to affected users. Removal of guy wires and holding of poles shall be done as required to complete the scope of work, shall be as agreed upon by the utility company and Contractor, and shall be at the expense of the Contractor.
D. Arbitrary disruption of underground and aerial utility services will not be permitted.

3.08 REMOVAL AND REPAIR OF TREES

A. Consult with Engineer/Architect and obtain permission prior to removal of any tree or shrub not noted on the Contract Documents to be removed well in advance of such removals.
B. Fell trees to be removed so as not to injure trees to remain.
C. Remove stumps and roots to a minimum of 12” below grade.
D. Take every precaution to prevent damage to trees and shrubs not noted to be removed.
E. Carefully trim and shape trees, tree limbs, and bushes located such that Contractor's equipment will not damage same during construction. Flush cut all limbs and branches. Replace trees and bushes other than those whose removal is approved by Engineer/Architect, which are destroyed or damaged to the extent that their continued life is impaired.
F. Prior to Final Payment, the Owner may employ a competent arborist to inspect all trees and shrubs along the work line and to properly trim, prune, repair, and protect any that have been damaged, and to designate those which have been so damaged as to require replacement.

3.09 MAINTENANCE OF TRENCHES AND EXCAVATIONS

A. Maintain the backfilled trenches and other excavations at all times during the progress of the scope of work. In particular, keep those trenches or excavations within 15’ of the edge of pavements or traveled roadways filled to the same level as the adjacent undisturbed ground. Immediately fill in any settlement, which occurs during this period to prevent the possibility of accidents.

3.10 PROGRESS

A. Complete backfilling operations within a reasonable distance of trenching and pipe laying operations, and other excavations. The specific limitations of this paragraph shall be at the discretion of Owner and Engineer/Architect, but the general intent is to require Contractor to minimize the inconvenience to nearby residents or businesses. Owner and Engineer/Architect will be permitted to require Contractor to cease trenching and pipe laying operations at such time as they feel that backfilling has not progressed satisfactorily. At no time shall the exposed trench length exceed 100’.

END OF SECTION

SECTION 31 25 00: EROSION AND SEDIMENTATION CONTROLS

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor, material, and equipment required to perform the scope of work described herein and/or as shown per Contract Documents:
B. Furnishing, installing, and maintaining temporary erosion controls and temporary sedimentation controls.
C. Temporary seeding.
D. Mulching.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 REFERENCES

A. EPA, "Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices."

1.04 DEFINITIONS

A. Temporary erosion controls shall include grassing, mulching, watering, and reseeding on-site sloped surfaces, providing berms at the top of the slopes, and providing interceptor ditches at the ends of berms and at those locations which shall ensure that erosion during construction shall be either eliminated or minimized.
B. Temporary sedimentation controls shall include silt dams, traps, and barriers to control soil erosion.

1.05 SUBMITTALS

A. General: Submit the following in accordance with conditions of contract and general conditions sections:
   1. Product data for silt barriers and netting.
   2. The Contractor has the option to submit additional control measures in the form of Shop Drawings.
   3. Certificates of purity and content for all seed products, see Section 32 92 00.

1.06 QUALITY ASSURANCE

A. Provide erosion control methods in accordance with methods as indicated on the Erosion Control Plan and/or requirements of authorities having jurisdiction. The Contractor shall comply with all National Pollutant Discharge Elimination System (NPDES) rules and regulations in terms of both installation and maintenance during construction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the site under provisions of general conditions.
B. Store and protect products under provisions of general conditions.

C. Deliver grass and other seed crop materials in sealed containers. Damaged packaging containing product is not acceptable.

PART 2: PRODUCTS

2.01 SILT-BARRIER PRODUCTS

A. Filter stone shall be crushed 1-inch stone without excessive fines or dust.
B. Silt barrier shall be Mirafi 100X or approved equal which provides a water flow capacity of 40 gallons per minute per square foot.
C. Erosion control blankets shall be as shown on the Contract Documents or approved equal.

2.02 TEMPORARY SEED MATERIALS

A. Seed mixtures for temporary erosion protection applications are specified on the Contract Documents.

PART 3: EXECUTION

3.01 GENERAL

A. Erosion control devices as shown on the Contract Documents are the minimum required, based upon the finished grades for the site. Contractor is responsible for providing additional devices for erosion protection at the Contractor's expense to minimize erosion leaving the site during all phases of activity.
B. The Contractor shall construct the sedimentation control devices prior to clearing and grubbing the site to ensure complete silt control.
C. Silt dams, traps, and barriers shall be installed and shall be maintained in place for the duration of construction. This is done by periodically replacing silted structures or removing the silt from the up gradient side of it.
D. Erosion and sedimentation controls shall be maintained in a condition which shall retain unfiltered water.
E. The Contractor shall be solely responsible for ensuring that no silt or debris leaves the immediate construction site. Any silt or debris that does leave the immediate site shall be cleaned up, and the area disturbed shall be returned to its natural state as directed by the Engineer/Architect at the Contractor's expense.
F. The Contractor shall be responsible to clean-up all silt debris built up on the site and for the removal of all erosion control measures at the appropriate times as directed by the Engineer/Architect.
G. The Contractor shall be required to maintain temporary construction entrances and remove all mud and debris from public roads on a daily basis, or more often if needed.

3.02 PERMANENT SEEDING

A. Seed Bed Preparation.
1. Rough grade lawn areas to smooth, even surface with loose uniformity fine texture. Roll, rake, and drag lawn areas. Remove ridges and fill depressions as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.
2. Prepared seed bed shall be friable topsoil, free from subsoil clay lumps, brush, weeds, and other litter, and shall be free of roots, stumps, and stones larger than 1-inch in any dimension.

3. If seed bed has become muddy, hard, or excessively dry, refill to a smooth, friable, uniform condition; free from stones or lumps. Re-grade all settling prior to seeding. Seed immediately after bed preparation.

B. Seeding Areas Less Steep Than a 1-Vertical to 3-Horizontal Slope:
1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.
2. Place seed with a mechanical drill seeder (Brillion or equal). Distribute seed evenly over entire area by drilling equal quantity in two (2) directions at right angles to each other.
3. Do not seed immediately following rain or if seed bed is muddy.
4. Roll sown area with a roller weighing at least 200 pounds per lineal foot.
5. Immediately after seeding and compacting, apply mulch material to attain even coverage over the entire target area.

C. Seeding Areas Steeper Than 1-Vertical to 3-Horizontal Slope:
1. Mix specified seed, and pulverized mulch in water, using equipment specifically designed for hydroseeden application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.
2. Apply slurry uniformly to all areas to be seeded. Rate of application as required by Manufacturer to obtain specified seed sowing rate.
3. On all slope areas 1:3 or steeper (or as designated on the Contract Documents), incorporate wood fiber tackifier into hydroseed slurry. Tackifier shall be Conwed 2000 or equal and applied at a rate of 1,750 pounds per acre.
4. Erosion control blankets, as specified and called for on the Contract Documents, may be necessary.

3.03 CLEAN UP

A. Any disturbed areas to be covered with sod or seed established within 5 days of finished grading.

END OF SECTION

SECTION 32 13 13: CONCRETE PAVING

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and material required to perform the scope of work described herein and/or as shown on the Contract Documents:
B. Preparation for concrete paving (conventional-form and slip-form).
C. Concrete paving for walks (conventional-form and slip-form).
D. Cast-In-Place concrete paving over prepared subbase:
E. Parking areas.
F. Driveways.
G. Vehicular entrances.
H. Walkways.
I. Curbs.
J. Manhole aprons.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated with Contract Documents.

1.03 SUBMITTALS

A. Sample of broom finish.
B. Layout of grid lines and expansion joints.
C. Product data is required for admixtures and releasing agents.
D. Mix design from concrete plant is required for review.

1.04 STANDARDS

A. Work to conform to ACI 301 most current edition.
B. All materials to conform to ASTM specifications noted below.
C. Construction Tolerance: 1/8” per 1’-0” in 10’ for grade and alignment of top of forms; ¼” in 10’ for vertical face on longitudinal axis.
D. Slope in flat pads to be 1” in 10’.

1.05 QUALITY CONTROL

A. Subgrades may be tested by an independent testing agency prior to preparation for slabs. Testing agency shall be paid by Owner. Contractor shall coordinate testing.
B. The concrete samples shall be taken by and tested by an independent testing agency. Testing agency shall be paid by Owner. Contractor shall coordinate testing to ensure that agency is on-site for each pour.

PART 2: PRODUCTS

2.01 MATERIALS

A. Forms to be wood or steel.
B. Joint filler to be asphalt impregnated wood fiberboard.
C. Reinforcing steel to be ASTM A 615, Grade 60, deformed billet steel bars, unfinished.
D. Reinforcing supports to be galvanized steel chairs, of sizes and heights to allow bars to meet drawing specification.
E. Reinforcing wire to be welded wire ASTM A 185 as noted on Contract Documents.
F. Dowels to be plain steel, unfinished.

G. Cement to be ASTM Type I or sulfate resistant type, Portland cement, gray in color.
H. Fine and course aggregates to conform to ASTM C 33.
I. Water for mixing concrete to be clean and potable.
J. Admixtures to conform to ASTM C 260.
K. Curing compound shall be Sonneborn Kure-N-Seal or accepted alternate.
L. Wire Mesh: Welded plain steel wire fabric, ASTM A 185
M. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60
N. Fabricated Bar Mats: Steel bar or rod mats, ASTM A 184, using ASTM A 615, Grade 60 steel bars.
O. Joint Dowels Bars: Plain steel bars, ASTM A 615, Grade 60
P. Hook Bolts: ASTM A 307, Grade A threaded bolts,
Q. Epoxy Adhesive: ASTM C 881

2.02 CONCRETE MIX

A. Concrete mix shall contain not less than 564 pounds of dry cement per cubic yard of concrete (6 sacks of cement per cubic yard of concrete)
B. Concrete strength: 3500psi. @ 28 days – sidewalks.
C. Slump to be 5” maximum for handwork and 3” maximum for machined work.
D. Air entrainment to be not less than 5%, nor more than 7% in all exterior concrete mixes.
E. Maximum water cement ratio at point of placement = 0.50.
F. Limit use of Fly Ash to 25% of cement content by weight.
G. Adjustments to concrete mixes:
H. Mix design adjustments may be requested by contractor when characteristics of materials, project conditions, weather, test results or other circumstances warrant.
I. Mix design adjustments must be approved by Engineer prior to use.
J. Use of plasticizer must be approved by Engineer prior to concrete placement.
K. Coarse aggregate for concrete may be either slag or natural aggregate. Both coarse aggregate and fine aggregate for concrete shall be capable of meeting applicable MDOT specifications therefore.
L. Concrete delivery tickets shall bear a certification from the producer that the concrete mix meets the requirements of this Section, and delivery tickets shall be made available to the Engineer or his representative upon request.
M. Weather and temperature limitations for concrete placement are as set forth in 2020 MDOT Standard Specifications for Construction, Section 602.03.T.

2.03 ACCESSORIES

A. Sealants for control joints see Section 07 92 00.

PART 3: EXECUTION

3.01 PREPARATION

A. Verify elevations of all subgrades prior to placing concrete.
B. Coordinate all finish grading with site drainage. Verify that areas are graded to drain properly.
C. Verify with soils Engineer that subgrades are properly compacted for the loads to be carried. Any areas that are soft or spongy need to be re-excavated, filled with granular fill, compacted and tested.
D. Do not proceed with pours until subgrades, expansion joint layouts, and reinforcing have been reviewed by the Engineer and local code officials as required.
E. Provide for dampening of subsurfaces as required.
F. Provide for dewatering as required. All subsurfaces are to be free of standing water prior to placement of concrete.

G. Ensure that adequate protection materials are on hand if concrete is to be placed in inclement weather. Provide for protection of concrete from rain, snow, freezing, or hot weather over 90°F.

3.02 FORMING

A. Layout and install forms per Contract Documents.
B. Ensure that forms are securely installed and will not fail or move out of alignment during placement of concrete.
C. Install joint fillers with forms as per approved layouts.
D. Place control joints every 20' or as per noted on approved layout.
E. Place expansion joint material at perimeter of paving where it abuts other structures or appurtenances.
F. Hold expansion joint material down ½" below top of slabs to receive sealant installed under Section 07900.

3.03 REINFORCEMENT

A. Place slab reinforcement as per details on Contract Documents.
B. Support all reinforcement on steel chairs. Tie reinforcing to chairs to prevent movement during pour.
C. Stop reinforcement at expansion/contraction joints. Dowel slabs together at these joints with plain steel dowels, lubricating one end and the other bonded to the concrete.

3.04 PLACING CONCRETE

A. Compact base and maintain grades and pitches as per Contract Documents.
B. Prior to placing concrete, inspect formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work not less than 24 hours prior to pouring.
C. Review layout of expansion joints and control joints before pouring concrete.
D. Place concrete in accordance with ACI 301-96.
E. Place concrete continuously between cold joints. Do not allow cold joints between predetermined joints.
F. Concrete paving to receive a light broom finish with troweled control joints and edges per approved sample, broom finish to run perpendicular to the path of travel on walks or as noted.
G. If concrete is to be poured in freezing weather, protect slabs from freezing for 48 hours.
H. Review layout of grid lines with Engineer before scoring slabs.
I. Score control joints into concrete with concrete saw. Control joint to be ¼ the depth of the slab. Cut to be 1" minimum. Seal cut with sealant per Section 07900.

