

PROJECT MANUAL

CITY OF MIDLAND

BID NO. 4650

CURRIE WEST CLUBHOUSE EXPANSION

Midland, MI 48640

May, 2026



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SECTION 000050 – TABLE OF CONTENTS

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

000010- COVER PAGE
000050- TABLE OF CONTENTS
CITY OF MIDLAND- INVITATION TO BID [Page 1 of 4]
CITY OF MIDLAND- INSTRUCTIONS TO BIDDERS [Page 2 of 4]
CITY OF MIDLAND- PROPOSAL FORM [Pages 3 and 4 of 4]
CITY OF MIDLAND- LIST OF SUBCONTRACTORS [1-Page]
CITY OF MIDLAND- CONSTRUCTION BOILERPLATE [4-Pages]
000070- AGREEMENT FORM
000080- GENERAL CONDITIONS
000090- SUPPLEMENTARY CONDITIONS

DIVISION 01 – GENERAL REQUIREMENTS

010100 – SUMMARY OF WORK
010190 – CONTRACT CONSIDERATIONS
010270 – APPLICATIONS FOR PAYMENT
010280 – CHANGE ORDER PROCEDURE
010390 – COORDINATION AND MEETINGS
013400 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
014000 – QUALITY CONTROL
015000 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS
017000 – CONTRACT CLOSEOUT

DIVISION 02 - SITE CONSTRUCTION

024119 - SELECTIVE DEMOLITION

DIVISION 03 - CONCRETE

033000 - CAST-IN-PLACE CONCRETE

DIVISION 04 - MASONRY

048100 - UNIT MASONRY ASSEMBLIES

DIVISION 05 - METALS

NOT APPLICABLE

DIVISION 06 - WOOD AND PLASTICS

061000 - ROUGH CARPENTRY
061600 - SHEATHING
061700 - SHOP FABRICATED WOOD TRUSSES
064000 - INTERIOR ARCHITECTURAL WOODWORK

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

072100 - THERMAL INSULATION
072500 - WEATHER BARRIER
073000 - ASPHALT SHINGLES

TABLE OF CONTENTS

000050-1

076000 - SHEET METAL FLASHING AND TRIM
074623 - WOOD SIDING
079000 -JOINT SEALANTS

DIVISION 08 - DOORS AND WINDOWS
083100 – ACCESS DOORS AND PANELS
084113 - ALUMINUM FRAMED ENTRANCES AND STOREFRONTS
085200 - WOOD WINDOWS
087000 - DOOR HARDWARE
088000 - GLAZING

DIVISION 09 - FINISHES
092000 - GYPSUM BOARD
096813 - TILE CARPETING
098433 - SOUND ABSORBING WALL UNITS
099120 - INTERIOR PAINTING

DIVISION 10 - SPECIALTIES
NOT APPLICABLE

DIVISION 11 - EQUIPMENT
NOT APPLICABLE

DIVISION 12 - FURNISHINGS
NOT USED

DIVISION 20 – MECHANICAL
See Mechanical Drawings for all requirements and specifications.

DIVISION 26 – ELECTRICAL
See Electrical Drawings for all requirements and specifications.

DIVISION 31 – EARTHWORK
311000 – SITE CLEARING
312000 – EARTH MOVING
315000 – EXCAVATION SUPPORT AND PROTECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS
329200 – TURF AND GRASSES

DIVISION 33 – UTILITIES
NOT APPLICABLE

END OF SECTION 000050



City Hall • 333 W. Ellsworth • Midland, Michigan 48640 • 989-837-3300

**INVITATION TO BID
BID NO. 4650
CURRIE WEST CLUBHOUSE EXPANSION**

Sealed bids will be accepted until **2:00 PM, Tuesday, June 9, 2026** to provide the City of Midland with pricing for Currie West Clubhouse Expansion, per the attached specifications and standard instructions. Technical questions shall be directed to Tyler Abbs, City of Midland Facilities Manager at (989) 837-3370.

Bid should be submitted in a sealed envelope clearly marked as **“BID 4650 – CURRIE WEST CLUBHOUSE EXPANSION”**. Bid submission can be delivered or mailed **ATTN: Purchasing to City of Midland, Office of the City Clerk, 333 W. Ellsworth Street, Midland, MI 48640.**

Mandatory pre-bid meeting: will be May 19, 2026 at 9:00 AM at Currie Municipal Golf Course 1300 Currie Pkwy, Midland, MI 48640. Check-In will be located in the West Clubhouse Dining Room.

A certified check or bid bond for a sum of not less than five percent (5%) of the amount of the Proposal will be required with each bid.

Bid documents are available for download at Bidnet Direct by SOVRA/MITN Purchasing Group.

Registration is required to view and download bid package and specifications; follow link at <https://www.bidnetdirect.com/mitn>. Information can also be obtained directly from the Purchasing Department which is part of the Finance Department at City Hall, Midland, MI or by emailing purchasing@midland-mi.org.

Invitation to Bid and all its pages, documents and attachments, including those added subsequently by written notice, submitted and properly executed, shall constitute the contract between the City of Midland and the successful vendor when approved and accepted by the City.

The City reserves the right to accept or reject all or any parts of any and all bids, to waive irregularities and to award in the best interests of the City of Midland.

Christina Evans

Christina Evans
Accounting Manager
Midland, Michigan

**CITY OF MIDLAND, MICHIGAN
STANDARD INSTRUCTIONS TO BIDDERS**

1. **Receipt and Opening of Bids:** Sealed bids will be accepted and date/time stamped upon receipt in the office of the City Clerk, City Hall, 333 West Ellsworth, Midland, MI 48640-5132, until the time indicated on the attached Invitation to Bid for goods or services listed in the specifications and will be publicly opened and read aloud.
2. **Form of Bid:** Bids shall be submitted on the enclosed form with any exceptions, deviations or modifications to the published requirements clearly noted and explained.
3. **Submission of Bids:**
 - A) Envelopes containing bids shall be sealed and clearly marked on the outside of the envelope with the name and address of the bidder, the title and bid number of the project, and the date and time of the scheduled bid opening.
 - B) Any bid received after the scheduled opening time will not be accepted and will be returned unopened.
 - C) Any bidder may withdraw their bid response by written request at any time prior to the scheduled bid opening.
 - D) Telephonic or faxed bids will not be accepted and telephonic, telegraphic, or faxed amendments to bids or withdrawals will not be accepted under any circumstances.
 - E) Unless otherwise specified, no bid may be withdrawn, changed, or modified in any way for a period of sixty (60) calendar days from the date of the bid opening.
 - F) Negligence on the part of the bidder in preparing the bid confers no rights for the withdrawal of the bid after opening.
 - G) Bids received prior to the time of bid opening will be securely kept unopened. No responsibility will attach to any officer or employee of the City for the premature opening of a bid not properly addressed or identified.
 - H) In case of a discrepancy between unit prices and their extensions, the unit price bid shall govern.
4. **Brand Names:** Wherever in the specifications or proposal form brand names, trade names, manufacturer, or catalog numbers are called, it is for establishing a grade or quality level only and the phrase "or equal" is deemed to follow unless a prequalified list or the term "only", "no exceptions", or similar phrase is included.
5. **Taxes:** The City of Midland is exempt from State and Federal taxes. However, property purchased by a contractor to be used in the construction, alteration, repair, or improvement of property owned by the City is taxable to the contractor. Therefore, the price bid for contracts other than construction contracts must be exclusive of taxes and will be so construed. Construction contracts will be construed to include all applicable taxes unless the contract specifies otherwise.
6. **Acceptance of Bids:** The City will award to the lowest, responsive, responsible vendor that meets the functional requirements and needs expressed by the specifications. Tie bids will be awarded based on the most favorable terms for payment and/or delivery schedule or other costs associated with the award process. Receipt of a purchase order or properly executed contract covering the materials or services as described in the bid will indicate the award of bid and contract of purchase.
7. **City's Rights:** The City reserves the right to accept or reject any or all bids, to waive irregularities or defects, to award on a split-order or lump-sum basis, and accept other than the low bid when deemed to be in the City's best interests.
8. **Non-Appropriations:** The City shall be bound, hereunder, only to the extent that funds shall have been appropriated and budgeted or are otherwise available for the purpose of this contract. In the event that no funds or insufficient funds are appropriated and budgeted, or are otherwise unavailable by any means whatsoever in any fiscal period of payments due under this contract, then the City shall immediately notify the Contractor of such occurrence and this contract shall terminate the last day of the fiscal period for which appropriations were received without penalty or expense to the City of any kind, whatsoever.
9. **Delivery:** Bids shall include all delivery charges with terms of Freight Prepay - FOB Midland, MI.
10. **Laws:** The laws of the State of Michigan shall govern the rights, obligations, and remedies of the Parties under this bid and any agreement reached through this process. The City of Midland is a Michigan municipal corporation.
11. **Disclosure:** All of the information included in your bid response is subject to the "Freedom of Information Act" and may be disclosed in its entirety after the formal, public bid opening has been completed. Bid tabulations will be available MITN website, <https://www.bidnetdirect.com/mitn> subsequent to bid opening date.
12. **Independent Price Determination:** By submission of this proposal, the bidder certifies that the pricing structure offered has been arrived at independently without consultation, communication, or agreement of such prices for the purpose of restricting competition with any other bidder or competitor.
13. **Acceptance of Materials:** All components used in the manufacture or construction of materials, supplies, and equipment, and all finished goods, shall be new, the latest make/model, of the best quality, and highest grade workmanship. In the event the delivered material is found to be defective or does not conform to specifications, the City reserves the right to cancel the order upon written notice to the bidder and return the materials to the bidder at the bidder's expense.
14. **Non-Iran Linked Business:** By signing bid/quote response form, I certify and agree on behalf of myself and the company submitting this proposal the following: (1) that I am duly authorized to legally bind the company submitting this proposal; and (2) that the company submitting this proposal is not an "Iran linked business," as that term is defined in Section 2(e) of the Iran Economic Sanctions Act, being Michigan Public Act No. 517 of 2012; and (3) That I and the company submitting this proposal will immediately comply with any further certifications or information submissions requested by the City in this regard."

**PROPOSAL FOR
ITB 4650 – CURRIE WEST CLUBHOUSE EXPANSION
JUNE 9, 2026: 2:00 pm**

Date _____

Name of Bidder _____

Bidder's Address _____

Bidder's Phone Number _____ Bidder's Email _____

To: City of Midland
Office of the City Clerk
Attn: Purchasing
333 W. Ellsworth Street
Midland, MI 48640-5132

Proposal for: **ITB 4650 – CURRIE WEST CLUBHOUSE EXPANSION**

1. The undersigned, hereinafter called the CONTRACTOR, hereby declares that he has read the "Instruction to Bidders".
The CONTRACTOR, hereby proposes to furnish all specified and necessary equipment, devices, provide supervision including all overhead and profit to meet the construction schedule; all in accordance with the project documents and other contract documents. Including:

Addendum No. _____, Dated _____
Addendum No. _____, Dated _____
Addendum No. _____, Dated _____

LUMP SUM BASE BID PROPOSAL TOTAL

_____ Dollars (\$ _____)

ALTERNATE BID ITEM:

Alternate Bid Item #1:

Base bid is to furnish and install roofing as indicated for the new building addition only. Alternate #1 is to demolish and remove existing asphalt shingles & underlayment (all) down to the wood sheathing. Furnish and install new asphalt shingles over underlayment and ice guard. Refer to project manual for roof specifications.

Dollars (\$ _____)

_____ Dollars

2. Construction completion schedule (Please note: This schedule shall be for 100% completion of project)
The undersigned agrees, if awarded the contract, the project will be completed within _____ calendar days of construction start.

3. The undersigned has carefully examined the bidding and contract documents, and any and all Addenda issued, and agrees to be bound by all requirements thereof in the submission of his proposal, and in the performance of the contract if awarded this proposal.
4. The undersigned agrees that his proposal shall not be withdrawn until sixty (60) days after the time set for receipt of proposals.
5. Payment terms
 - a. Payment shall be made monthly based upon percentage of work completed that month.
 - b. Retainage of 5% withheld until project completion and all punch list and closeout documents have been provided to the owner.

6. Address, Legal Status and Signature of Bidder

The undersigned bidder does hereby designate the address given below as the legal address to which all notices, directions, or other communications may be served or mailed.

Address: _____

City: _____ State: _____ Zip: _____

The undersigned bidder does hereby declare that the bidder has the legal status checked below:

- _____ Individual
- _____ Co-Partnership
- _____ Corporation incorporated under the laws of the State of _____

This proposal is submitted in the name of: _____

(Name of Bidder)

By: _____

Title: _____

Signed and sealed this _____ day of _____, 20____.

Bids may be inspected at the bid opening or in the Procurement Office during normal business hours. Tabulations will be available at the MITN website subsequent to bid open date.

LATE BIDS WILL BE REJECTED.

**CITY OF MIDLAND, MICHIGAN
SPECIAL PROVISIONS FOR CONSTRUCTION WORK**

1. Confined Space Entry Obligations:

- b) All contractors and sub-contractors conducting permit-required confined space entry shall have a written permit-required space program meeting the requirements of the Michigan Occupational Safety and Health Administration (MIOSHA) General Industry Safety Standards Commission, Part 90. Confined Space Entry; and Occupational Health Standards Commission, Part 490. Permit-Required Confined Spaces, as well as current confined space entry team training documentation and a rescue plan. Contractors shall provide written proof of that program, training records and rescue plan upon request, before the bid is awarded or at any time after the bid is awarded.
- b.) Contractors shall comply with all MIOSHA confined space standards and all other regulations concerning confined space entry at all times.
- c) The City of Midland is in compliance with all MIOSHA standards pertaining to confined space entry. A copy of the City of Midland Master Plan for Permit-Required Confined Space Entry can be obtained from the Human Resources Department in City Hall, 333 West Ellsworth, Midland, Michigan 48640.

2. Liquidated Damages:

- a) If the contractor fails to finish the project prior to the completion date established in the contract including approved extensions, liquidated damages will be charged for each calendar day that the work remains incomplete. If no completion date is listed in the specifications, this clause will be null and void.
- b) The amount of liquidated damages will be deducted from the money due the contractor prior to final payment or in the case where the remaining amount due is less than the total amount of liquidated damages, the City shall have the right to recover the difference from the contractor or the contractor's surety.
- c) Unless specifically amended or modified by the bid specifications, the schedule for liquidated damages shall be as follows:

CONTRACT AMOUNT

<u>FROM</u>	<u>TO</u>	<u>LIQUIDATED DAMAGES</u>
\$ 0	\$50,000	\$100 per calendar day
\$50,001	\$100,000	\$200 per calendar day
\$100,001	\$500,000	\$300 per calendar day
\$500,001	and up	\$400 per calendar day

- d) The amounts set forth in the above schedule are not to be considered punitive, but rather predetermined and reasonable amounts to compensate for the detriment to the public and to defray expenses incurred by the City due to delay in the completion of the project.

3. Bid Security:

- a) A bid security, as a guarantee of good faith, in the form of a certified check, cashier's check, or bidder's bond may be required to be submitted for this project as indicated on the bid response form.
- b) If alternate bids are being proposed, only one bid security will be required in the amount of the highest proposed total bid.

- c) Such bid security will be returned to the unsuccessful bidders upon award of the bid and to the successful bidder upon approval by the City of the executed contract and any additional bonds required or to all bidders upon rejection of the bid in its entirety by the City.
- d) Bid security shall be forfeited to the City as liquidated damages, not as a penalty, if the successful bidder fails or refuses to enter into a contract with the City according to the terms of the bid or fails to provide sufficient bonds and/or insurance certificates as required by the City and established in this specification document.

4. Insurance Certificate:

The successful vendor shall supply to the City prior to award an Insurance Certificate in the minimum amount prescribed below listing the City of Midland as "Additional Insured". All certificates of insurance shall be on the standard ACCORD CERTIFICATE OF INSURANCE form showing the specific limits of insurance required. The contractor shall not commence any work on this project until a valid form has been delivered to the City and has been approved by the City Attorney.

Commercial General Liability Insurance

The contractor shall procure and maintain during the life of this contract, Commercial General Liability Insurance on an occurrence basis with limits of liability not less than \$1,000,000 per occurrence and \$2,000,000 aggregate combined single limit, Personal Injury, Bodily Injury and Property Damage. Coverage shall include the following: a) contractual liability; b) products and completed operations; c) independent contractors; d) broad form general liability extensions or equivalent; e) per contract aggregate.

Automobile Liability

The contractor shall procure and maintain during the life of this contract, automobile liability insurance, including applicable No-Fault coverages, with limits of liability of not less than \$1,000,000 per occurrence combined single limit bodily injury and property damage. Coverage shall include all owned, non-owned, and hired vehicles.

Workers Compensation Liability Insurance

The contractor shall procure and maintain during the life of this contractor, Workers Compensation Insurance, including employers liability coverage in accordance with all applicable statutes of the state of Michigan. Employer liability limits shall be at least \$500,000/\$500,000/\$500,000.

5. Performance and Payment Bond

The successful contractor shall furnish a performance bond in the amount of 100% of the contract price as security for the faithful performance of the project. The contractor shall also provide a payment bond in the amount of 100% of the contract price as security for payment of all persons or companies that supply materials and/or labor in connection with this project. Surety bonds shall be provided through firms that are listed as approved on the U.S. Treasury Department's Circular 570.