3.05 CURING

A. Apply curing compound immediately after finishing is complete.
B. Apply curing compound exactly per manufacturer's written instructions.

3.06 TOLERANCES

A. Variation from design elevations may be ½" in field if drainage is maintained and no ponding (bird bath) occurs and all ADA requirements are met.
B. Variation from design elevations at doors, steps, curbs, and adjacent slabs shall be no more than 1/8" and all ADA requirements are met.
C. Ponding shall be defined as any area where depth of standing water exceeds ¼'.

D. If ponding occurs, the contractor shall be responsible for eliminating the problem at no cost to the Owner per the direction of the Engineer.

3.07 PORTLAND CEMENT CONCRETE PAVING

A. Scope of this section includes providing all labor and material required to perform the work described herein and/or as shown on the Contract Documents.
   1. Cast-In-Place Concrete Paving over prepared subbase:
      a. Parking areas.
      b. Driveways.
      c. Vehicular entrances .
      d. Walkways.
      e. Curbs.
      f. Manhole aprons.

3.08 MEASUREMENT AND PAYMENT

A. Concrete pavement, of the thickness specified, will be determined by area in square yards based on field measurements.

B. When concrete pavement with integral curb is specified, it will be measured in square yards, including the area occupied by the curbs.

C. All concrete pavement placed, at thickness specified, will be paid for at the contract unit prices for actual units of work performed.

D. Attention is called to the fact that the cost of the sand base course (C.I.P.) shall be included in the contract unit price for concrete pavement respectively, and no separate payments shall be made therefore.

E. Unit price bid for construction concrete pavement, at thickness specified, shall be payment in full for all labor, materials, equipment, incidental and collateral work, and expense required to complete installation in accordance with Project Plans and Specifications.

END OF SECTION

SECTION 32 31 00 - FENCES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: vinyl fencing systems.
B. All related sections incorporated within Contract Documents.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM D256 Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
   2. ASTM D638 Standard Test Method for Tensile Properties of Plastics.
   3. ASTM D648 Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
   4. ASTM D792 Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
   5. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
   6. ASTM D4216 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) and Related PVC and Chlorinated Poly (Vinyl Chloride) (CPVC) Building Products Compounds.
   7. ASTM F964 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Exterior Profiles Used for Fencing.

1.03 DEFINITIONS

A. Posts: Vertical structure support members of the fence system.
B. Rails: Horizontal structural support members of the fence system.
C. Pickets: Vertical members between the bottom and top rails.
D. Aluminum Channel: Structural supports inside rails.
E. Galvanized Steel Channel: Structural supports inside rails.

1.04 SYSTEM DESCRIPTION

A. The contractor shall provide a complete PVC fencing system of the design, style and strength defined herein. Fencing components are comprised of profiles made of extruded, rigid polyvinylchloride (PVC). This PVC material is specially formulated for outdoor use with superior color hold and impact resistant properties after extended outdoor exposure. The system shall include all posts, rails, pickets, caps, metal inserts, and accessory items necessary to complete the installation. Color shall be White.

1.05 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract.
B. Product Data: Submit product data for specified products.
C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories and finish colors. Include details showing fabrication and installation of rails and pickets, including plans, elevations, sections, details of components and attachments to other units of work, if required.
D. Samples: Submit selection and verification samples for finishes, colors, and profiles if requested.
E. Quality Assurance Submittals: Submit the following:
    1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties. Include copies of selected test reports by independent laboratories verifying the compliance of fencing components and systems with applicable building codes upon request.
    2. Compliance Reports: Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction. Provide evidence that the polyvinyl chloride fencing systems are in compliance with applicable building code in effect for project.
    3. Certificates: Product certificates signed by the manufacturer certifying that materials comply with specified performance characteristics and criteria and physical requirements.
    4. Manufacturer's Instructions: Manufacturer's installation instructions.
F. Closeout Submittals: Submit the following:
    1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
    2. Warranty: Warranty documents specified herein.

1.06 QUALITY ASSURANCE

A. Obtain PVC fence accessories, fittings and fasteners from a single source and manufacturer approved source to ensure consistent quality standards are maintained throughout the project.

1.07 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 1.
B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
D. Storage and Protection: Store materials protected from exposure to material handling

damage and accumulation of dirt and grime, at temperature and humidity conditions recommended by manufacturer. Handle and store product according to fence and railing manufacturer's recommendations. Store in original packaging whenever possible until components are required on the project.

1.08 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions used with their permission. The manufacturer is responsible for technical accuracy.
B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

PART 2 - PRODUCTS

2.01 PVC FENCING SYSTEMS

A. Manufacturer:

1. Vinyl products are to be manufactured from 100% new vinyl. The base ingredient is rigid PVC (polyvinyl chloride) homo-polymer compound with a high level of titanium dioxide pigment for long-term UV resistance.
2. Post profile types and sizes:
   a. 5" x 5" x 0.154" wall (127 x 127 x 3.9 mm).
   b. 6" x 6" x 0.116" wall (153 x 153 x 2.9 mm). (ends)
3. Rail profile types and sizes:
   a. 2 ¼" x 3 ½" (57 x 89 mm) open.
   b. 2" x 6 ½" (51 x 165 mm) slotted.
4. Picket profile types and sizes
   a. 1" x 8" (25 x 203 mm) tongue and groove (T&G)
5. Lattice:
   a. 2 5/8" weave, white only, 16" x 88", lattice diamond.
6. Cap profile types and sizes:
   a. Post cap – Classic Manor: 5" x 5" (127 x 127 mm)
7. Finishes: Smooth, soft gloss.
8. Colors:
   a. Rails: white
   b. Posts: white
   c. Pickets: white
   d. Decorative cap rails: white,
   e. Post and Rail caps: white.
9. Product(s)/System(s) Testing: Provide PVC fencing system that complies with the following physical/chemical properties:
   a. ASTM D256 - Izod Impact greater than 5 ft lb/in (2.1 N•m/m) at 23 degrees C.
   b. ASTM D638 - Tensile Strength 6950 psi (43 MPa).

c. ASTM D638 - Tensile Modulus 407,800 psi (2963 MPa).
d. ASTM D648 - Deflection Temperature 67 degrees C.

2.05 MATERIALS

A. Fence System Materials:
   1. General: Posts, rails, pickets, post caps, and picket caps shall comply with ASTM D4216, Class 13334432.
      a. Posts: One-piece extruded square profile.
      b. Rails: One-piece extruded rectangular profile.
      c. Picket/panels: One-piece extruded profile.
      d. Post Caps Molded: Specify to fit the selected post profile.
      e. Rail Caps Molded: Specify to fit the selected post profile.
      f. Picket Caps Molded: Specify to fit the selected post profile.
      g. Aluminum/Galvanized Steel Reinforcement Insert.
      h. Fasteners and miscellaneous components.

2.06 RELATED MATERIALS

A. Related Materials: Refer to other sections listed in Related Sections Paragraph herein for related materials.
B. Adhesive and Cement:
   1. Adhesive: PVC based adhesive with the same UV properties as proposed fencing system as recommended by manufacturer.

2.07 FABRICATION

A. General: Fabricate fencing systems to comply with requirements indicated for design, dimensions, details, finish and member sizes, including wall thickness, but not less than those required to support structural loads.

2.08 SOURCE QUALITY

A. Source Quality: Obtain PVC fencing system products from a single licensed dealer or approved source.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, product carton instructions for installation, or design/detail drawings.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions, which have been previously

installed under other sections, are acceptable for product installation in accordance with that manufacturer's instructions.

3.03 PREPARATION

A. All new installation shall be laid out by the contractor in accordance with the construction plans.

3.04 INSTALLATION

A. Depending upon the style of fence being installed, set fence posts on 6' or 8' centers (see individual installation instructions for the appropriate style). Posts shall be placed 36" in the ground, depending upon the style of fence and local conditions and set in concrete at no less than 48" from existing ground level.
B. Place assembled fence sections into position and slide rails into posts. The rails are secured into posts by tabs which are notched into the rails and catch on the inside wall of the post. Top rails may be further secured with a #8-3/4" screw through the rail, inside the post.
C. Site Tolerances: All posts to be set within 1/8" of plans in any direction.
D. Installation and panel tolerances to be per manufacturer's requirements.

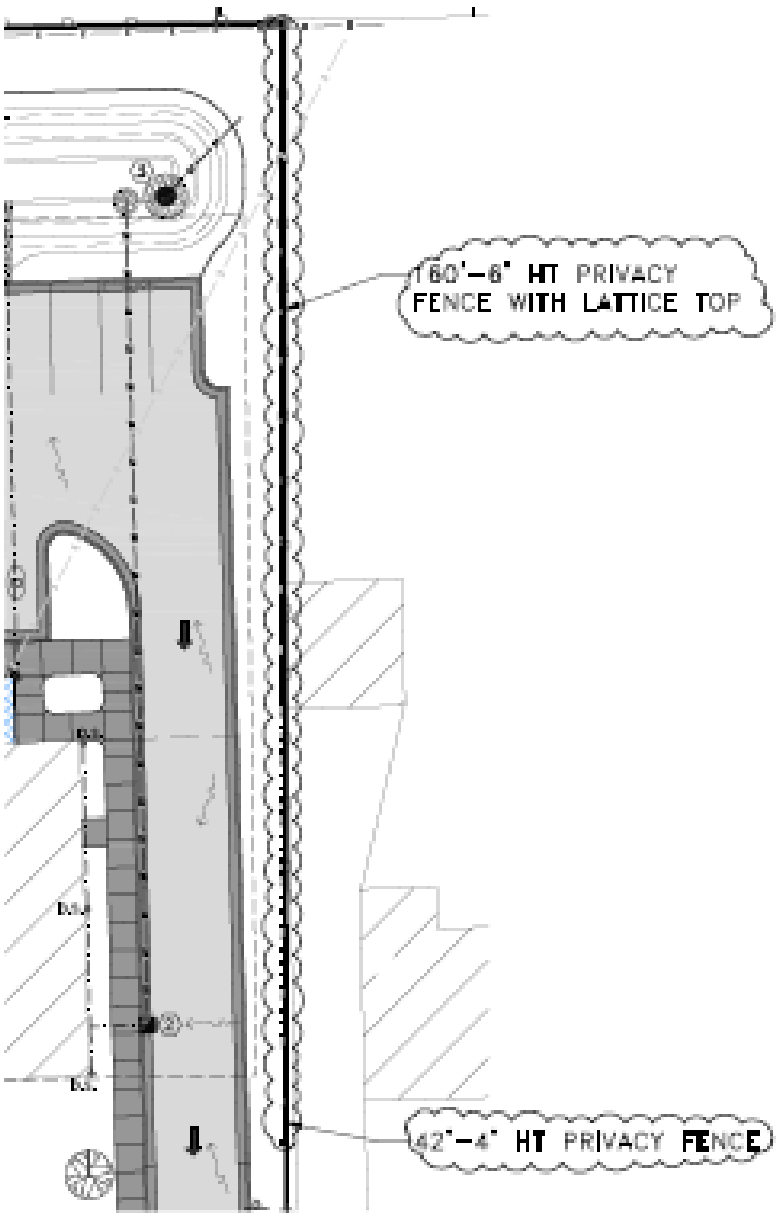
3.05 FIELD QUALITY REQUIREMENTS

A. Inspection: field inspection to be performed in accordance with manufacturer's warranty requirements.
B. Manufacturer's Field Service: Upon Owner's request, provide manufacturer's field service consisting of produce use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
   1. Site visit: 1 minimum, as required, per owner's request.

3.06 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace products that have been installed and are damaged. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

See sketch next page



END OF SECTION

SECTION 32 92 00: TURF AND GRASSES

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor, material, and equipment required to perform the scope of work described herein and/or as shown on the drawings:
   1. Furnishing, installing, and maintaining temporary erosion controls and temporary sedimentation controls.
   2. Temporary seeding.
   3. Mulching
   4. Lawns
   5. Topsoil and soil amendments
   6. Fertilizers and mulches
   7. Sod

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 REFERENCES

A. EPA, "Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices."

1.04 DEFINITIONS

A. Temporary erosion controls shall include grassing, mulching, watering, and reseeding on-site sloped surfaces, providing berms at the top of the slopes and providing interceptor ditches at the ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or minimized.
B. Temporary sedimentation controls shall include silt dams, traps, barriers, and appurtenances to control soil erosion.

1.05 SUBMITTALS

A. General: Submit the following in accordance with conditions of contract and general conditions sections:
   1. Product data for silt barriers and netting.
   2. The Contractor has the option to submit additional control measures in the form of Shop Drawings.
   3. Certificates of purity and content for all seed products:
      a. Provide fresh, clean, new crop seed complying with tolerance for purity and germination as established by the Official Seed Analysts of North America.
      b. Provide seed mixtures composed of grass species and other cover crop at the proportions and rates indicated on the Contract Documents.
      c. Submit seed vendor's certified statement for each seed mixture required, stating botanical and common name, percentages by weight, and percentages of purity, germination and weed seed content for each specified seed species.
B. Sod placement schedule indicating anticipated dates.
C. Maintenance instructions recommending procedures to be established by Owner for maintenance of landscaping during an entire year. Submit before expiration of required maintenance periods.