6. Subcontractor Usage:

The City has the right of approval on subcontractors used for any City project. The use of ineligible vendors as subcontractors may cause the main contractor to be placed on the City's list of ineligible vendors. The City does **not** pay subcontractors directly, that is the responsibility of the general. For a list of the City's ineligible vendors, contact the City Purchasing Agent.

City of Midland
Contractor Safety Qualification Statement

APPENDIX XII

Description of work or job name: _____ Contract No.: _____

Contract Company: _____ Owner/CEO: _____ Phone: _____

Safety Officer: _____ Title: _____ Phone: _____

Contractor experience modification rate (EMR): _____ OSHA Recordable Injury Incident Rate (past year): _____

We have received a written copy of and agree to follow the requirements of the City of Midland's "Contractor Safety Program:"
 Yes No Comments: _____

We have an active written safety program which will be provided to City representatives upon request.
 Yes No Comments: _____

We understand the essential requirements of the following applicable safety regulations and agree to make a good faith effort to follow them. We further certify that these applicable regulations are readily accessible to employees:

	Yes	N/A		Yes	N/A
a. Use of reflective safety vests	<input type="checkbox"/>	<input type="checkbox"/>	h. Welding and cutting	<input type="checkbox"/>	<input type="checkbox"/>
b. Confined space entry	<input type="checkbox"/>	<input type="checkbox"/>	i. Hazard communication ("right-to-know")	<input type="checkbox"/>	<input type="checkbox"/>
c. Control of hazardous energy	<input type="checkbox"/>	<input type="checkbox"/>	j. Alcohol and drug use	<input type="checkbox"/>	<input type="checkbox"/>
d. Elevated work	<input type="checkbox"/>	<input type="checkbox"/>	k. Bloodborne pathogens	<input type="checkbox"/>	<input type="checkbox"/>
e. Excavations, trenches & shoring	<input type="checkbox"/>	<input type="checkbox"/>	l. Respiratory protection	<input type="checkbox"/>	<input type="checkbox"/>
f. Personal protective equipment	<input type="checkbox"/>	<input type="checkbox"/>	m. Other applicable regulations:		
g. Work area protection and traffic control	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>
			_____	<input type="checkbox"/>	<input type="checkbox"/>

Project-specific concerns of applicable safety regulations and safety control measures will be discussed and documented at the pre-project meeting with City representatives.

Important! *The City reserves the right to request verification, in writing, of the contractor's current safety program, training and certification records, and emergency response plans as applicable to the work being done.*

Other comments: _____

We attest that the above information is true to the best of our knowledge and can be substantiated if requested.

Contract Representative: _____	<u>Received by:</u> _____
Title: _____ Date: _____	Contracting Dept.: _____
MI Contractor's License No. (if applicable): _____	Name: _____ Date: _____
	Original to: Contracting Department
	Copy to: Contractor

SECTION 000070 - AGREEMENT FORM

1.1 DOCUMENTS:

The "Standard Form of Agreement between Owner and Contractor", A.I.A. Document A101, 2017 Edition, where the basis of payment is a stipulated sum will be the form of agreement utilized for this project.

1.2 RELATED INFORMATION:

Attention is directed to the following divisions of the specifications for additional information related to the agreement form.

Contractors shall be held responsible for having familiarized themselves with this document and all other documents affecting their contracts in this specification.

This document is on file at the Architect's office or can be obtained from:

Michigan Society of Architects
553 East Jefferson
Detroit, Michigan 48226

END OF SECTION 000070

SECTION 000080 - GENERAL CONDITIONS

1.1 DOCUMENTS:

"The General Conditions of the Contract for Construction", A.I.A. Document A-201, 2017 Edition, forms a part of these specifications and shall have the same effect as if bound herein.

This document is modified as described in Modifications of the General Conditions.

Contractors shall be held responsible for having familiarized themselves with this document and all other documents affecting their contracts in this specification.

This document is on file at the Architect's office or can be obtained from:

Michigan Society of Architects
553 East Jefferson
Detroit, Michigan 48226

END OF SECTION 000080

SECTION 000090 - SUPPLEMENTARY CONDITIONS

The following Supplementary Conditions modify, change, delete from or add to the "General Conditions of the Contract for Construction", A.I.A. Document A-201, 2017 Edition, where any article of the General Conditions is modified or any paragraph, subparagraph or clause thereof is modified or deleted by these Supplementary Conditions. The unaltered provisions of the article, paragraph, subparagraph, or clause shall remain in effect.

ARTICLE 1 - CONTRACT DOCUMENTS

Modify Article 1.1.3 as follows:

1.1.3 The Work

The work comprises all required demolition and removal work, and completely new construction and renovation as required by the contract documents, including all labor necessary to produce such construction, and all materials, equipment and incidentals incorporated or to be incorporated in such construction to produce the intended results.

Modify Article 1.2.3 as follows:

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the work. The Contract Documents are complimentary, and what is required by one shall be as binding as if required by all. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well known technical, or trade meanings are used in the Contract Documents in accordance with such recognized meanings. Where reference is made to specifications of manufacturers, trade associations or the like, such is understood to be made a part of this specification to have the same effect as if fully reproduced herein. Approval or equal, acceptable, and words of similar definition are understood to mean, "in the judgment of the Architect".

Add Article 1.2.4 as follows:

1.2.4 Computed dimensions take precedence over scaled dimensions, large scale details over smaller. Should there be conflict(s) between or within drawings and/or specifications, that which requires the highest degree of performance (quality, quantity, strength, finish, completion, complexity, sophistication, etc.), will be required and shall be provided at no increase in contract amount. All such conflicts shall be brought to the attention of the Architect/Engineer for interpretation of the intent of the drawings and/or specifications.

ARTICLE 2 - OWNER

Add Article 2.4.2 as follows:

2.4.2 As stated in the contract documents, certain equipment may be pre-purchased by the Owner, the cost of which is not to be included in the contract.

Add Article 2.4.3 as follows:

2.4.3 The Owner and their representative shall at all times have access to the work wherever it is in preparation of progress and the contractor shall provide proper facilities for such access and for review of construction.

ARTICLE 3 - CONTRACTOR

Add Article 3.1.4 as follows:

3.1.4 Term "GENERAL CONTRACTOR" or "PRIME CONTRACTOR" means person, firm or corporation who performs Architectural Trades Work and who is fully responsible to the Owner for all administration, handling and coordination of Work.

Add Article 3.1.5 as follows:

3.1.5 Term "MECHANICAL CONTRACTOR" means person, firm or corporation who performs the Mechanical Work, as a Subcontractor to the General Contractor. Can also be the Prime Contractor.

Add Article 3.1.6 as follows:

3.1.6 Term "PLUMBING CONTRACTOR" means person, firm or corporation who performs the Plumbing Work, as a Subcontractor to the General Contractor.

Add Article 3.1.7 as follows:

3.1.7 Term "ELECTRICAL CONTRACTOR" means person, firm or corporation who performs the Electrical Work, as a Subcontractor to the General Contractor.

Add Article 3.1.8 as follows:

3.1.8 Term "SITE CONTRACTOR" means person, firm or corporation who performs the Site Work (if other than General Contractor) as a Subcontractor to the General Contractor.

Add Article 3.3.4 as follows:

3.3.4 All work shall be furnished and installed in strict accordance with Federal, State & Local laws and codes regarding handicapped requirements as well as the requirements of the governing Health Department, State and Local Mechanical Codes, Plumbing Codes, Electrical Codes, Building Code(s), Office of Fire Safety, testing agencies referenced, i.e. U.L., F.M., etc., and/or all other governing codes.

Add Article 3.4.4 as follows:

3.4.4 The Contractor shall be responsible for all work, equipment and materials to accommodate continuous construction. Responsibility shall include but not be limited to: temporary haul roads,

temporary drives, fuel, heat, power, water, air, enclosures, blankets, straw, snow removal, etc. The Owner will not accept claims for additional costs due to site or climatic conditions.

Add Article 3.5.3 as follows:

3.5.3 The Contractor warrants that the contract has been completed in full conformity with the intent of the contract documents and has not made any substitutions of materials except as authorized in writing by the Owner and the Architect. The Contractor agrees to return to the site of the work within fourteen (14) working days of receipt of written notice from the Owner or the Architect and will furnish at contractor's expense all necessary labor and material to make proper repairs or corrections made necessary by defective materials or inferior workmanship furnished or performed under contract, including damage to adjacent materials or equipment caused by the defect, all corrective work shall be without cost to the Owner and shall be completed to the satisfaction of the Owner and Architect. Failure to take action by the contractor on warranted work shall result in notification of the bonding company by the Owner or Architect with the intent to have the defective material or inferior workmanship corrected at the contractor's expense. The warranty of work shall commence upon the substantial completion date of the project and remain in full force and effect for one (1) year from the date thereof.

Add Article 3.5.4 as follows:

3.5.4 Defective material or inferior workmanship corrected by the contractor shall be warranty for an additional year from date of acceptance by the Owner or Architect of the warranty work.