1.06 QUALITY ASSURANCE

A. Provide permanent erosion control methods in accordance with methods as indicated on the Erosion Control Plan and/or requirements of authorities having jurisdiction. The Contractor shall comply with all National Pollutant Discharge Elimination System (NPDES) rules and regulations in terms of both installation and maintenance during construction.
B. Installer Qualifications: Engage an experienced installer who has completed landscaping work similar in material, design, and extent to that indicated for this project and with a record of successful landscape establishment.
C. Installer's Field Supervision: Require installer to maintain an experienced full-time supervisor on the project site during times that landscaping is in progress.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the site under provisions of general conditions.
B. Store and protect products under provisions of general conditions.
C. Packaged Materials: Deliver any accessory packaged materials in containers showing weight, analysis, and name or manufacturer. Protect materials from deterioration during delivery and while stored at site.
D. Seed: Deliver seed in original sealed, labeled, and undamaged containers.
E. Sod: Harvest, deliver, store, and handle sod according to the requirements of the American Sod Producers Association's (ASPA) "Specifications for Turf-grass Sod Materials and Transplanting / Installing."

1.08 SILT-BARRIER PRODUCTS

A. Filter stone shall be crushed 1" stone without excessive fines or dust.
B. Silt barrier shall be Mirafi 100X or approved equal which provides a water flow capacity of 40 gallons per minute per square foot.
C. Erosion control blankets shall be as shown on the drawings.

PART 2 EXECUTION

2.01 PROJECT CONDITIONS

A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage to either plants or utilities, include long term planning in final planting conditions. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.
B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Engineer/Architect before planting.

2.02 COORDINATION AND SCHEDULING

A. Coordinate installation of planting material during normal planting seasons for each type of plant material required.

2.03 WARRANTY

A. General Warranty: The special warranty specified in this article shall not deprive the Owner of other rights the Owner may have under the other provisions of the Contract

Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Warrant the following living planting materials for a period of one (1) year after date of substantial completion, against defects including death and unsatisfactory growth, except for defects resulting from lack of maintenance, neglect, or abuse by Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.

2.04 LAWN MAINTENANCE

A. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following period, unless agreed upon by the Engineer/Architect and Owner:

B. Seeded lawns: 60 days after date of substantial completion:

C. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during next planting season.

D. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.

E. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawns uniformly moist to a depth of 4".

F. Water lawn at the minimum rate of 1" per week.

G. Mow lawns as soon as there is enough top growth to cut with mower set at a specified height for principal species planted. Repeat mowing as required to maintain specified height without cutting more than 40 % of the grass height. Remove no more than 40 % of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.

H. Post-fertilization: Apply fertilizer to lawn after first mowing and when grass is dry:

I. Use fertilizer that will provide actual nitrogen of a least 1lb. per 1000 sq.ft. of lawn area.

2.05 GRASS MATERIALS

A. Sod: Seed mix shall be nature tolerant and of local conditions.

B. Grass shall be fully developed with full root structure when delivered to the site.

2.06 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7; 4% organic material minimum, free of stones ½" or larger in any dimension, and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
2. Topsoil Source: Imported topsoil from off-site sources. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4" deep; do not obtain from bogs or marshes.

2.07 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

2.08 PLACEMENT OF TOPSOIL

A. Loosen by raking, compacted sub soil before placement of topsoil.
B. Place topsoil in the areas and to the proper depth and to within ½" of the contours and elevations shown on the Contract Documents.
C. Fine grade and rake topsoil to remove all debris and rocks over ½".
D. Leave site clean, raked, and ready for landscaping.

2.09 PLANTING SOIL PREPARATION

A. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
B. Mix soil amendments and fertilizers with topsoil at rates required. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days.

2.10 SOD PLACEMENT

A. Limit sub-grade preparation to areas that will be planted in the immediate future.
B. Loosen sub-grade to a minimum depth of 4 ". Remove stones larger than ½ "in any dimension and sticks, roots, rubbish, and other extraneous materials.
C. Spread planting soil mixture to depth less thickness of sod, required to meet finish thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or sub-grade is frozen.
    1. Place approximately ½ the thickness of planting soil mixture required. Work into top of loosened sub-grade to create a transition layer and then place remainder of planting soil mixture.
D. Grade lawn and disturbed areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges and fill depressions to meet finish grades. Limit fine grading to areas that can be covered in the immediate future. Remove trash, debris, stones larger than ½ "in any dimension, and other objects that may interfere with planting or maintenance operations.
E. Moisten prepared lawn areas before placing sod when soil is dry.
F. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.
G. Leave site clean, raked, and ready for landscaping.

2.11 RECONDITIONING LAWNS

A. Recondition existing lawn areas damaged by Contractor's operations, including storage of material or equipment and movement of vehicles. Also recondition lawn areas where settlement or washouts occur or where minor re-grading is required.
B. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractors operations, including oil drippings, fuel spills, stone, grave and other construction materials and replace with new topsoil.
C. Where substantial lawn remains, mow, dethatch, core aerate, and rake. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

D. Remove waste and foreign material, including weeds, soil cores, grass vegetation and turf, and legally dispose of it off the Owner's property.
E. Till stripped, bare and compacted areas thoroughly to a depth of 6".
F. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4" of soil. Provide new planting soil as required to fill low spots and meet new finish grades.
G. Water newly planted areas and keep moist until sod is established.

2.12 CLEANUP AND PROTECTION

A. During project, keep pavements clean and work area in an orderly condition.
B. Protect landscaping from damage due to landscape operations, operations by other Contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.
C. All trees and natural areas to be preserved shall be protected during construction by any approved industry standards or as noted.
D. Protective fences shall be installed prior to the start of any site preparation work (clearing, grubbing, or grading), and shall be maintained throughout all phases of the construction process.
E. Protective fences shall surround trees or groups of trees and shall be located at the outermost limit of branches (drip line), or natural areas. Protective fences shall follow the limit of construction line, in order to prevent the following:
    1. Soil compaction in the root zone resulting from vehicular traffic or storage equipment or materials.
    2. Root zone disturbances due to grade changes (greater than 6" cut or fill), or trenching not reviewed and authorized.
    3. Wounds to exposed roots, trunk, or limbs by mechanical equipment.
    4. Other activities detrimental to trees such as chemical storage, cement truck cleaning, and fires.
F. Where any of the above exceptions result in a fence being closer than 4' to a trunk, protect the trunk with strapped on planking to a height 8' (or to the limits of the lower branching) in addition to the fencing provided.
G. Any roots exposed by construction activity shall be pruned flush with the soil. Backfill root areas with good quality topsoil as soon as possible. If exposed root areas are not backfilled within two (2) days, cover them with organic material in a manner, which reduces soil temperature and minimizes water loss due to evaporation.
H. Any trenching required during construction shall be placed as far from existing tree trunks as possible.
I. No landscape topsoil dressing greater than 4" shall be permitted within the drip line of trees, unless otherwise noted or approved by the Engineer.
J. Pruning to provide clearance for structures, vehicle traffic and equipment shall take place before damage occurs. Ripping of branches, etc. and shall be approved by Architect and Owner before proceeding.
K. All pruning shall be done according to recognized, approved standards of the industry. When pruning roots, make the cut as far away from the trunk as possible. Try to make cuts a minimum of 3 times the trunk diameter and avoid cutting roots greater than 2" in diameter. Use a stump grinder or other mechanical device approved by industry standards to level off offending roots. Never prune more than one (1) quadrant of a tree's root system in one (1) given year.
L. Prior to excavation or grade cutting within tree drip lines, make a clean cut between the disturbed and undisturbed root zones with a rock saw or similar equipment to minimize damage to remaining roots.
M. All grading within protected root zone areas shall be done by hand or with small equipment to minimize damage.
N. No dumping of waste materials shall occur under the drip lines of trees. This includes washing of concrete trucks.

O. All trees incurring construction disturbances to tree, roots, or soil shall have slow-release fertilizer added to the soil prior to backfilling and final landscape clean up.

2.13 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris and legally dispose of it off the Owner's property.

END OF SECTION

SECTION 32 93 00: PLANTING

PART 1: GENERAL

1.01 SUMMARY

A. Scope of this section includes providing all labor and materials required to perform the scope of work described herein and/or as shown per Contract Documents. This section includes, but is not limited to, the following:
   1. Lawns.
   2. Topsoil and soil amendments.
   3. Fertilizers and mulches.

1.02 RELATED SCOPE OF WORK

A. All related sections incorporated within Contract Documents.

1.03 SUBMITTALS

A. Planting schedule indicating anticipated dates and locations for each type of planting, noting any deviation from the Contract Documents.
B. Maintenance instructions recommending procedures to be established by Owner for maintenance of landscaping during an entire year.
C. Submit before expiration of required maintenance period time line.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed landscaping work similar in material, design, and extent to that indicated for this project and with a record of successful landscape establishment.
B. Installer's Field Supervision:
   1. Require installer to maintain an experienced full-time supervisor on the project site during times that landscaping is in progress.

1.05 DELIVERY, STORAGE AND HANDLING

A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name or manufacturer. Protect materials from deterioration during delivery and while stored at site.
B. Mulch: To be stored on-site and kept protected until ready for installation.
C. Seed: Deliver seed in original sealed, labeled, and undamaged containers.
D. Sod: Harvest, deliver, store, and handle sod according to the requirements of the American Sod Producers Association's (ASPA) "Specifications for Turf-grass Sod Materials and Transplanting / Installing."
E. Trees and shrubs: Protect all plants from damage and erosion. Limit any on-site storage time. Keep plants watered as needed while stored on site.

1.06 PROJECT CONDITIONS

A. Utilities: Determine location of above grade and underground utilities and perform scope of work in a manner which will avoid damage to either plants or utilities, include long term planning in final planting conditions. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Engineer/Architect before planting.

1.07 COORDINATION AND SCHEDULING

A. Coordinate installation of planting material during normal planting seasons for each type of plant material required.

1.08 WARRANTY

A. General Warranty: The special warranty specified in this article shall not deprive the Owner of other rights the Owner may have under the other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Warrant the following living planting materials for a period of **one (1) year** after date of substantial completion, against defects including death and unsatisfactory growth, except for defects resulting from lack of maintenance, neglect, or abuse by Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.

1.09 LAWN MAINTENANCE

A. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following period, unless agreed upon by the Engineer/Architect and Owner:
   1. Seeded lawns: 30 days prior to date of substantial completion:
      a. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during next planting season.
      b. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.
   2. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawns uniformly moist to a depth of 4":
      a. Water lawn at the minimum rate of 1" per week.
   3. Mow lawns as soon as there is enough top growth to cut with mower set at a specified height for principal species planted. Repeat mowing as required to maintain specified height without cutting more than 40 % of the grass height. Remove no more than 40 % of grass-leaf growth in initial or subsequent mowings.
      a. Do not delay mowing until grass blades bend over and become matted.
      b. Do not mow when grass is wet.
   4. Post-fertilization: Apply fertilizer to lawn after first mowing and when grass is dry.
      a. Use fertilizer that will provide actual nitrogen of a least 1lb. per 1000 sq.ft. of lawn area.

PART 2: PRODUCTS

2.01 GRASS MATERIALS

A. Hydroseed: Mix specified seed, fertilizer and fiber mulch in water, using equipment specifically designated for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.

2.02 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, 4% organic material minimum, free of stones ½" or larger in any dimension, and other extraneous materials harmful to plant growth.
B. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient.
   1. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
C. Topsoil Source: Imported topsoil from off-site sources. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4" deep; do not obtain from bogs or marshes.

2.03 MULCH

A. Mulch: Mulch is to match existing. Any new mulch must be approved by Owner and Engineer/Architect to discuss mismatch of new mulch to old mulch, prior to purchasing or continuing scope of work.

PART 3: EXECUTION

3.01 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of scope of work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PLACEMENT OF TOPSOIL

A. Loosen by raking the compacted sub soil before placement of topsoil.
B. Place topsoil in the areas and to the proper depth and to within ½" of the contours and elevations shown on the Contract Documents.
C. Fine grade and rake topsoil to remove all debris and rocks over ½".
D. Leave site clean and raked and ready for landscaping.

3.03 PLANTING SOIL PREPARATION

A. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
B. Mix soil amendments and fertilizers with topsoil at rates required. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days.

3.04 LAWN PLANTING PREPARATION

A. Limit sub-grade preparation to areas that will be planted in the immediate future.
B. Loosen sub-grade to a minimum depth of 4". Remove stones larger than ½" in any dimension and sticks, roots, rubbish, and other extraneous materials.
C. Spread planting soil mixture to depth required to meet thickness, grades and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or sub-grade is frozen.
D. Place approximately ½ the thickness of planting soil mixture required. Work into top of loosened sub-grade to create a transition layer and then place remainder of planting soil mixture.
E. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than ½" in any dimension, and other objects that may interfere with planting or maintenance operations.

F. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

G. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

H. Leave site clean, raked, and ready for landscaping.

3.05 HYDROSEEDING NEW LAWNS

A. Hydroseeding: Mix specified seed, fertilizer and fiber mulch in water, using equipment specifically designated for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application:
   1. Mix slurry with non-asphaltic tackifier.
   2. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry application at the minimum rate of 500 lb. per acre dry weight but not less than the rate required to obtain specified seed-sowing rate. Apply slurry cover coat of fiber mulch at a rate of 1000 lb. per acre.

3.06 RECONDITIONING LAWNS

A. Recondition existing lawn areas damaged by Contractor's operations, including storage of material or equipment and movement of vehicles. Also recondition those lawn areas where settlement or washouts occur or where minor re-grading is required.

B. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.

C. Where substantial lawn remains, mow, dethatch, core aerate, and rake. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

D. Remove waste and foreign material, including weeds, soil cores, grass vegetation, and turf. Legally dispose of this off of the Owner's property.

E. Till stripped bare compacted areas thoroughly to a depth of 6".

F. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4" of soil. Provide new planting soil as required to fill low spots and meet new finish grades.

G. Water newly planted areas and keep moist until new grass is established.

3.07 CLEANUP AND PROTECTION

A. During landscaping, keep pavements clean and work area in an orderly condition.

B. Protect landscaping from damage due to landscape operations, other Contractor's operations, other trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

C. All trees and natural areas to be preserved shall be protected during construction by any approved industry standards or as noted.

D. Protective fences shall be installed prior to the start of any site preparation scope of work (e.g. clearing, grubbing, or grading), and shall be maintained throughout all phases of the construction process.

E. Protective fences shall surround trees or groups of trees and shall be located at the outermost limit of branches (drip line), or natural areas. Protective fences shall follow the limit of construction line, in order to prevent the following.

1. Soil compaction in the root zone resulting from vehicular traffic, storage, equipment, or materials.
2. Root zone disturbances due to grade changes (greater than 6” cut or fill), or trenching not reviewed and authorized.
3. Wounds to exposed roots, trunk, or limbs by mechanical equipment.
4. Other activities detrimental to trees such as chemical storage, cement truck cleaning, and fires.

F. Exceptions to installing fences at tree drip lines may be permitted in the following cases:
1. Where there is to be an approved grade change, impermeable paving surface, tree well, or other such site development. Erect the fence approximately 2 to 4’ behind the area in question.
2. Where permeable paving is to be installed within a tree’s drip line, erect the fence at the outer limits of the permeable paving area prior to grading in order to minimize root damage.
3. For protection of natural areas, no exceptions to installing fences at the limit of construction line shall be permitted.
4. Where any of the above exceptions result in a fence being closer than 4’ to a trunk, protect the trunk with strapped on planking to a height 8’ (or to the limits of the lower branching) in addition to the fencing provided.

G. Trees approved for removal shall be removed in a manner which does not impact trees to be preserved.

H. Any roots exposed by construction activity shall be pruned flush with the soil. Backfill root areas with good quality topsoil as soon as possible. If exposed root areas are not backfilled within two (2) days, cover them with organic material in a manner which reduces soil temperature and minimizes water loss due to evaporation.

I. Any trenching required during construction shall be placed as far from existing tree trunks as possible.

J. No landscape topsoil dressing greater than 4” shall be permitted within the drip line of trees, unless otherwise noted or approved by the Engineer/Architect.

K. Pruning to provide clearance for structures, vehicle traffic and equipment shall take place before damage occurs. (ripping of branches, etc.)

L. All pruning shall be done according to recognized, approved standards of the industry. When pruning roots, make the cut as far away from the trunk as possible. Try to make cuts a minimum of three (3) times the trunk diameter and avoid cutting roots greater than 2” in diameter. Use a stump grinder or other mechanical device approved by industry standards to level off offending roots. Never prune more than one (1) quadrant of a tree’s root system in one (1) given year.

M. Prior to excavation or grade cutting within tree drip lines, make a clean cut between the disturbed and undisturbed root zones with a rock saw or similar equipment to minimize damage to remaining roots.

N. All grading within protected root zone areas shall be done by hand or with small equipment to minimize damage.

O. No dumping of waste materials shall occur under the drip lines of trees. This includes washing of concrete trucks.

P. All trees incurring construction disturbances to roots or soil shall have slow-release fertilizer added to the soil prior to backfilling and final landscape clean up.

3.08 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris and legally dispose of it off the Owner’s property.

END OF SECTION

Professional Service Industries, Inc.
45000 Helm Street • Suite 200, Plymouth, MI 48107
Phone: (248) 957-9911
Fax: (248) 957-9909

June 19, 2023

David Arthur Consultants, Inc
110 Main Street
Dundee, MI 48131

Attn: Mr. Jason Nolff, AIA, LEED AP BD+C

RE: Geotechnical Exploration and Engineering Report
Proposed Scout Building Addition
151 Van Nest Street
Village of Dundee, Monroe County, Michigan
PSI Project No. **03811381**

Dear Mr. Nolff:

PSI has completed a geotechnical exploration and engineering report for the proposed Scout building addition and new patio located at 151 Van Nest Street in the Village of Dundee, Monroe County, Michigan. This report presents the results of our observations, analysis and recommendations for the proposed building addition.

PSI appreciates the opportunity to perform this geotechnical study and to assist you and the design team on this project. If you have any questions regarding this report, or if we may be of further service, please contact our office.

Respectfully,
PROFESSIONAL SERVICE INDUSTRIES, INC.

Larisa N. Aghassi
Staff Geotechnical Engineer

Kevin F. Dubnicki, P.E.
Senior Project Engineer

1 cc: via PDF

Geotechnical Exploration and Engineering Report

For the Proposed

Proposed Scout Building Addition
151 Van Nest Street
Village of Dundee,
Monroe County, Michigan

Prepared for

David Arthur Consultants, Inc
110 Main Street
Dundee, MI 48131

Prepared by

Professional Service Industries, Inc.
37483 Interchange Drive
Plymouth, Michigan 48335

June 19, 2023

PSI Project 03811381

Larisa N. Aghassi
Staff Geotechnical Engineer

Kevin F. Dubnicki, PE
Senior Project Engineer

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APPENDIX

1 EXECUTIVE SUMMARY

Professional Service Industries, Inc. (PSI) has completed a geotechnical exploration and engineering report for the proposed building addition and new patio located at 151 Van Nest Street in the Village of Dundee, Monroe County, Michigan. PSI understands the proposed building will consist of a single-story slab-on-grade building with wood framed construction at the west side of the existing one story building . Specific details relative to the anticipated wall and column loads were not provided. For the purposes of our analysis, PSI assumes that the column loads will not exceed 60 kips and the wall loads supported on the perimeter continuous foundations may be on the order of 2 to 3 kips per lineal foot (klf). A total of six (6) soil test borings were performed and selected samples were tested in the laboratory.

A stratum of apparently native mottled brown, yellowish brown and gray sandy clay with variable percentages of gravel was encountered below the topsoil at all boring locations. The mottled brown sandy clay stratum extended to depths ranging approximately from 11.5 to 14.0 feet below the ground surface. A stratum of gray sandy clay with variable percentages of gravel was encountered below the mottled brown, yellowish brown and gray sandy clay at all boring locations. The gray sandy clay stratum extended through the final explored depths ranging from approximately 15.5 to 20.5 feet below the ground surface.

Based on the borings performed within proposed building addition, the exposed soil at the bottom of footing elevation is anticipated to consist predominately of native hard sandy clay. The native sandy clay soils are generally anticipated to be suitable for support of the proposed building on a conventional shallow spread footing foundation system, provided they are dry and stable at the time of construction and settlements are within tolerable levels. Following proper site preparation/inspection as outlined in Section 4.1, PSI recommends that the proposed building addition be supported on conventional shallow spread footing foundations designed for a **net allowable bearing pressure of up to 3,000 pounds per square foot (psf)** bearing on the native hard sandy clay. PSI estimates that total settlement of the native soils or properly compacted engineered fill soils may be on the order of 1 inch or less due to loads exerted by the proposed building foundations. Differential settlement between two, newly constructed adjacent columns bearing on similar soils may be up to approximately 50% of the total settlement. Where adjacent foundations bear on dissimilar subgrades or where layers of weaker soils are present within the primary zone of influence below the foundations differential settlement may be 75% or more of the estimated total settlement.

The driller looked for indications of groundwater seepage both during and immediately after completion of the drilling operations. Groundwater or perched water was not encountered during drilling or following completion of drilling at all boring locations. It is possible for the groundwater table to vary within the depths explored during other times of the year depending upon climatic conditions (seasonal fluctuation). PSI recommends that the Contractor verify the actual groundwater and seepage conditions at the time of the construction activities and propose the groundwater control methods for the Engineer's approval, including the disposal of discharge water.

This Executive Summary should not be considered separately from the entire text of this report with all the conclusions and qualifications mentioned herein. Details of our analysis and recommendations are given in the following sections of this report.

2 PROJECT INFORMATION

2.1 PROJECT AUTHORIZATION

Professional Service Industries, Inc. (PSI) has completed a geotechnical exploration and engineering report for the proposed Scout building addition and new patio to be located at 151 Van Nest Street in the Village of Dundee, Monroe County, Michigan. PSI's work was authorized by Mr. David A. Kubiske, PE, President/CEO of David Arthur Consultants, Inc. on May 12, 2023. PSI's work was performed in general accordance with PSI Proposal No. 381-399615 dated May 11, 2023.

2.2 PROJECT DESCRIPTION

Initial project information was provided by Mr. Jason Nolff, AIA, LEED AP BD+C of David Arthur Consultants, Inc. via an email on April 28, 2023. The information provided included a site plan titled "Soil Borings" provided by David Arthur Consultants, Inc depicting the proposed building addition and boring locations.

PSI understands the proposed building will consist of a single-story slab-on-grade building with wood framed construction at the west side of an existing one-story building. Specific details relative to the anticipated wall and column loads were not provided. For the purposes of our analysis, PSI assumes that the column loads will not exceed 60 kips and the wall loads supported on the perimeter continuous foundations may be on the order of 2 to 3 kips per lineal foot (klf). A total of six (6) soil test borings were performed and selected samples were tested in the laboratory.

PSI assumes that the finished floor/surface elevation will match the existing finish floor elevation. Therefore, PSI anticipates that less than 1 foot of material may need to be filled/cut from the existing site grades from the proposed building area (exclusive of any additional cut/fill associated with the removal and replacement of unsuitable soil sections).

The geotechnical recommendations presented in this report are based on the available project information, and the results of our geotechnical exploration described in this report. If any of the noted information is considered incorrect or is changed, please inform PSI in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. PSI will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

2.3 PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to explore the subsurface conditions at the site to provide the geotechnical parameters required to prepare recommendations for the design and construction of the foundations for the proposed building addition and new patio. PSI's authorized scope of services included drilling a total of six (6) soil test borings. Four (4) borings were completed at proposed building addition footprint and two (2) borings were completed at proposed new patio footprint. Laboratory testing of selected samples, an engineering evaluation of the data generated, and the preparation of a geotechnical report.

This report presents available project information, briefly outlines the testing procedures, describes the site and supplementary subsurface conditions, and provides recommendations regarding the following:

- A discussion of subsurface soil and groundwater conditions encountered.
- An evaluation of the data as it relates to the proposed building structure.
- Recommendations for site preparation and earthwork, including excavation as well as placement and compaction of fill soils.
- Recommendations for shallow foundation design, including allowable bearing capacity, minimum size and depth of foundation, and estimated settlement.
- Recommended site seismic classification.
- Recommendation for slab-on-grade floor subgrade modulus, preparation and support.
- A site location map, a boring location plan, soil boring logs and laboratory test results will be appended to the report.

The geotechnical scope of services did not include an environmental assessment for determining the presence or absence of wetlands, hazardous or toxic materials in the soil, bedrock, surface water, groundwater or air on, below or around this site. Any statement in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes. Prior to the development of any site, an environmental assessment is advisable.

PSI did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminates in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. David Arthur Consultants, Inc. acknowledges that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. David Arthur Consultants, Inc. further acknowledges that site conditions are outside of PSI's control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

3 SITE AND SUBSURFACE CONDITIONS

3.1 SITE LOCATION AND DESCRIPTION

The site of the proposed building addition is at 151 Van Nest Street in the Village of Dundee, Monroe County, Michigan. The general site location is shown on the Site Vicinity Map in the Appendix as Figure No. 1. At the time of our field exploration, the ground surface consisted of manicured grass, drives and existing one-story commercial/ Scout building. The ground surface within the individual proposed site improvements exhibited a total difference in topography across the proposed development area of approximately 1 foot based on visual observations.

3.2 FIELD AND LABORATORY SERVICES

The field exploration program consisted of drilling a total of six (6) soil test borings. four (4) borings were completed at the proposed building addition footprint to a depth of approximately 20.5 feet below the existing ground surface and two (2) borings were completed at proposed new patio to a depth of approximately 15.5 feet below the existing ground surface. David Arthur Consultants, Inc. selected the boring locations. The boring locations were staked in the field by PSI measuring from existing reference points using the provided plan. The approximate boring locations are provided on the Boring Location Diagram, Figure No.2 in the Appendix, which was prepared by PSI using Google Earth based on the previously referenced site plan. An All-Terrain Vehicle (ATV) mounted drill rig was used to perform the soil borings utilizing 2¼-inch diameter continuous flight hollow-stem augers to advance the boreholes. Standard Penetration Tests (SPT) were conducted, and soil samples were obtained using split spoon sampling procedures at regular intervals not exceeding five (5) feet. Drilling and sampling techniques were performed in general accordance with ASTM Standard D1586. After completion of the drilling operations, the borings were backfilled with auger cuttings. The drilling operations were performed on June 2, 2023.