Add Article 3.6.1 as follows:

3.6.1 The Contractor submitting a bid shall include and the successful bidder shall be required to pay all taxes which are levied by Federal, State or Municipal governments upon labor, and for materials entering into the work. The Owner reserves the right to require evidence of payment of such taxes prior to final payment. The above includes taxes which are legally enacted at the time bids are received, whether or not yet effective.

Modify Article 3.7.1 as follows:

3.7.1 The Prime Contractor shall obtain and pay for the building permit and for all other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the work which are customarily secured after execution of the contract and which are legally required at the time bids are received, excluding the following trades:

- .1 The Mechanical Trades Contractor shall obtain and pay for all required mechanical permits and inspections.
- .2 The Plumbing Trades Contractor shall obtain and pay for all required plumbing permits and inspections.
- .3 The Electrical Trades Contractor shall obtain and pay for all required electrical permits and inspections.

- .4 The Site Work Contractor shall obtain and pay for all required site work permits and inspections.

Add Article 3.9.4 as follows:

3.9.4 The Contractor shall maintain a competent Project Manager and Superintendent approved by the Architect/Engineer and Owner throughout the period of construction. The Project Manager or Superintendent shall be deemed an agent of the contractor and any orders given him by the Architect/Engineer shall be binding upon the contractor. The Project Manager or Superintendent of the Contractor may not be removed from (or replaced on) the job during the period of construction without approval of the Architect/Engineer and Owner.

Add to Article 3.12.5 as follows:

3.12.5 The Contractor shall mark corrections, notations, etc., and note his approval on each copy of shop drawings before they are submitted to the Architect. Shop drawings which, in the opinion of the Architect have not been fully checked by the Contractor will not be reviewed by the Architect. The shop drawings will be returned for proper checking by the Contractor. No extension of the contract completion date will be allowed because of such action by the Architect.

Add Article 3.13.1 as follows:

3.13.1 The Contractor shall coordinate with the Owner all arrangements necessary to conduct construction operations, with a minimum of interference to the Owner's operations. Clean-up of areas not within the construction limits shall be daily and complete, and any damage to these areas caused by construction operations shall be repaired to original condition immediately.

Add Article 3.13.2 as follows:

3.13.2 The Contractor shall not disrupt any of the existing utility services without prior approval. The Contractor shall obtain permission to do so from the Owner through the Architect. Requests for permission to disrupt any utility shall be submitted well in advance of the need in order to not delay the work. The refusal by the Owner of such a request which is submitted on short notice, will not be accepted as a basis for time extension.

ARTICLE 4 – ARCHITECT/ENGINEER

Add Article 4.2.7.1 as follows:

4.2.7.1 The Architect/Engineer shall make all interpretations concerning the contract documents during bidding and construction phases of the project.

ARTICLE 7 - CHANGES IN THE WORK

Add Article 7.1.4 as follows:

7.1.4 If the Architect/Engineer or Owner needs or wishes to change the scope or character of the work, a bulletin may be issued by the Architect. The Contractor upon receipt of the bulletin shall within ten (10) days, submit to the Architect a completely itemized lump sum quotation in two (2) copies, indicating the cost or credit to the Owner resulting from the change in the work.

Add Article 7.1.5 as follows:

7.1.5 Extra compensation will not be authorized for work which, though not specifically detailed or specified, is reasonably inferable to satisfy the design intent and/or obviously necessary to maintain the quality of construction and finish established by the drawings and specifications. The contractor is expected to examine the drawings, specifications and site of the work carefully before submitting a proposal and to obtain from the Architect in writing, any additional information which would affect its bid.

Add Article 7.3.3.1.1 as follows:

7.3.3.1.1 By mutual acceptance of a lump sum properly itemized bulletin quotation indicating; quantities, unit costs, and total costs of materials including applicable sales and use taxes and delivery charges; hours of labor, hourly rates and total labor costs, including direct and indirect payroll taxes and insurance based upon direct cost of labor; copies of detailed subcontractor's quotations; fee as stated in the proposal and the contract, which shall include all costs for on-site superintendence, general supervision, other direct and indirect costs or charges of any nature, overhead and profit; this shall apply to subcontractors as well as the contractor. Charges for direct and indirect taxes on labor, insurance and other payroll loadings, sales and use taxes, premium time (overtime) costs shall be computed separately and shall not be subject to the percentage fee. This shall apply to subcontractors as well as the contractor. Should the change result in both work being added and work being omitted, the applicable fee shall be computed on the net costs of the change even though the change results in different trades being employed.

ARTICLE 8 - TIME

ARTICLE 9 - PAYMENTS AND COMPLETION

Modify Article 9.3.1 as follows:

9.3.1 At least ten (10) days before the date for each progress payment established in the Owner/Contractor Agreement, the Contractor shall submit to the Architect an itemized application for payment utilizing AIA Document G702 & Continuation Sheet G703, "Application and Certificate for Payment"; notarized and supported by such data substantiating the contractor's right to payment as the Owner or the Architect may require, reflecting retainage which shall be five (5%) percent through substantial completion of the entire project. Upon reaching substantial completion, the Architect shall determine such retainages as may be required to finish incomplete work and unsettled claims. In addition, each Application for Payment shall be accompanied by the following: all in a form and substance satisfactory to the Owner and in compliance with applicable statutes set forth by the State in which the work is being done.

- .1 A current Sworn Statement from the Contractor setting forth all subcontractors and materialmen with whom the Contractor has subcontracted, the amount of each subcontract, the amount requested for any subcontractor or materialman in the application for payment and the amount to be paid to the Contractor from such progress payment, together with a current duly executed waiver of construction, mechanics' and materialmen's liens from the Contractor establishing receipt of payment or satisfaction of the payment requested by the Contractor in the current Application for Payment;
- .2 Commencing with the second (2nd) Application for Payment submitted by the Contractor, duly executed so-called "after the fact" waivers of construction, mechanics' and materialmen's liens from all subcontractors, materialmen and, when appropriate from lower tier subcontractors, establishing receipt of payment or satisfaction of payment of all amounts requested on behalf of such entities and disbursed prior to submittal by the Contractor of the current Application for Payment, plus sworn statements from all subcontractors, materialmen and, where appropriate from lower tier subcontractors, covering all amounts described in previous applications for payment.
- .3 Final waivers of lien must be submitted for all contracts, subcontracts and material for final payments.

Add Article 9.10.6 as follows:

9.10.6 Upon completion of the project, or portions thereof, the Contractor shall transfer to the Owner all applicable items accumulated throughout construction. Satisfaction of the following requirements shall be considered a part of payment requests. These include but are not limited to the following items:

- .1 Service manuals, installation instructions, special tools and specialties.
- .2 Spare parts ordered as part of this contract.
- .3 Submittal of the Contractors' one year guarantee.
- .4 Submittal of manufacturer's guarantees, bonds, and letters of coverage extending beyond the time limitations of the Contractor's guarantee.
- .5 Delivery of any salvaged or borrowed materials or equipment to the Owner.
- .6 Record documents of completed facilities. See separate section for specific requirements.
- .7 All keys to all doors, gates and equipment.

Add Article 9.11 as follows:

9.11 Liquidated Damages:

9.11.1 Liquidated damages shall apply per "City of Midland Special Provisions For Construction Work".

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

Add Article 10.5 as follows:

10.5 General construction industry safety rules and regulations for the state in which the work is being prosecuted and the U.S. Department of Labor, Safety and Health Regulations for Construction, known as the U.S. Construction Safety Act shall be adhered to by all Contractors and Subcontractors on this project. Certification of this coverage shall be submitted along with that required in Article 11.

ARTICLE 11 - INSURANCE

Add to Article 11.1.1 as follows:

11.1.1 The Contractor shall purchase and maintain such insurance from a company or companies licensed to do business in the state in which the project is located and will protect him from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by any subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Liability insurance shall include all major divisions of coverage on a comprehensive basis including; premises operations (including X, C, U); independent contractor's protective, products and completed operations, contractual liability; owned, non-owned, and hired motor vehicles and broad form property damage including completed operations.

Modify Article 11.1.2 as follows:

11.1.2 The insurance required by subparagraph 11.1.1 shall be written for not less than any limits of liability specified in the Contract Documents, or required by law, whichever is greater, provide minimum limits as follows:

a. Worker's Compensation:

- (1) State-statutory.
- (2) Applicable federal - statutory.
- (3) Employer's liability - \$500,000.
- (4) Benefits required by labor union contracts.

b. Contractor's liability insurance shall be comprehensive general liability including contractual liability.