The elevation of the ground surface at the boring locations was not provided. Prior to final design and construction, an actual field measurement at the boring locations should be made by a professional land surveyor. References to depths in this report and on the attached Boring Logs are from the existing ground surface unless otherwise noted.

Neither a topographic drawing, site grading plan, nor the finished floor elevation of the proposed building was provided. However, based on visual observations of the existing site topography, PSI anticipates that less than 1 foot of engineered fill will be required to achieve the proposed site elevations (exclusive of any additional cut/fill associated with removal of unsuitable soil sections).

Selected soil samples were tested in the laboratory to determine soil properties for PSI's engineering evaluation. Laboratory testing on the soil samples obtained during the field exploration included natural moisture content, Atterberg limits, Unconfined Compressive Strength and estimating the unconfined compressive strength of the cohesive soils encountered using a calibrated hand penetrometer. The results of the unconfined compressive strength tests are included in the Appendix. The moisture content, Atterberg limits and hand penetrometer test results are indicated on the Boring Logs opposite the depths at which the samples were obtained. The laboratory tests were performed in general accordance with applicable ASTM procedures. The unused portions of the recovered soil samples obtained during PSI's geotechnical exploration will be placed in storage at PSI's Plymouth facility. Unless otherwise requested in writing, the samples will be discarded after 60 days from the submission of the final report.

3.3 SUBSURFACE CONDITIONS

A generalized soil description encountered in the borings, beginning below the surficial topsoil and proceeding downward, is as follows:

> ***Stratum 1: Mottled Brown, Yellowish-Brown and Gray Sandy Clay***. A stratum of apparently native mottled brown, yellowish brown and gray sandy clay with variable percentages of gravel was encountered below the topsoil at all boring locations. The mottled brown sandy clay stratum extended to depths ranging approximately from 11.5 to 14.0 feet below the ground surface. Standard Penetration Resistance (N) values ranged from 10 to 29 blows per foot. The unconfined compressive strength of the mottled brown sandy clay stratum ranged from approximately 2.75 tsf to greater than 4.5 tsf, thereby indicating consistencies of very stiff to hard. The moisture contents of the tested soil samples from the mottled brown sandy clay stratum ranged from 11 to 16 percent. The samples visually appeared to be in a moist condition when examined in the laboratory. Atterberg limit test performed on representative samples of the mottled brown sandy clay stratum prepared from Boring B-3 and B-6 indicates the soil to be moderate in plasticity with Liquid Limits (LL) ranging from 25 to 26 and Plastic Limit (PL) of 13.
>
> ***Stratum 2: Gray Sandy Clay***. A stratum of gray sandy clay with variable percentages of gravel was encountered below the mottled brown, yellowish brown and gray sandy clay at all boring locations. The gray sandy clay stratum extended through the final explored depths ranging from approximately 15.5 to 20.5 feet below the ground surface. Standard Penetration Resistance (N) values ranged from 16 to 24 blows per foot. The unconfined compressive strength of the gray sandy clay stratum was approximately greater than 4.5 tsf, thereby indicating a consistency of hard. The moisture contents of the tested soil samples from the gray sandy clay stratum ranged from 11 to 14 percent. The samples visually appeared to be in a moist condition when examined in the laboratory. An Atterberg limit test performed on representative sample of the gray sandy clay stratum prepared from Boring B-1 indicates the soil to be moderate in plasticity with Liquid Limit (LL) of 25 and Plastic Limit (PL) of 10.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The Boring Logs should be reviewed for specific information at the individual pavement core/boring locations. These records include soil descriptions, stratification, penetration resistance, location of the samples, and laboratory test data. The Boring Logs are presented in the Appendix.

The stratification shown on the Boring Logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratification represents the approximate boundary between subsurface materials; however, the actual transition may be gradual. Water level information obtained during field operations is also shown on the Boring Logs. The Boring Logs were prepared on the basis of the laboratory testing and supplemental visual engineering classification, as well as the field logs of the soil conditions encountered.

3.4 GROUNDWATER INFORMATION

The driller looked for indications of groundwater seepage both during and immediately after completion of the drilling operations. Groundwater or perched water was not encountered during drilling or following completion of drilling at all boring locations.

It is possible for the groundwater table to vary within the depths explored during other times of the year depending upon climatic conditions (seasonal fluctuation). Groundwater monitoring wells are required to accurately define the position and fluctuation of the groundwater table, especially if a boring is drilled in cohesive soil, where several days or weeks may be required for the groundwater to reach a static level. The installation of such monitoring wells was not included in the scope of services for this project. The change in color of the soil from brown to gray may indicate the long-term minimum piezometric level in the area. Based on the subsurface conditions at the boring locations performed, the long term piezometric level at this site may be located at a depth of approximately 11.5 feet.

3.5 SITE SEISMIC CLASSIFICATION

Monroe County, Michigan lies in the Central Stable Tectonic Region and in the Seismic Zone 1 of probable seismic activity of the Building Officials Congress of America (BOCA), National Building Code and the Uniform Building Code (UBC). This zone indicates that minor damages due to occasional earthquakes might be expected in this area. In the 2015 Michigan Building Code (MBC), the State of Michigan has adopted the provisions of the 2015 International Building Code (IBC). The IBC requires a Site Class be established for the calculation of earthquake design forces. This class is a function of soil or rock type as well as the depth of soil, strata types and strength/consistency for the uppermost 100 feet of the subsurface profile. Soil borings at the project site extended to a maximum depth of approximately 20.5 feet below the existing ground surface. Based on regional geologic mapping in the general project area, PSI anticipates that the subsurface conditions below the explored depth may generally consist of Lacustrine clay and silt consistent with soils encountered through the depth explored underlain by the Dundee Limestone bedrock formation at a depth of approximately 100 feet or greater. Based on our review of the available data, knowledge of regional geology, the Standard Penetration Test (SPT) N-values, we recommend that the seismic design for this project be based on Site Class D as defined in the 2015 IBC Section 1613.3.2.

The 2015 IBC recommended seismic parameters for the site (which uses 2008 USGS hazard data) interpolated between the nearest four grid points from latitude 41.958571 and longitude -83.658319 and Site Class D obtained from the IBC-2015 Web Service Documentation and USGS, are as follows:

Period (seconds)	2% Probability of Event in 50 years* (%g)	Site Coefficients	Max. Spectral Acceleration Parameters	Design Spectral Acceleration Parameters	
0.2 (S_s)	10.8	F_a = 1.60	S_{ms} = 0.173	S_{Ds} = 0.115	T_0 = 0.141
1.0 (S_1)	5.1	F_v = 2.40	S_{m1} = 0.122	S_{D1} = 0.081	T_s = 0.704

$S_{ms} = F_a S_s$ $S_{Ds} = 2/3 * S_{ms}$ $T_0 = 0.2 * S_{D1}/S_{Ds}$

$S_{m1} = F_v S_1$ $S_{D1} = 2/3 * S_{m1}$ $T_s = S_{D1}/S_{Ds}$

The site coefficients F_a and F_v were interpolated from the 2015 IBC Tables 1613.3.3(1) and 1613.3.3(2) as a function of the site classification and the mapped spectral response acceleration at the short (S_s) and 1 second (S_1) periods.

Based on the spectral response acceleration coefficients SDs and SD1 above, the Seismic Design Category for this site is Category A and Category B for occupancy categories I through III, and Category A and Category C for occupancy category IV, respectively as prescribed by the 2015 IBC Tables 1613.3.5(1) and 1613.3.5(2).

4 EVALUATION AND RECOMMENDATIONS

PSI has performed our analysis based on the information developed during this exploration. The resulting recommendations are provided in the following sections. If our estimations or understandings of the project are considered incorrect or if conditions during construction are significantly different from those described in this report, please contact PSI immediately in writing so that we may amend our recommendations presented in this report if appropriate and if desired by the client.

4.1 GENERAL SITE PREPARATION AND FILL PLACEMENT

Prior to site grading activities or excavation for foundation elements, PSI recommends that existing underground utilities be identified and rerouted or properly abandoned in-place. Existing underground utilities that are not re-routed or abandoned should be adequately marked and protected to minimize the potential for damage during construction activities.

PSI understands that a former building may have been present with the footprint of the proposed building addition. Fill and or foundations were not encountered during PSI's geotechnical investigation but may still be present. Foundations, if encountered should be removed in there entirety from below the proposed building addition. Depressions resulting from the removal of these items should be backfilled with engineered fill or specified materials, such as lean concrete or grout, to the final design grade.

PSI recommends that the existing topsoil be stripped from the proposed building footprint and new patio and under PSI's supervision. After site stripping and undercutting unsuitable/unstable soil sections (as necessary), the exposed soils should be thoroughly proof rolled/compacted with a large, heavy rubber-tired vehicle. Areas that exhibit instability or are observed to rut or deflect excessively under the moving load should be undercut, stabilized by aeration, drying (if wet) and additional compaction to attain a stable finished subgrade. The proof rolling/compacting and undercutting activities should be performed during a period of dry weather and should be performed under the supervision of the geotechnical engineer's representative. Where subgrade conditions are not improved through undercutting and replacement or where aeration, drying and compaction are considered impractical due to the underlying soil and groundwater conditions, time constraints, and/or seasonal limitations, it may be necessary to stabilize the subgrade soils with chemical additives such as hydrated lime, cement, fly ash or lime kiln dust. A contractor specializing in this type of work should be consulted in developing the mix design for this site as well as for placement and mixing of the additives on-site. PSI can assist with this process if desired. Alternatively, localized areas of subgrade instability can be stabilized in-place with a woven geotextile, geogrid and a layer of well graded crushed concrete or well graded coarse aggregate such as MDOT 4AA, 6A or 21AA. The need for the use of chemical additives, geotextile, geogrid and the thickness and gradation requirements of the crushed aggregate layer required should be determined at the time of the subgrade preparation, based on the condition of the exposed subgrade at the time of construction. The subgrade should be stabilized prior to placement of engineered fill or aggregate base course.

New engineered fill supporting at-grade structures should be an environmentally clean material, free of organic matter, frozen soil, or other deleterious material. The material proposed to be used as engineered fill should be evaluated and approved for use by a PSI geotechnical engineer or his representative prior to placement in the field. Based on the borings performed, the existing near-surface moderate plasticity brown mottled sandy clay and underlying low plasticity brown to grayish brown sandy clay soils which are cut as a result of general site grading or excavated from foundations, below grade utilities or from the proposed storm water retention pond

are generally expected to be suitable for re-use as engineered fill provided moisture contents are adjusted to proper levels prior to placement and compaction and provided that it can be demonstrated that a stable fill structure can be achieved with these soils.

Fill materials should be placed in maximum horizontal lifts of 8 inches of loose material and should be compacted within the range of ±2% of the optimum moisture content value. Moisture contents should be adjusted to the proper levels prior to placement and compaction. Adequate compaction will not be achieved if the fill is in a saturated condition. Wet soils may require drying or mixing with dry soil to facilitate compaction. If water must be added to dry soil, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying prior to compaction.

The structural fill should be compacted to 95% of the Modified Proctor maximum dry density as determined per ASTM D1557. Each lift of engineered fill should be tested for conformance to the project density requirements by a representative of PSI prior to placement of subsequent lifts. A minimum of one test per 2,500 square feet of building and parking area should be performed for each lift, unless otherwise specified by the engineer. The moisture/density relationship (Proctor) of the material to be used as engineered fill should be evaluated by a PSI geotechnical engineer or his representative prior to placement in the field. PSI recommends one Proctor test for every 5,000 cubic yards (cyds) of fill and one test per each change of material.

PSI recommends that imported granular soils conform to the gradation requirements of MDOT Class II granular material. In addition, free-draining, non-plastic granular material such as MDOT Class II granular material is recommended for use as backfill against foundations and below grade walls. PSI recommends that imported or on-site cohesive soils used as engineered fill below at-grade structural elements have a liquid limit less than 40 percent and a plasticity index in the range of 10 to 25. A sheep's foot roller is recommended for compaction if cohesive soils are used. Vibratory compaction equipment should be used for compaction in granular soils. Small, hand-operated compaction equipment should be used in confined spaces and against below-grade walls and foundations.

Organic soils, fill and other deleterious materials, which are removed or uncovered during site grading and subgrade undercut operations, foundation and utility excavations at this site, must be wasted in non-load bearing areas such as landscaped areas or removed from the site as directed by the project's engineer and should not be reused as engineered fill in other areas of the site.

4.2 FOUNDATION RECOMMENDATIONS

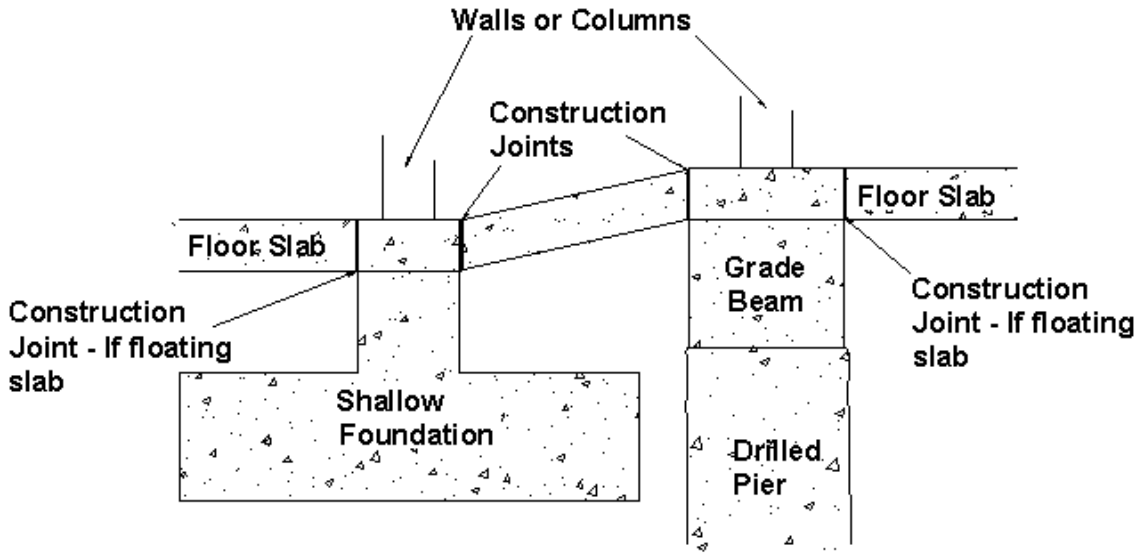
PSI understands that the proposed project includes the construction of a building addition and new patio to be located at 151 Van Nest Street in the Village of Dundee, Monroe County, Michigan. PSI understands the proposed building will consist of a single-story slab-on-grade building with wood framed construction at the west side of an existing one-story building. Specific details relative to the anticipated wall and column loads were not provided. For the purposes of our analysis, PSI assumes that the column loads will not exceed 60 kips and the wall loads supported on the perimeter continuous foundations may be on the order of 2 to 3 kips per lineal foot (klf). A total of six (6) soil test borings were performed and selected samples were tested in the laboratory.
Based on the borings performed within proposed building addition, the exposed soil at the bottom of footing elevation is anticipated to consist predominately of hard sandy clay. The native sandy clay soils are generally anticipated to be suitable for support of the proposed building on a conventional shallow spread footing foundation system, provided they are dry and stable at the time of construction and settlements are within tolerable

levels. Following proper site preparation/inspection as outlined above, PSI recommends that the proposed building addition be supported on conventional shallow spread footing foundations designed for a **net allowable bearing pressure of up to 3,000 pounds per square foot (psf)** bearing on the native hard sandy clay. PSI estimates that total settlement of the native soils or properly compacted engineered fill soils may be on the order of 1 inch or less due to loads exerted by the proposed building foundations. Differential settlement between two, newly constructed adjacent columns bearing on similar soils may be up to approximately 50% of the total settlement. Where adjacent foundations bear on dissimilar subgrades or where layers of weaker soils are present within the primary zone of influence below the foundations differential settlement may be 75% or more of the estimated total settlement.

4.2.1 GENERAL FOUNDATION RECOMMENDATIONS

The structural engineer should evaluate the need for the proposed addition to be structurally independent of the existing building structure to allow for independent movement between the existing building and the proposed addition. The following sketch depicts one option for accommodating these potential differential settlements.

Sample construction joint detail for variable foundation types



Where new foundations supporting the proposed new building addition are placed adjacent to foundations supporting the existing building structure, they should be placed at the same elevation as the existing footings, if possible, to minimize superposition of loads. Foundations should then be stepped up as necessary at a grade no steeper than two units horizontal to one unit vertical to achieve the elevation of the new foundations. Where excavations are performed adjacent to spread footing foundations supporting the existing building structure, care must be taken so as not to undermine these foundations as well as the existing building's floor slab during construction of the proposed new building addition foundations. If possible, PSI recommends maintaining a minimum excavation slope of 1:1 (horizontal:vertical) away from the existing foundations and floor slab. If safe lateral distances are not available to accommodate a stable slope for the excavation, it will be necessary to temporarily or permanently shore or underpin the existing foundations and floor slab.

If localized areas of fill are exposed at the foundation bearing elevation, the soil should be undercut and replaced to the foundation bearing level with clean compacted engineered fill prior to placement of the foundation concrete or the foundations should be extended to a suitable underlying natural soil stratum. Where the removal of localized unsuitable bearing material is performed beneath the proposed footings and the excavation is backfilled with compacted fill materials, the excavation must extend laterally beyond the perimeter of the foundation for a distance equal to one-half of the thickness of the engineered backfill placed below the footing bottom. The over excavation is necessary for proper support of lateral loads exerted through the new fill by the foundations.

Exterior footings and footings in unheated areas should be located at a minimum depth of 42 inches below the final exterior grade for proper protection against frost during normal winters. Interior footings may be supported at a shallower depth, while providing necessary clearance for floor slab and utility construction, provided they are bearing on suitable, undisturbed native soils, properly inspected existing fill soils or on properly placed and compacted engineered fill. A minimum interior foundation bearing depth of 24 inches is recommended for stability. If the structures are to be constructed during the winter months or if footings will likely be subjected to freezing temperatures after foundation construction, then all footings should be adequately protected from freezing.

Minimum dimensions of 30 inches for column footings and 18 inches for continuous footings and trench footings should be used in foundation design to minimize the possibility of a local bearing capacity failure. In addition, PSI recommends that continuous footings be suitably reinforced to make them as rigid as possible.

PSI recommends that exposed foundation excavation inverts be observed and tested by a representative of PSI prior to steel or concrete placement to document that the observed conditions are consistent with the geotechnical report and that all unsuitable soils have been removed and replaced with properly compacted engineered fill as outlined above. The foundation excavation should be observed and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. The foundation concrete should be placed during the same day the excavation is made. If it is required that footing excavations be left open for more than one day, they should be protected to reduce evaporation or entry of moisture.

4.3 FLOOR SLAB-ON-GRADE RECOMMENDATIONS

PSI anticipates that the proposed floor slab may be grade supported on native sandy clay soil, provided they are dry and stable at the time of construction. Prior to placement of the slab-on-grade floor, the subgrade soil below the proposed floor slab should be scarified and compacted to 95% of its maximum dry density as determined per ASTM D1557, for a minimum depth of 12 inches below the final graded surface.

PSI recommends that the vertical subgrade modulus, k be limited to 150 pounds per cubic inch, as determined by a 1-foot by 1-foot plate load test, in floor slab-on-grade design calculations. PSI recommends that a minimum of 4 inches of free-draining, compacted aggregate be placed beneath the floor slab-on-grade to facilitate fine grading and provide increased support for the slabs-on-grade as well as to provide a capillary break below the floor slab. The compacted aggregate should comply with the recommendations of the current version of ACI 302.1, “Concrete and Slab Construction.” In areas with carpet, tile or other moisture-sensitive floor finishes, a vapor retarder should be properly placed in accordance with ACI 302.1, local building codes and the flooring manufacturer’s recommendations.

The proposed floor slab should have an adequate number of joints to reduce cracking resulting from any differential movement and volume changes during curing. Slab-on-grade floors should not be rigidly connected to the proposed building columns, walls, or foundations. Proper joints should be provided at the junctions of the slab and foundation system so that a limited amount of independent movement can occur without causing distress. The floor slab should be suitably reinforced to make it as rigid as practical.

5 CONSTRUCTION CONSIDERATIONS

5.1 DRAINAGE, GROUNDWATER AND RELATED CONSIDERATION

The driller looked for indications of groundwater seepage both during and immediately after completion of the drilling operations. Groundwater or perched water was not encountered during drilling or following completion of drilling at all boring locations. The change in color of the soil from brown to gray may indicate the long-term minimum piezometric level in the area. Based on the subsurface conditions at the boring locations performed, the long term piezometric level at this site may be located at a depth of approximately 11.5 feet.

It is possible for the groundwater table to vary within the depths explored during other times of the year depending upon climatic conditions (seasonal fluctuation). Groundwater monitoring wells are required to accurately define the position and fluctuation of the groundwater table, especially if a boring is drilled in cohesive soil, where several days or weeks may be required for the groundwater to reach a static level. The installation of such monitoring wells was not included in the scope of services for this project. PSI recommends that the Contractor verify the actual groundwater and seepage conditions at the time of the construction activities and propose a groundwater control methods for the Engineer's approval, including the disposal of discharge water.

Water should not be allowed to collect in shallow foundation excavations or other prepared subgrades of the construction area, either during or after construction. Water accumulation should be removed from excavations by pumping from sump pits placed around the perimeter of the excavation.

Every effort should be made to keep the excavations and any other prepared subgrades dry if water is encountered or if rainfall or snowmelt occurs during construction. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather. Positive site surface drainage should be provided to reduce infiltration of surface water. The grades should be sloped away from the proposed building structure and surface drainage should be collected and discharged.

5.2 EXCAVATION SAFETY CONSIDERATIONS

Typically, soils penetrated by augers can be removed with conventional earthmoving equipment (backhoe and/or trencher). However, subsurface excavation equipment varies, and field refusal conditions may vary as well. Therefore, it is possible that difficult excavation conditions may be encountered at the proposed site location between the boring locations.

Excavation near any existing structure or utility must be performed with the utmost of care and under the supervision of the geotechnical engineer's representative. Locations of all underground utilities within the proposed site must be verified by the Contractor prior to excavation.

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart

P". This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the Owner and the Contractor could be liable for substantial penalties.

The Contractor is solely responsible for designing and constructing stable, safe, temporary excavations and should shore, slope or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The Contractor's "responsible person", as defined in 29 CFR Part 1926, must evaluate the soil exposed in the excavations as part of the Contractor's safety procedures.

The angle of the excavation side slopes must strictly be decided based on the soil type and unconfined compressive strength of the excavated soil per OSHA requirements. For Type A soils, such as clay above water table having unconfined compressive strength values equal to or more than 1½ ton per square foot (tsf), the maximum allowable slope for excavations up to 20 feet deep is ¾ (Horizontal) :1 (Vertical). For Type B soils, such as clay above water table having unconfined compressive strength values between ½ to 1½ ton per square foot (tsf), or angular gravel, the maximum allowable slope for excavations up to 20 feet deep is 1 (Horizontal) :1 (Vertical). For Type C soils, such as clay above water table having unconfined compressive strength values less than ½ ton per square foot (tsf), or granular soils such as gravel and sand, and all submerged soils, the maximum allowable slope for excavations up to 20 feet deep is 1½ (Horizontal) :1 (Vertical). The Contractor should be aware that slope height, slope inclination, and excavation depth should not exceed the specified local, state, and federal regulations.

Earthwork, subgrade preparation, and foundation construction operations must be conducted in strict accordance with the project specifications and under the supervision of the geotechnical engineer or his representative. PSI is providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor’s or other parties’ compliance with local, state, and federal safety or other regulation.

6 REPORT LIMITATIONS

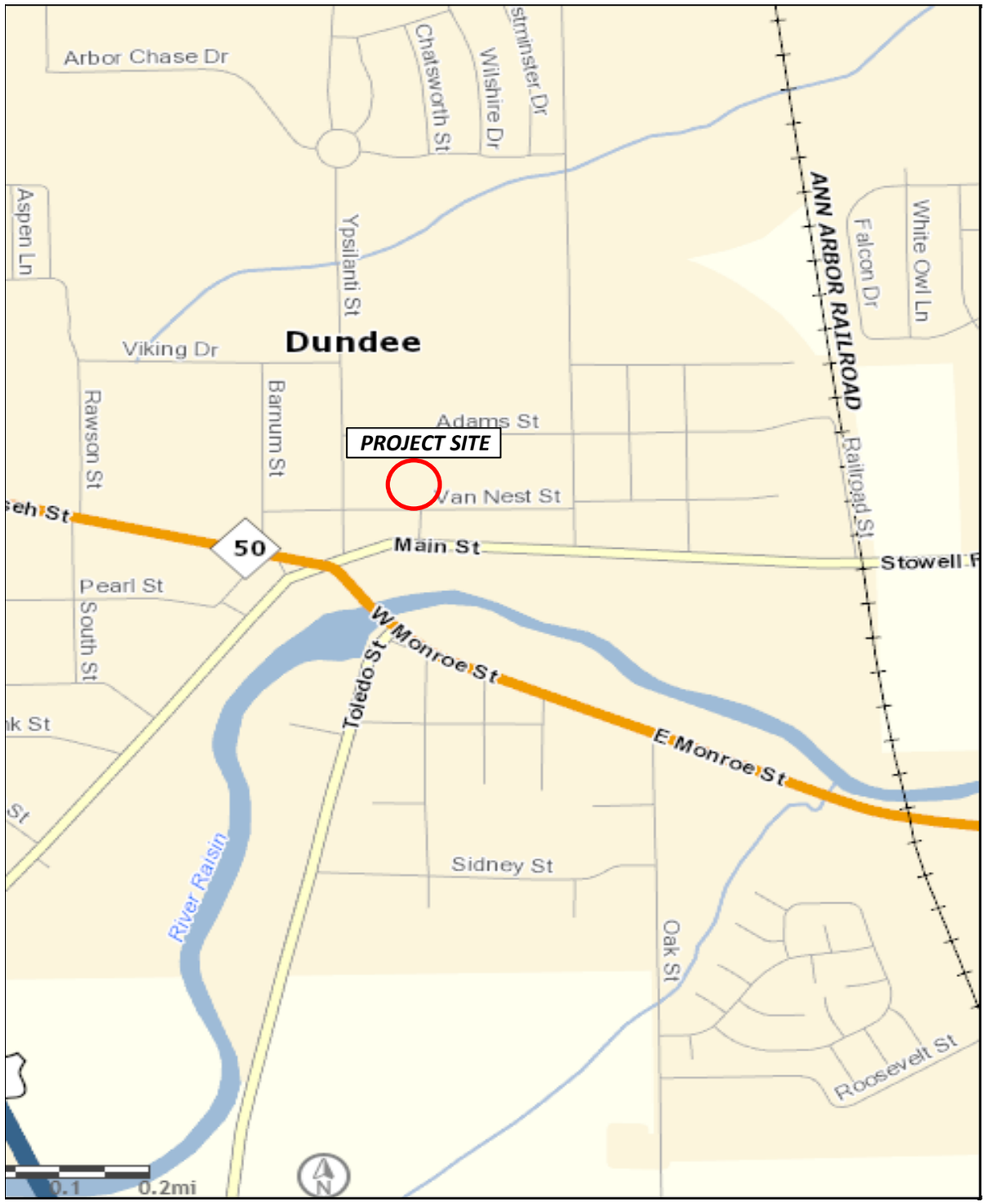
The recommendations submitted in this report are based on the available subsurface information obtained by PSI and the project information furnished by David Arthur Consultants, Inc. If there are any revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the earthwork, subgrade preparation and foundation design parameter recommendations are required. If PSI is not notified of such changes, PSI will not be responsible for the impact of those changes on the project.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional engineering practices in the local area. No other warranties are implied or expressed.