- (1) Bodily Injury:
\$1,000,000 Each occurrence.
\$2,000,000 Aggregate.
- (2) Property damage (including completed operations broad form):
\$1,000,000 Each occurrence.
\$2,000,000 Aggregate.
- (3) Broad form completed operations and product liability insurance shall be maintained until final payment is made and Contractor shall continue to provide evidence of such coverage

to Owner on an annual basis during the coverage period. **(Name: City of Midland and William A. Kibbe & Associates, Inc. & Consultants as an additional insured).**

- (4) Property damage liability insurance shall include coverage for X (Explosion), C (Collapse), and U (Underground).
- (5) Contractual Liability (Hold Harmless Coverage):
 - (a) Bodily Injury: \$1,000,000 Each Occurrence.
 - (b) Property Damage: \$1,000,000 Each Occurrence.
\$2,000,000 Aggregate.
- (6) Personal Injury with Employment Exclusion Deleted:
 - \$1,000,000 Each Person Aggregate.
 - \$2,000,000 General Aggregate.
- c. Comprehensive automotive liability (owned, non-owned, hired):
 - (1) Bodily injury: \$1,000,000 Each person.
\$1,000,000 Each occurrence.
 - (2) Property damage: \$1,000,000 Each occurrence.
- d. An umbrella policy extending all limits to a minimum of an additional \$2,000,000.
- e. This insurance shall not be intended to cover any responsibility for damages as included herein under heading of "Damages", Articles 7.4 and 8.3.

Add Article 11.1.5 as follows:

11.1.5 The Contractor shall furnish to the Owner and the Architect/Engineer, insurance policies protecting both the Owner and the Architect/Engineer from liability for damages as provided for under the Contractor's liability insurance. Liability limits shall be the same as for the Contractor's liability insurance.

Add to Article 11.2.4 as follows:

11.2.4 The Owner shall secure and maintain property insurance, all risk, completed value, in the amount equal to the contract sum for the work.

Modify Article 11.3.1 as follows:

11.3.1 The Owner and Contractor waive all rights against: (1) each other and the subcontractors, sub-subcontractors, agents, and employees each of the other, and (2) the Architect/Engineer, his consultants, and separate contractors, if any, and any of their subcontractors, sub-subcontractors, agents and employees for damages caused by fire or other perils to the extent covered by insurance obtained pursuant to this policy or any other property insurance applicable to the work, except such rights as they may have to the proceeds of such insurance held by the Owner as trustee. The foregoing waiver afforded the Architect, his

agents and employees shall not extend to the liability imposed. The Owner or the Contractor, as appropriate, shall require of the Architect/Engineer, separate contractors, subcontractors, sub-subcontractors, by appropriate agreements written where legally required for validity, similar waivers each in favor of all parties enumerated in this agreement.

Add Article 11.4.1 as follows:

11.4.1 Performance Bond and Labor and Material Payment Bond shall be from a security company duly approved by the U.S. Department of Treasury and listed in the U.S.T. Circular No. 570, latest edition. Surety company shall be rated A.M. Best as 'B' or better and licensed to operate in the State of Michigan. The total cost of the bonds or any additional costs as may be required by the Prime Contractor's Surety Company shall be borne by the Prime Contractor and included in the Prime Contractor's bid.

Add Article 15 as follows:

ARTICLE 16 - EQUAL OPPORTUNITY

16.1 The Contractor shall maintain policies of employment as follows:

16.1.1 The Contractor and all subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin or age. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, national origin or age. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

15.1.2 The Contractor and all subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, national origin or age."

END OF SECTION 000090

SECTION 010100 - SUMMARY OF WORK

1.1 GENERAL SUMMARY

- A. Comply with procedures described in this section relative to construction of the project, and Owner's use of the site.
- B. Related Documents:
 - 1. Documents affecting the work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these specifications.

1.2 DESCRIPTION OF PROPOSED IMPROVEMENTS:

- 1. Install soil erosion & sedimentation control measures and monitor throughout construction.
- 2. Selective demolition as required for construction of improvements for building addition.
- 3. Site work including sawcutting of existing asphalt, excavation for footings, foundations and limited grading to accommodate the new addition.
Please note that this site is in the 100-year floodplain as determined by FEMA and requires a Part 31 permit, which has been applied for by the Engineer.
- 4. Foundations.
- 5. Utility extensions from existing building to new building addition.
- 6. Addition to house two golf simulator bays and associated elements. Construction and finishes as specified, including exterior envelope, aluminum window systems and shingled roofing. Mechanical equipment and ducts. Associated plumbing and electrical work related to the space noted above.
- 7. Final grading and hydroseeding.
- 8. Removal of soil erosion & sedimentation control measures, after lawn is established.

1.3 OWNER OCCUPANCY

Owner/visitors will be around the site throughout the duration of the project. Provide safety barriers around construction areas and all the areas being worked on. This will need to be coordinated with the Owner and the awarded contractor. Maintain existing operations and circulation to all required areas not being used for construction access.

1.4 PRE-ORDERED PRODUCTS

Golf simulators and associated equipment. (Purchased by City and installed by contractor)

END OF SECTION 010100

SECTION 010190 - CONTRACT CONSIDERATIONS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements to Division 1, General Requirements, which are hereby made a part of this specification.

1.1 CASH ALLOWANCES

- A. Construction Testing (Soils & Materials): (NOT USED).
- B. Construction Staking: (NOT USED).

1.2 CONTINGENCY ALLOWANCE (NOT USED).

1.3 SPECIAL INSPECTIONS AND TESTING ALLOWANCES. (Paid for by the Owner, if required by AHJ)

1.4 SCHEDULE OF VALUES

- A. Within 24 hours after opening of the proposals, the successful bidder shall submit in duplicate to the Architect for his inspection a complete bid breakdown. The schedule of values shall be on AIA Form G703. (Contractor's standard form or electronic media printout will be considered).

1.5 APPLICATIONS FOR PAYMENT

- A. Submit three (3) copies of each application on AIA Form G702.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

1.6 CHANGE PROCEDURES

- A. Change Order Forms: Change orders will be processed on forms provided by the Architect.

1.7 ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option.
- B. Coordinate related Work and modify surrounding Work as required.
- C. Schedule of Alternates: (See Bid Form).

END OF SECTION 010190

SECTION 010270 - APPLICATIONS FOR PAYMENT

1.1 GENERAL SUMMARY

- A. Comply with procedures described in this Section when applying for progress payment and final payment under the Contract.
- B. Related Work:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these specifications.
 - 2. The Contract Sum and the schedule for payments are described in the Form of Agreement.
 - 3. Payments upon Substantial Completion and Completion of the Work are described in the General Conditions.
 - 4. The Architect/Engineer's approval of applications for progress payment and final payment may be contingent upon the Architect/Engineer's approval of status of Project Record Documents.

1.2 QUALITY ASSURANCE

- A. Prior to start of construction, secure the Architect/Engineer's approval of the schedule of values.
- B. During progress of the Work, modify the schedule of values as approved by the Architect to reflect changes in the Contract Sum due to Change Orders or other modifications of the Contract.
- C. Base requests for payment on the approved schedule of values.

PROCEDURES

1.3

- A. Informal submittal: Unless otherwise directed by the Architect/Engineer:
 - 1. Make an informal submittal of request for payment by filling in, with erasable pencil or on word processor, pertinent portions of AIA Document G702, "Application and Certificate for Payment," plus continuation sheet or sheets.
 - 2. Make this preliminary submittal to the Architect at least ten days prior to the end of the month or at the last regular job meeting of the month.
 - 3. Revise the informal submittal of request for payment as agreed at the job meeting, initialing all copies.
 - 4. Submit a request/application for payment each calendar month.
 - 5. Waivers of Lien: Do not submit copies of partial or full waivers of lien with informal submittal.

- B. Formal submittal: Unless otherwise directed by the Project Manager:
1. Make formal submittal of request for payment by filling in the agreed data, by typewriter or neat lettering in ink, on AIA Document G702, "Application and Certificate for Payment," plus continuation sheet or sheets.
 2. Sign and notarize the Application and Certificate for Payment.
 3. Submit the original and four copies of the Application and Certificate for Payment, including copies of the continuation sheet or sheets and waivers to the Project Manager.
 4. Waivers of Lien: Submit partial waivers on each item for amount requested, prior to deduction for retainage, on each item. When an application shows completion of an item, submit final or full waivers.
 5. Submit sworn statement with each request for payment.
 6. The Architect/Engineer will compare the formal submittal with the approved informal submittal and, when approved, will sign the Application and Certificate for Payment, will make required copies, and will distribute:
 - a. One copy to Contractor;
 - b. Two copies to Owner;
 - c. One copy to Project Manager's file.
 7. The Owner, upon approval, will disburse directly to the Contractor.

END OF SECTION 010270

SECTION 010280 - CHANGE ORDER PROCEDURE

1.1 GENERAL SUMMARY

- A. Make such changes in the Work, in the Contract Sum, in the Contract Time for Completion, or any combination thereof, as are described in written Change Orders signed by the Owner and the Architect/Engineer and issued after execution of the Contract, in accordance with the provisions of this Section.