This report has been prepared for the exclusive use of David Arthur Consultants, Inc. and their authorized representatives. This report is intended for the specific application to the proposed building addition and new patio to be located at 151 Van Nest Street in the Village of Dundee, Monroe County, Michigan.

APPENDIX

SITE LOCATION MAP



N

PROJECT NAME:	PROJECT NUMBER	Figure No.
Proposed Scout Building Addition 151 Van Nest Street Village of Dundee, Monroe County, Michigan	03811381	1
	Date: June 19, 2023	intertek psi

BORING LOCATION PLAN

N

LEGEND:

- APPROXIMATE BORING LOCATION

PROJECT NAME:		PROJECT NUMBER	Figure No.
Proposed Scout Building Addition 151 Van Nest Street Village of Dundee, Monroe County, Michigan	Prepared by PSI using Google Earth for use in the geotechnical exploration and report	03811381	2
		Date: June 19, 2023	intertek psi

BORING B-1

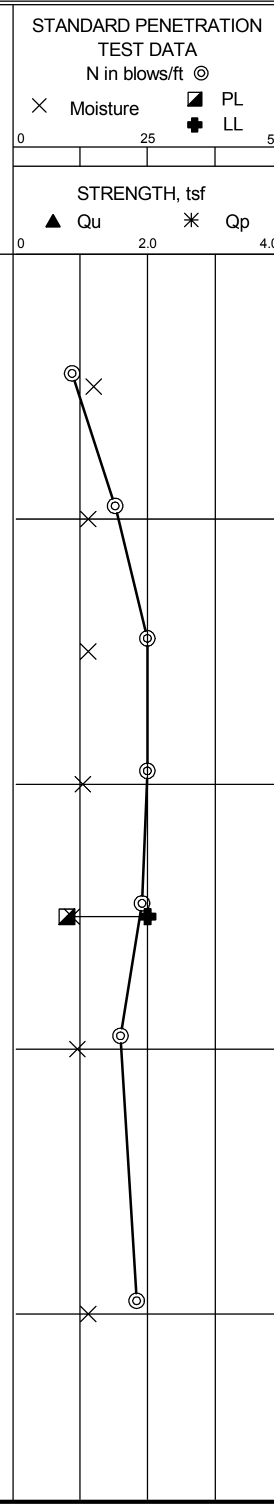
DATE STARTED:	6/2/23	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	6/2/23	**DRILLER:** A. Sasse	**LOGGED BY:** L. Aghassi
COMPLETION DEPTH	20.5 ft	**DRILL RIG:**	D-50
BENCHMARK:	N/A	**DRILLING METHOD:**	2.25" HSA
ELEVATION:	N/A	**SAMPLING METHOD:**	2" SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K. Dubnicki

Water		
▽	While Drilling	Dry
▼	Upon Completion	Dry
▽	Cave-In	16.7 feet

BORING LOCATION:
See Boring Location Plan

REMARKS: Borehole backfilled with auger cuttings upon completion

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0			Approximately 18" of dark brown SANDY TOPSOIL				
		1	18	SANDY CLAY - trace gravel, mottled brown, yellowish brown and gray, moist, very stiff to hard	CL	3,5,6 N=11	15	Qp = 2.75 tsf
	5	2	18			4,8,11 N=19	14	Qp = 4.5+ tsf
		3	18			6,11,14 N=25	14	Qp = 4.5+ tsf
	10	4	18			7,11,14 N=25	13	Qp = 4.5+ tsf
		5	18	SANDY CLAY - trace gravel, gray, moist, hard	CL	5,10,14 N=24	11	LL = 25 PL = 10 Qp = 4.5+ tsf
	15	6	18			4,8,12 N=20	12	Qp = 4.5+ tsf
	20	7	18			6,9,14 N=23	14	Qp = 4.5+ tsf
				*End of Boring				



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Professional Service Industries, Inc.
45000 Helm Street, Suite 200
Plymouth, MI 48170
Telephone: (248) 957-9911

PROJECT NO.: 03811381
PROJECT: Proposed Scout Building Addition
LOCATION: 151 Van Nest
Village of Dundee
Monroe County, Michigan

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-2

DATE STARTED:	6/2/23	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	6/2/23	**DRILLER:** A. Sasse	**LOGGED BY:** L. Aghassi
COMPLETION DEPTH	15.5 ft	**DRILL RIG:**	D-50
BENCHMARK:	N/A	**DRILLING METHOD:**	2.25" HSA
ELEVATION:	N/A	**SAMPLING METHOD:**	2" SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K. Dubnicki

REMARKS: Borehole backfilled with auger cuttings upon completion

Water		
	While Drilling	Dry
	Upon Completion	Dry
	Cave-In	4.5 feet

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA (N in blows/ft; Moisture; PL; LL; STRENGTH, tsf: Qu, Qp)	Additional Remarks
	0					Approximately 18" of dark brown SANDY TOPSOIL					
				1	12	SANDY CLAY - trace gravel, mottled brown, yellowish brown and gray, moist, hard		3,4,7 N=11	15		Qp = 4.5+ tsf
	5			2	18			6,8,12 N=20	13		Qp = 4.5+ tsf
				3	18		CL	5,8,12 N=20	13		Qp = 4.5+ tsf
	10			4	18			6,9,15 N=24	13		Qp = 4.5+ tsf
				5	18			5,8,13 N=21	11		DD = 127 pcf >> Q_u = 7.3 tsf Qp = 4.5+ tsf
	15			6	18	SANDY CLAY - trace gravel, gray, moist, hard	CL	4,8,11 N=19	13		Qp = 4.5+ tsf
						*End of Boring					

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LOCATION: 151 Van Nest
Village of Dundee
Monroe County, Michigan

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-3

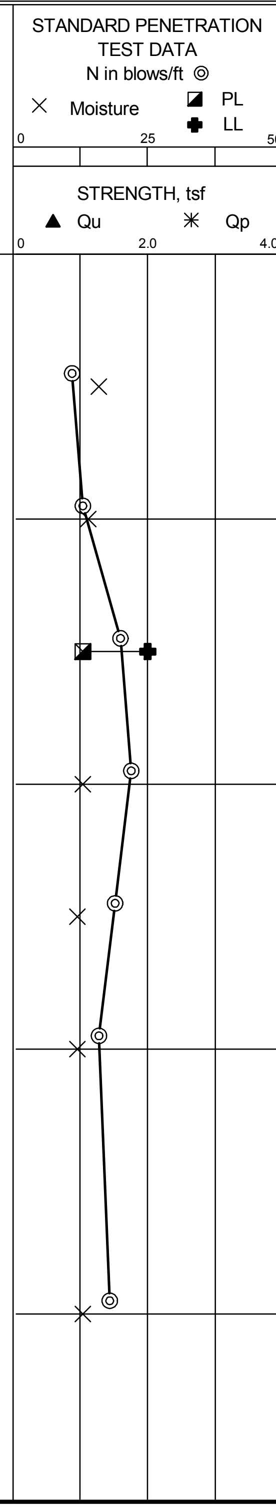
DATE STARTED:	6/2/23	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	6/2/23	**DRILLER:** A. Sasse	**LOGGED BY:** L. Aghassi
COMPLETION DEPTH	20.5 ft	**DRILL RIG:**	D-50
BENCHMARK:	N/A	**DRILLING METHOD:**	2.25" HSA
ELEVATION:	N/A	**SAMPLING METHOD:**	2" SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K. Dubnicki

REMARKS: Borehole backfilled with auger cuttings upon completion

Water		
While Drilling		Dry
Upon Completion		Dry
Cave-In		11.3 feet

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0			Approximately 18" of dark brown SANDY TOPSOIL				
		1	18	SANDY CLAY - trace gravel, mottled brown, yellowish brown and gray, moist, hard	CL	4,5,6 N=11	16	Qp = 4.0 tsf
	5	2	18			3,5,8 N=13	14	Qp = 4.5+ tsf
		3	18			3,8,12 N=20	13	LL = 25 PL = 13 Qp = 4.5+ tsf
	10	4	18			4,9,13 N=22	13	Qp = 4.5+ tsf
		5	18	SANDY CLAY - trace gravel, gray, moist, hard	CL	4,8,11 N=19	12	Qp = 4.5+ tsf
	15	6	18			4,7,9 N=16	12	Qp = 4.5+ tsf
	20	7	18			8,8,10 N=18	13	Qp = 4.5+ tsf
				*End of Boring				



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PROJECT NO.: 03811381
PROJECT: Proposed Scout Building Addition
LOCATION: 151 Van Nest
Village of Dundee
Monroe County, Michigan

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BORING B-4

DATE STARTED:	6/2/23	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	6/2/23	**DRILLER:** A. Sasse	**LOGGED BY:** L. Aghassi
COMPLETION DEPTH	15.5 ft	**DRILL RIG:**	D-50
BENCHMARK:	N/A	**DRILLING METHOD:**	2.25" HSA
ELEVATION:	N/A	**SAMPLING METHOD:**	2" SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K. Dubnicki

REMARKS: Borehole backfilled with auger cuttings upon completion

Water		
	While Drilling	Dry
	Upon Completion	Dry
	Cave-In	6.8 feet

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ Moisture × PL ◪ LL ✚ (0 25 50) STRENGTH, tsf Qu ▲ Qp ✳ (0 2.0 4.0)	Additional Remarks
	0					Approximately 16" of dark brown SANDY TOPSOIL					
				1	18	SANDY CLAY - trace gravel, mottled brown, yellowish brown and gray, moist, hard		3,5,8 N=13	13		Qp = 4.5+ tsf
	5			2	18			3,7,10 N=17	13		Qp = 4.5+ tsf
				3	18		CL	4,9,12 N=21	13		>> Qu = 6.8 tsf DD = 125 pcf Qp = 4.5+ tsf
	10			4	18			4,11,14 N=25	13		Qp = 4.5+ tsf
				5	18	SANDY CLAY - trace gravel, gray, moist, hard	CL	4,8,12 N=20	12		Qp = 4.5+ tsf
	15			6	18			3,7,9 N=16	13		Qp = 4.5+ tsf
						*End of Boring					

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LOCATION: 151 Van Nest
Village of Dundee
Monroe County, Michigan

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BORING B-5

DATE STARTED:	6/2/23	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	6/2/23	**DRILLER:** A. Sasse	**LOGGED BY:** L. Aghassi
COMPLETION DEPTH	20.5 ft	**DRILL RIG:**	D-50
BENCHMARK:	N/A	**DRILLING METHOD:**	2.25" HSA
ELEVATION:	N/A	**SAMPLING METHOD:**	2" SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K. Dubnicki

REMARKS: Borehole backfilled with auger cuttings upon completion

Water		
	While Drilling	Dry
	Upon Completion	Dry
	Cave-In	18.3 feet

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft / STRENGTH, tsf	Additional Remarks
	0					Approximately 18" of dark brown SANDY TOPSOIL					
				1	18	SANDY CLAY - trace gravel, mottled brown, yellowish brown and gray, moist, hard		3,5,7 N=12	13		Qp = 4.5+ tsf
	5			2	18			4,9,12 N=21	13		DD = 126 pcf Q_u = 7.9 tsf Qp = 4.5+ tsf
				3	18		CL	4,8,12 N=20	14		Qp = 4.5+ tsf
	10			4	18			5,9,13 N=22	13		Qp = 4.5+ tsf
				5	18			4,8,13 N=21	14		Qp = 4.5+ tsf
	15			6	18	SANDY CLAY - trace gravel, gray, moist, hard		4,7,11 N=18	11		Qp = 4.5+ tsf
				7	17		CL	3,7,9 N=16	13		Qp = 4.5+ tsf
	20					*End of Boring					

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
Moisture ✕ 0 25 50 PL ◪ LL ✚
STRENGTH, tsf
Qu ▲ Qp ✳ 0 2.0 4.0

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LOCATION: 151 Van Nest
Village of Dundee
Monroe County, Michigan