- B. Related Work:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these specifications.
 - 2. Changes in the Work are described further in the General Conditions and Supplemental Conditions.
 - 3. Architect/Engineer's supplemental instructions:
 - a. From time to time during progress of the Work, the Architect may issue supplemental instructions which interpret the Contract Documents or order minor changes in the Work without change in Contract Sum or Contract Time.
 - b. Should the Contractor consider that a change in Contract Sum or Contract Time is required, he shall submit an itemized proposal to the Architect immediately and before proceeding with the Work. If the proposal is found to be satisfactory and in proper order, the supplemental instructions in that event will be superseded by a Change Order.
 - 4. Proposal requests:
 - a. From time to time during progress of the Work, the Architect may issue a proposal request (bulletin) for an itemized quotation for changes in the Contract Sum and/or Contract Time incidental to proposed modifications to the Contract Documents.
 - b. This will not be a Change Order and will not be a direction to proceed with the changes described therein.

1.2 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such measures as are needed to assure familiarity of the Contractor's staff and employees with these procedures for processing Change Order data.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Maintain a "Register of proposal requests, supplemental instructions, and Change Orders" at the job site, accurately reflecting current status of all pertinent data.

- B. Make the Register available to the Architect for review at his request.

1.4 PROCESSING PROPOSAL REQUESTS

- A. Make written reply to the Architect in response to each proposal request.
 - 1. State proposed change in the Contract Sum, if any.
 - 2. State proposed change in the Contract Time of Completion, if any.
 - 3. Clearly describe other changes in the Work, if any, required by the proposed change or desirable therewith.
 - 4. Include full backup data such as subcontractor's letter of proposal or similar information.
 - 5. Submit this response in single copy.

- B. When cost or credit for the change has been agreed upon by the Owner and the Contractor, or the Owner has directed that cost or credit be determined in accordance with provisions of the General Conditions, the Architect/Engineer will issue a Change Order to the Contractor.

1.5 PROCESSING CHANGE ORDERS

- A. Change Orders will be numbered in sequence and dated.
 - 1. The Change Order will describe the change(s), will refer to the proposal requests or supplemental instructions involved, and will be signed by the Owner and the Architect/Engineer.
 - 2. The Architect/Engineer will issue three copies of each Change Order to the Owner.
 - a. The Owner will promptly sign all three copies and return two copies to the Architect/Engineer.
 - b. The Architect/Engineer will retain one signed copy in his file, will forward one signed copy to the Contractor.

END OF SECTION 010280

SECTION 010390 - COORDINATION AND MEETINGS

1.1 GENERAL

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this specification.

1.2 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify utility requirement characteristics of operating equipment are compatible with building utilities.
- C. Coordinate space requirements and installation of special equipment, and mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable.
- D. In finished areas, conceal pipes, ducts, and wiring within the construction.

1.3 CUTTING AND PATCHING

- A. Employ a skilled and experienced mechanic to perform cutting and patching new or existing Work; restore Work with new Products.
- B. Submit written request in advance of cutting or altering structural or building enclosure elements.
- C. Fit Work tight to adjacent elements. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- D. Refinish surfaces to match adjacent finishes.

1.4 CONFERENCES

- A. Prime Contractor will schedule a pre-construction conference after Notice of Award has been sent to the Prime Contractor.

1.5 PROGRESS MEETINGS

- A. The Prime Contractor will schedule and administer meetings throughout progress of the Work at maximum monthly intervals.

END OF SECTION 010390

SECTION 013400 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

1.1 GENERAL SUMMARY

- A. Make submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements, all as described in this Section. Coordinate all submittals with the Progress Schedule and actual work progress.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Individual requirements for submittals also may be described in pertinent Sections of these Specifications.
- C. Work not included:
 - 1. Non-required submittals will not be reviewed by the Architect/Engineer.

1.2 SUBMITTALS

- A. Make submittals of Shop Drawings, samples, substitution requests, and other items in accordance with the provisions of this Section. Provide additional copies as may be required for Governing Authorities.

1.3 QUALITY ASSURANCE

- A. Coordination of submittals:
 - 1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
 - 2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
 - 3. By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.

2.0 PRODUCTS

2.1 SHOP DRAWINGS

- A. Scale and measurements: Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.
- B. Types of prints required:
 - 1. Submit (5 total sets) of Shop Drawings in the form of original documents or (1) electronic submittal in PDF format, e-mailed to Architect.
- C. Review comments of the Architect will be shown when it is returned to the Contractor. The Contractor may make and distribute such copies as are required for his purposes.

2.2 MANUFACTURERS' LITERATURE

- A. Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, **clearly show which portions of the contents are being submitted for review. If actual items are not identified, they will be returned without being reviewed.**
- B. Submit the number of copies which are required to be returned, plus two copies which will be retained by the Architect.
- C. Where the product data is required for maintenance manuals and close-out documents, submit two additional copies which will be returned. Maintain one additional copy at the project site for reference purposes.
 - 1. Do not proceed with the installation of manufactured products until a copy of related product data is in the installer's possession at the project site.

2.3 SAMPLES

- A. Provide Sample or Samples identical to the precise article proposed to be provided. Identify as described under "Identification of Submittals" below. Colored scans are not acceptable.
- B. Number of Samples required:
 - 1. Submit three sets of samples; one set will be returned. Provide 3 or more samples in each set where variations in color, pattern or texture are observable; show average condition and extreme range of variations. Submit full documentation with each set. Sample submittals are for Architect/Engineer's review of color, texture, pattern and "kind"; maintain returned samples at project site for purposes of quality control comparisons.
 - 2. By pre-arrangement in specific cases, a single sample may be submitted for review and, when approved, be installed in the Work at a location agreed upon by the Architect.

2.4 MISCELLANEOUS SUBMITTALS

- A. Provide copies of miscellaneous submittals as follows:
 - 1. Warranties: Submit 2 executed copies, plus additional copies as required for maintenance & close-out manuals.
 - 2. Maintenance Manuals: Submit 1 bound copy and one unlocked copy of the files on a USB flash drive.
 - 3. Record Drawings: Submit original maintained marked-up prints (2 sets).

3.0 EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

- A. Consecutively number all submittals.
 - 1. When material is resubmitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
 - 2. On re-submittals, cite the original submittal number for reference.
- B. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
- C. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
- D. Submittal Log:

1. Maintain an accurate submittal log for the duration of the Work, showing current status of all submittals at all times.
2. Make the submittal log available to the Architect for the Architect's review upon request.

3.2 GROUPING OF SUBMITTALS

- A. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
1. Partial submittals may be rejected as not complying with the provisions of the Contract.
 2. The Contractor may be held liable for delays so occasioned.
 3. Items requiring color selection; i.e. interior finishes shall be submitted as a group to facilitate overall color coordinated selection. Color selections will not be made until the majority of samples are received.

3.3 TIMING OF SUBMITTALS

- A. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and re-submittals, and for placing orders and securing delivery.
- B. In scheduling, allow up to ten working days for review by the Architect following the Architect's receipt of the submittal.

3.4 ARCHITECT/ENGINEER'S ACTIONS

- A. Review of the shop drawings by the Architect/Engineer is to determine general conformance with the design concept of the project and with the information given in the contract documents. **Neither the receipt nor the review of shop drawings by the Architect/Engineer shall relieve the contractor of his responsibility for performance of the work in accordance with the requirements of the contract documents.** Contractor shall be responsible for dimensions to be confirmed and correlated at the site; for information that pertains to fabrication process or to the means, method, techniques, sequences and procedures of construction, and for coordination of the work of all trades.
- B. Contractor Submittals, Shop Drawings or Product Data from time to time are submitted with errors. **If overlooked by the Architect/Engineer review process, it shall not grant the contractor leave to proceed in error, and regardless of any information contained in the Shop Drawing review, the contractor shall be required to meet the requirements of the drawings and specifications. Shop drawings and/or product data review shall not waive or supersede in any way the requirements of the contract documents (drawings and specifications).**

3.5 REQUIRED SUBMITTALS

- A. Submittals required by the Contract Documents: The General Contractor shall be responsible for review of the following divisions of the specifications and submission of requested shop drawings: Division 00 thru 33. The Mechanical & Plumbing Subcontractor shall be responsible for review of the following divisions of specifications and submission of requested shop drawings: (Division 00 thru 33). The Electrical Subcontractor shall be responsible for review of the following divisions of the specifications and submission of requested shop drawings: (Division 00 thru 33). All shop drawings shall be submitted as detailed under Division 01, Section 013400.

END OF SECTION 013400

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements, consisting of multiple products, assemblies, and subassemblies.
 - E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
 - F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
 - G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
 - H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
 - I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
 - J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.
- 1.3 DELEGATED-DESIGN SERVICES
- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
- 1.4 CONFLICTING REQUIREMENTS
- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.
 - B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits.

To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

- A. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, telephone number, and email address of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.