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-6

DATE STARTED:	6/2/23	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	6/2/23	**DRILLER:** A. Sasse	**LOGGED BY:** L. Aghassi
COMPLETION DEPTH	20.5 ft	**DRILL RIG:**	D-50
BENCHMARK:	N/A	**DRILLING METHOD:**	2.25" HSA
ELEVATION:	N/A	**SAMPLING METHOD:**	2" SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	K. Dubnicki

REMARKS: Borehole backfilled with auger cuttings upon completion

Water		
	While Drilling	Dry
	Upon Completion	Dry
	Cave-In	17.0 feet

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft / STRENGTH, tsf	Additional Remarks
	0					Approximately 14" of dark brown SANDY TOPSOIL					
				1	17	SANDY CLAY - trace gravel, mottled brown, yellowish brown and gray, moist, hard		3,4,6 N=10	14		Qp = 4.5+ tsf
	5			2	18			5,8,11 N=19	14		Qp = 4.5+ tsf
				3	18		CL	5,9,13 N=22	13		Qp = 4.5+ tsf
	10			4	18			4,10,19 N=29	14		LL = 26 PL = 13 Qp = 4.5+ tsf
				5	17	SANDY CLAY - trace gravel, gray, moist, hard		4,8,12 N=20	11		Qp = 4.5+ tsf
	15			6	18		CL	5,10,14 N=24	12		Qp = 4.5+ tsf
	20			7	18			3,7,11 N=18	13		Qp = 4.5+ tsf
						*End of Boring					

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PROJECT NO.: 03811381
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GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.
HSA: Hollow Stem Auger - typically 3¼" or 4¼ I.D. openings, except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry
R.C.: Diamond Bit Core Sampler
H.A.: Hand Auger
P.A.: Power Auger - Handheld motorized auger

SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
RC: Rock Core
TC: Texas Cone
BS: Bulk Sample
PM: Pressuremeter
CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N_{60}: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q_u: Unconfined compressive strength, TSF
Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL),%
DD: Dry unit weight, pcf
▼,▽,⧩ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

Q_U - TSF	N - Blows/foot	Consistency
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

Description	Criteria
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term	% Dry Weight
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

Description	Criteria
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided:	Fracture planes appear polished or glossy, sometimes striated
Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed:	Inclusion of small pockets of different soils
Layer:	Inclusion greater than 3 inches thick (75 mm)
Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

Q_U - TSF	Consistency
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

Description	Criteria
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

Voids	Void Diameter
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

Component	Size Range
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

Rock Mass Description	RQD Value
Excellent	90 -100
Good	75 - 90
Fair	50 - 75
Poor	25 -50
Very Poor	Less than 25

DEGREE OF WEATHERING

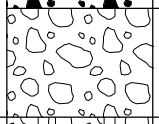
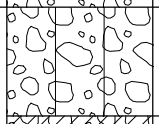
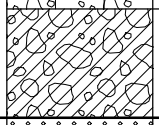
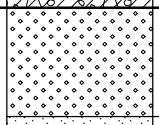
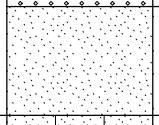
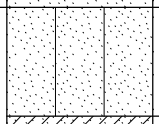
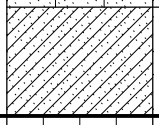
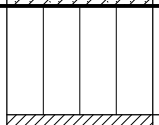
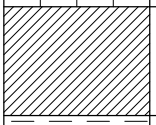
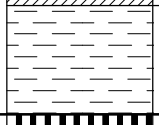
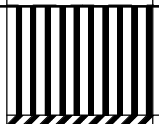
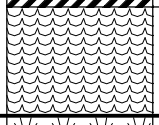
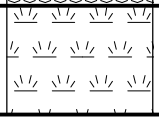
Slightly Weathered: Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.

Weathered: Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.

Highly Weathered: Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

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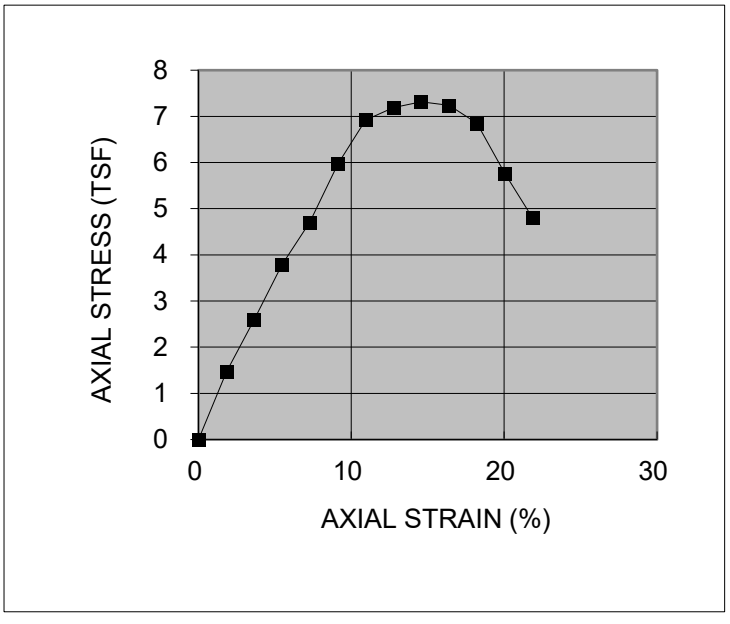
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)

Project Name: Proposed Scout Building Addition
Location: Village of Dunde, Monroe County, Michigan
Project No.: 03811381
Source: B-2; SS5 **Sample Depth:** 11.5' - 13.0'
Description: SANDY CLAY (CL) - trace gravel, mottled brown, gray and yellowish brown
Qp (tsf): 4.5+
Wet Weight (gm): 157.99
Date Tested: 6/6/23
Tested By: RA
Checked By: LNA

Height:	2.745 inches	69.72 mm	
Diameter:	1.404 inches	35.65 mm	
Moisture Content:	11%	**Saturation (%):**	
Ht.-Diameter Ratio:	1.96	**Specific Gravity:**	
Dry Density:	127 pcf		

READING NUMBER	DEFORM. (in.)	LOAD DIAL READING	LOAD (lbs)	STRAIN (%)	CORRECTED AREA (in^2)	AXIAL STRESS (tsf)
0	0.000	0	0.0	0.00	1.547	0.00
1	0.050	127	32	1.82	1.576	1.46
2	0.100	215	58	3.64	1.606	2.60
3	0.150	292	86	5.46	1.637	3.78
4	0.200	352	109	7.29	1.669	4.70
5	0.250	423	141	9.11	1.702	5.96
6	0.300	476	167	10.93	1.737	6.92
7	0.350	495	177	12.75	1.773	7.19
8	0.400	508	184	14.57	1.811	7.32
9	0.450	512	186	16.39	1.850	7.24
10	0.500	500	180	18.22	1.892	6.85
11	0.550	451	155	20.04	1.935	5.77
12	0.600	403	132	21.86	1.980	4.80
13	0.650					
14	0.700					
15	0.750					
16	0.800					
17	0.850					
18	0.900					
19	0.950					
20	1.000					

Qu = 7.32 tsf 700.51 kPa, Strain 15.00%



Failure Sketch

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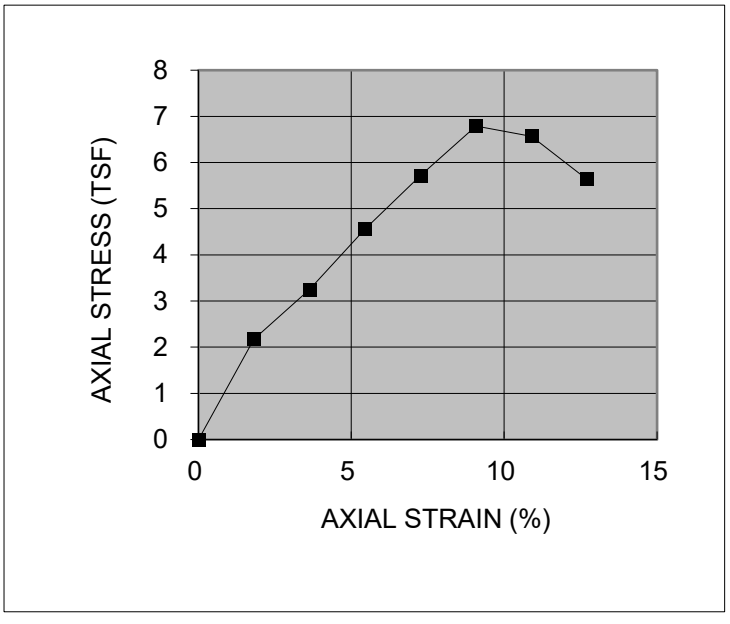
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)

Project Name: Proposed Scout Building Addition
Location: Village of Dunde, Monroe County, Michigan
Project No.: 03811381
Source: B-4; SS3 **Sample Depth:** 6.5' - 8.0'
Description: SANDY CLAY (CL) - trace gravel, mottled brown, gray and yellowish brown
Qp (tsf): 4.5+
Wet Weight (gm): 152.12
Date Tested: 6/6/23
Tested By: RA
Checked By: LNA

Height:	2.753 inches	69.93 mm	
Diameter:	1.379 inches	35.04 mm	
Moisture Content:	13%	**Saturation (%):**	
Ht.-Diameter Ratio:	2.00	**Specific Gravity:**	
Dry Density:	125 pcf		

READING NUMBER	DEFORM. (in.)	LOAD DIAL READING	LOAD (lbs)	STRAIN (%)	CORRECTED AREA (in^2)	AXIAL STRESS (tsf)
0	0.000	0	0.0	0.00	1.494	0.00
1	0.050	177	46	1.82	1.522	2.18
2	0.100	248	70	3.63	1.551	3.25
3	0.150	328	100	5.45	1.580	4.56
4	0.200	395	128	7.26	1.611	5.72
5	0.250	451	155	9.08	1.644	6.79
6	0.300	447	153	10.90	1.677	6.57
7	0.350	409	134	12.71	1.712	5.64
8	0.400					
9	0.450					
10	0.500					
11	0.550					
12	0.600					
13	0.650					
14	0.700					
15	0.750					
16	0.800					
17	0.850					
18	0.900					
19	0.950					
20	1.000					

Qu = 6.79 tsf 650.25 kPa, Strain 9.08%



Failure Sketch

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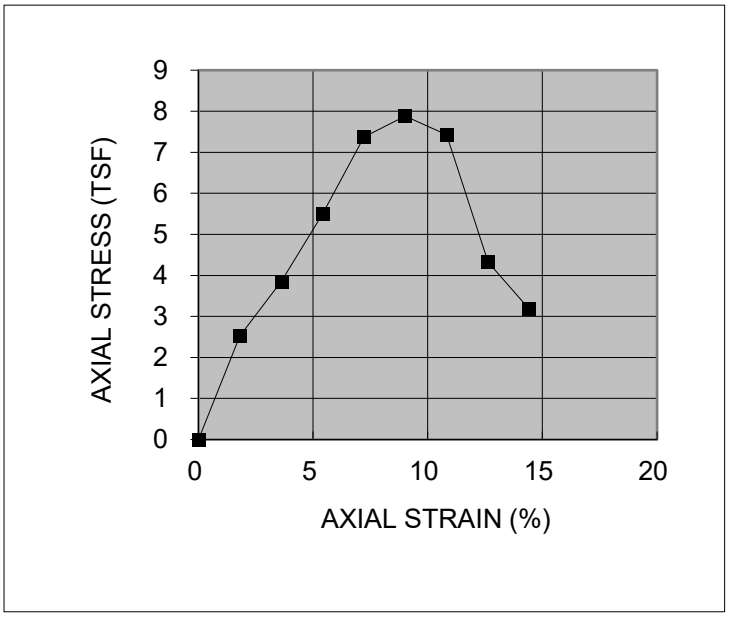
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)

Project Name: Proposed Scout Building Addition
Location: Village of Dunde, Monroe County, Michigan
Project No.: 03811381
Source: B-5; SS2 **Sample Depth:** 4.0' - 5.5'
Description: SANDY CLAY (CL) - trace gravel, mottled brown, gray and yellowish brown
Qp (tsf): 4.5+
Wet Weight (gm): 156.69
Date Tested: 6/6/23
Tested By: RA
Checked By: LNA

Height:	2.773 inches	70.43 mm	
Diameter:	1.388 inches	35.25 mm	
Moisture Content:	13%	**Saturation (%):**	
Ht.-Diameter Ratio:	2.00	**Specific Gravity:**	
Dry Density:	126 pcf		

READING NUMBER	DEFORM. (in.)	LOAD DIAL READING	LOAD (lbs)	STRAIN (%)	CORRECTED AREA (in^2)	AXIAL STRESS (tsf)
0	0.000	0	0.0	0.00	1.513	0.00
1	0.050	201	54	1.80	1.541	2.52
2	0.100	287	84	3.61	1.569	3.85
3	0.150	381	122	5.41	1.599	5.49
4	0.200	476	167	7.21	1.630	7.38
5	0.250	505	182	9.02	1.663	7.88
6	0.300	492	175	10.82	1.696	7.43
7	0.350	338	104	12.62	1.731	4.33
8	0.400	271	78	14.43	1.768	3.18
9	0.450					
10	0.500					
11	0.550					
12	0.600					
13	0.650					
14	0.700					
15	0.750					
16	0.800					
17	0.850					
18	0.900					
19	0.950					
20	1.000					

Qu = 7.88 tsf 754.72 kPa, Strain 9.02%



Failure Sketch

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