11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Statement on condition of substrates and their acceptability for installation of product.
 2. Statement that products at Project site comply with requirements.
 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 5. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Statement that equipment complies with requirements.
 2. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 3. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - d. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups of size indicated.

2. Build mockups in location indicated or, if not indicated, as directed by Architect.
3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
8. Demolish and remove mockups when directed unless otherwise indicated.

1.9 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 1. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspection: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspection, for construction that replaced Work that failed to comply with the Contract Documents.

- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections.
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 6. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency/special inspector to conduct special tests and inspections required by (AHJ) authorities having jurisdiction as the responsibility of Owner, as indicated in the Statement of Special Inspections and the schedule of Special Inspections attached to this Section, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspection corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas

with durable seams that are as invisible as possible.

- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1.01 GENERAL SUMMARY

- A. This Section describes construction facilities and temporary controls required for the Work.
- B. The Contractor provides all temporary utilities, controls and services as described in this section. No extra compensation will be provided should temporary utilities, controls and services provided prove to be inadequate or incompatible with the needs of the Contractor, Subcontractors, and Sub-subcontractors. The Contractor, Subcontractors, and Sub-subcontractors shall make other arrangements as needed.
- C. Related Work:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these specifications.
 - 2. Except that equipment furnished by subcontractors shall comply with requirements of pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the Work is not part of this Section.
 - 3. Permanent installation and hookup of the various utility lines are described in other Sections.

1.02 REQUIREMENTS

- A. The General (Prime) Contractor shall provide construction facilities and temporary controls when first needed, ready for use, to avoid delay in the work. Maintain, expand and modify as needed. Do not remove until no longer needed or replaced by authorized use of permanent facilities.
- B. Construction facilities and temporary controls shall consist of, but not be limited to:
 - 1. Temporary utilities such as heat, water, electricity, and telephone;
 - 2. Field office for the Prime Contractor's personnel, if needed.
 - 3. Sanitary facilities need to be provided by the contractor.
 - 4. Enclosures such as tarpaulins, temporary insulated enclosures, barricades, canopies, and temporary partitions.
 - 5. Temporary fencing of the construction site; to be determined by the contractor and it needs to be adequate for all areas disturbed by new work, including layout & material storage areas. (if required)
 - 6. Project sign (not required)
 - 7. Subcontractors shall provide their own field office, if desirable, located per the Prime Contractor. All utilities and telephone to be by contractor.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

1.04 REGULATIONS, STANDARDS AND INSTALLATION

- A. Regulations: Comply with requirements of local laws and regulations governing construction and local industry standards, in the installation and maintenance of temporary services and facilities.
- B. Standards: Comply with the requirements of NFPA Code 241, "Building Construction and Demolition Operations", the ANSI-A10 Series Standards for "Safety Requirements for Construction and Demolition", and the NECA National Joint Guideline NJG-6 "Temporary Job Utilities and Services".
- C. Installation: Use qualified tradesmen for installation. Locate temporary services and facilities where they will serve the project adequately and result in minimum interference with the work.

PART 2. PRODUCTS

A. Sanitary Facilities:

- 1. Contractor shall install single occupancy self-contained toilet units of the chemical, aerated recirculation or combustion type, properly vented and fully enclosed with glass fiber reinforced polyester shell.
- 2. Maintain in a sanitary condition at all times.
- 3. Construction personnel are not allowed to use existing building washroom facilities.
- 4. Contractor to coordinate location for toilet unit with owner.

B. First Aid Supplies:

- 1. The General Contractor and Subcontractors shall comply with governing regulations and recognized recommendations within the construction industry.

C. Temporary Fire Protection:

- 1. The Contractor and subcontractors shall keep their area clear of combustible debris. Each contractor, who is welding, cutting or performing any operation that may result in a fire, shall have an approved fire-extinguishing device in the area.

D. Temporary Controls:

- 1. The Contractor shall provide for site cleaning, dust control and maintenance of site traffic, including the Owner's use of the site.

E. Occupied Areas:

- 1. The facility will be occupied during the construction period. Provide proper safety barricades and fencing along with dust barriers to protect the facilities from exposure.

F. Use of Premises:

- 1. The facility will remain in full operation during the renovations. Barricades will need to be installed, and temporary signage will be needed to direct traffic around construction areas.

This will need to be coordinated with the owner, engineer & awarded contractor. Maintain circulation paths not being used for construction access. All workmen shall park their cars in areas designated by the Contractor's Superintendent as agreed to by the Owner.

2.02 TEMPORARY FENCING & BARRICADES

- A. The Contractor and each Subcontractor or Sub-subcontractor shall provide for their work: Barricades, Warning Signs: Comply with recognized standards and code requirements for erection of substantial barricades where needed to prevent accidents. Paint with appropriate colors and warning signs to inform personnel at the site and the public, of the hazard being protected against. Provide lighting where needed, including flashing warning lights where appropriate.
- B. Provide and maintain for the duration of construction a temporary fence if so indicated on the drawings, of a design and type needed to prevent entry onto the Work by the public.
- C. Interior barricades: (Not Required)

2.03 REMOVAL OF UTILITIES, FACILITIES AND CONTROLS

- A. Clean and repair damage caused by installation or use of temporary work.
- B. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 3. EXECUTION

3.01 MAINTENANCE AND REMOVAL

- A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.
- B. Establish a system for daily collection and disposal of waste materials. Enforce requirements strictly. Do not hold collected materials longer than 4 days.
 - 1. Burying or burning of waste materials on the site or washing waste material down sewers will not be permitted.
- C. Contractor shall maintain and enforce regulations covering all fire hazards, including smoking, and shall provide adequate fire extinguishers and other protective measures in proper locations. Additionally, enforcement of all applicable provisions of the Michigan Occupational Safety and Health Act shall be the responsibility of the General Contractor.

END OF SECTION 015000

SECTION 017000 - CONTRACT CLOSEOUT

1.0 GENERAL

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this specification. Also see Mechanical, Plumbing & Electrical specifications for any additional requirements.

1.1 CONTRACT CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and Work is substantially complete in accordance with Contract Documents and ready for Architect/Engineer's inspection. Identify any and all items that remain to be completed or corrected.
- B. After inspection by Owner and Architect, and if the Architect concurs that work is substantially completed, he shall prepare a Certification of Substantial Completion on A.I.A. Form G704, accompanied by Contractor's list of items to be completed or corrected, as verified and amended by the Architect, Owner and General Contractor.
- C. When the Contractor considers the work to be complete, he shall submit a final request for inspection. The Architect, Owner, and General Contractor shall inspect the work and if found to be acceptable, the Architect shall request the Contractor to make closeout submittals.
- D. If the Contractor does not have work completed in accordance with the contract documents and ready for final inspection, and the Architect must make an additional final inspection trip, the cost of this final inspection(s) shall be deducted from the contract.
- E. When Architect and Owner complete final inspection and approve the project, the Contractor shall submit final Application for Payment identifying total adjusted Contract Sum/Price, previous payments, and amount remaining due. If required, the Architect will prepare a final change order reflecting approved adjustments to the contract sum which were not previously made by change orders.

1.2 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. If the Contractor fails to clean up at the completion of the work, the Owner may do so and the cost thereof shall be charged to the Contractor(s) as the Architect so determines.
- C. Clean debris from site, roofs, gutters, downspouts, and drainage systems.
- D. Remove waste and surplus materials, rubbish, demolition materials, and construction facilities from the site. Burning of rubbish and debris on the premises will not be permitted at any time.
- E. Contractor shall repair all damaged site work as a result of demolition or construction.

1.3 ADJUSTING

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

1.4 PROJECT RECORD DOCUMENTS (For each Building)

- A. Maintain on site, one set of Contract Documents to be utilized for record documents. This requirement is for all trades, architectural, mechanical, and electrical.
- B. Record actual revisions to the Work. Record information concurrent with construction progress.

- C. Specifications: Legibly mark and record at each Product Section a description of actual Products installed.
- D. Record Documents and Shop Drawings: Legibly mark each item to record actual construction.
- E. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit to the Architect two (2) sets prior to final inspection, bound in 8-1/2 x 11 inch text pages, three D size ring binders with durable plastic covers. One flash drive with all documents (PDF) scanned. (Separate Binder for each Building)
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", and title of project.
- C. Internally subdivide the binder contents with permanent page dividers, logically organized, with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Contents:
 - 1. Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Operation and maintenance instructions, arranged by system.
 - 3. Project documents and certificates.

1.6 WARRANTIES

- A. Provide duplicate notarized copies.
- B. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.
- C. Submit to Architect prior to final Application for Payment. (can be combined but must separate by each building)

1.7 SPARE PARTS AND MAINTENANCE MATERIALS: See individual Specifications.

END OF SECTION 017000

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.

1.2 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.3 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.

1.4 WASTE MANAGEMENT PLAN

- A. Contractor to develop and submit a Waste Management Plan to the Owner for review and approval. It is the Owners intent to dispose of all waste in a sustainable way utilizing all local recycling and disposal sources available for demolition and construction waste.

1.5 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of selective demolition activities with starting and ending dates for each activity.
- C. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - 1. Before selective demolition, Owner will remove the following items:

- a. Systems Furniture
 - b. Removal and re-installation of existing server equipment to be phased with progress of work.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
 - D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
 - E. Storage or sale of removed items or materials on-site is not permitted.
 - F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.
 - G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Inventory and record the condition of items to be removed and salvaged.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off utilities with utility companies.
 - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION

- A. General: The intent is to remove the existing portions of west side exterior construction to expose the existing stud and foundation construction. Exterior materials shall be maintained and used for selecting new material with intent to match all aesthetic conditions – Siding, Roofing, Concrete Split Face units and sills, soffit panels and finish construction.
- B. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 4. Maintain fire watch during and for at least a half hour after flame-cutting operations.

5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
6. Dispose of demolished items and materials promptly.
- C. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- D. Removed and Salvaged Items:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- E. Removed and Reinstalled Items:
 1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 CLEANING

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to waste management plan.
 1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Footings
 - 2. Slabs-on-grade
- B. See Division 2 Section "Earthwork" for drainage fill under slabs-on-grade.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.
- C. Shop Drawings: For steel reinforcement.
- D. Material test reports or certificates.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- D. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- D. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain steel bars, cut bars true to length with ends square and free of burrs.

- E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I:
- B. Normal-Weight Aggregates: ASTM C 33, graded, 1-inch (25-mm) nominal maximum coarse-aggregate size.
 - 1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.
- D. Aggregate shall be non-reactive.
- E. Fly ash to be added to mix design, ASTM C 618 Class F.
- F. Air-Entraining Admixture: ASTM C 260.

2.4 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 - 1. Plastic Type: Polyethylene Vapor Retarder.
 - 2. Thickness: 6 mils minimum, unless noted otherwise.

2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

2.7 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Proportion normal-weight concrete mixture as follows:
 - 1. Refer to structural general notes.
 - 2. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

2.8 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork according to ACI 301 to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
- C. Control Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action

will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- C. Cold-Weather Placement: Comply with ACI 306.1.
- D. Hot-Weather Placement: Comply with ACI 301.

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view,.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in 1 direction.
 - 1. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces to receive trowel finish.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces exposed to view and to be covered with resilient flooring or carpet.
 2. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-foot- (3.05-m-) long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm)
- E. Polished Finish: Interior floors with no finished flooring shall receive finish with machine trowel to smooth "polished" finish.
- F. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- G. Broom Finish: Machine or hand trowel to smooth finish and light broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

3.9 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

3.10 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting: The Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
1. Testing Services: Tests shall be performed according to ACI 301.
- B. Cast-in-Place Concrete: Requirements for sampling and testing material.
1. Tests of cement and aggregates will be performed to ensure conformance with requirements stated herein.
 2. Three concrete tests cylinders will be taken for every 50 or less cubic yards of each class of concrete placed each day.

3. One additional test cylinder will be taken during cold weather and cured on site under the same conditions as concrete it represents.
4. One slump test will be taken for each set of test cylinders taken.

END OF SECTION 033000

SECTION 048100 - UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
 - 1. Concrete masonry units.
 - 2. Embedded Flashing.
 - 3. Cavity-Wall Insulation.
 - 4. Mortar and Grout.
 - 5. Reinforcing Steel.
 - 6. Masonry Joint Reinforcement.
 - 7. Ties and Anchors.

1.2 SUBMITTALS

- A. Product Data: For each masonry unit, accessory, and other manufactured product indicated.
- B. Shop Drawings: For masonry reinforcing bars; comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
- C. Samples: Showing the full range of colors and textures available for exposed masonry units.
- D. Material Test Reports: For each type of masonry unit, mortar, and grout required.
- E. Material Certificates: For each type of masonry unit required.

1.3 QUALITY ASSURANCE

- A. Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing on each type of unit required per test method indicated.
 - 1. Concrete Masonry Units: ASTM C 140.
 - 2. Mortar: For properties per ASTM C 270.
 - 3. Grout: For compressive strength per ASTM C 1019.
- B. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.
- C. Mockups: Build sample panels for each type of exposed unit masonry assembly to verify selections made under sample Submittals and to demonstrate aesthetic effects.
 - 1. Build mockups in sizes approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high by full thickness.
 - 2. Mockup location to be determined in the field by Architect and Owner.

1.4 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, 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.
 - 1. Extend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.

- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- 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 come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Construction: When the ambient temperature is within the limits indicated, use the following procedures:
 - a. 40 to 32 deg F (4 to 0 deg C): Heat mixing water or sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C).
 - b. 32 to 25 deg F (0 to -4 deg C): Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry.
 - c. 25 to 20 deg F (-4 to -7 deg C): Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F (4 deg C) if grouting. Use heat on both sides of walls under construction.
 - d. 20 deg F (-7 deg C) and Below: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F (4 deg C). Provide enclosures and use heat on both sides of walls under construction to maintain temperatures above 32 deg F (0 deg C) within the enclosures.
 - 2. Cold-Weather Protection: When the mean daily temperature is within the limits indicated, provide the following protection:
 - a. 40 to 25 deg F (4 to -4 deg C): Cover masonry with a weather-resistant membrane for 48 hours after construction.
 - b. 25 to 20 deg F (-4 to -7 deg C): Cover masonry with insulating blankets or provide enclosure and heat for 48 hours after construction to prevent freezing. Install wind breaks when wind velocity exceeds 15 mi./h (25 km/h).
 - c. 20 deg F (-7 deg C) and Below: Provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for 48 hours after construction.
 - 3. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. 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.

- F. When ambient temperature exceeds 100 deg F (38 deg C), or 90 deg F (32 deg C) with a wind velocity greater than 8 mph (13 km/h), do not spread mortar beds more than 48 inches (1200 mm) ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection.
- B. Products: Subject to compliance with requirements, provide the following products specified:
 - 1. Concrete Masonry Units:
 - a. 4" split face CMU to match existing adjoining construction,
 - b. Provide slope sill at top course as shown
 - c. Local manufacturer/supplier.

2.2 MASONRY UNITS

- A. Concrete Masonry Units: ASTM C 90.
 - 1. Unit Compressive Strength: 2000-psi- (13.1-MPa-) minimum, average net-area compressive strength for 3 units.
 - 2. Weight Classification:
 - a. Weight Classification: Above Grade: 125 pcf or greater.
 - b. Weight Classification: Below Grade; 125 pcf or greater.
 - 3. Special Shapes: Provide for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
 - a. Provide square edge unit, unless otherwise noted.
 - a. Provide bullnose corners as indicated on drawings.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Mortar Cement: ASTM C 1329.
 - 1. Available Products:
 - a. Blue Circle Cement; Magnolia Superbond Mortar Cement.
 - b. Lafarge Corporation; Lafarge Mortar Cement.
- D. Masonry Cement: ASTM C 91.
- E. Pigmented Mortar: For glazed concrete masonry units, use colored cement or cement-lime formulation as required to produce the color "white".
 - 1. Colored Mortar Cement:
 - a. Available Products:
 - 1) Blue Circle Cement; Magnolia Superbond Mortar Cement.
 - 2. Colored Portland Cement-Lime Mix:
 - a. Available Products:
 - 1) Blue Circle Cement; Eaglebond.
 - 2) Glen-Grey Corporation; Color Mortar Blend.
 - 3) Holnam, Inc.; Rainbow Mortamix Custom Color Cement/Lime.

- 4) Lafarge Corporation; Centurion Colorbond PL.
 - 5) Lehigh Portland Cement Co.; Lehigh Custom Color Portland/Lime.
 - 6) Riverton Corporation (The); Riverton Portland Cement Lime Custom Color.
3. Colored Masonry Cement:
- a. Available Products:
 - 1) Blue Circle Cement; Magnolia Masonry Cement.
 - 2) Essroc Materials, Inc.; Brixment-in-color.
 - 3) Holnan, Inc.; Rainbow Mortamix Custom color Masonry Cement.
 - 4) Lafarge Corporation; Centurion Colorbond.
 - 5) Lehigh Portland Cement Co.; Lehigh Custom Color Masonry Cement.
 - 6) National Cement Company, Inc.; Coosa Masonry Cement.
 - 7) Riverton Corporation (The); Flamingo Color Masonry Cement.
 - 8) Southdown, Inc.; Richcolor Masonry Cement.
- F. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch (6.5 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
- G. Aggregate for Grout: ASTM C 404.
- H. Water: Potable.

2.4 REINFORCING

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, Grade 60 (Grade 400).
- B. Masonry Joint Reinforcement: ASTM A 951; mill galvanized (Class I, 0.1 oz. zinc-coating per Sq. Ft.), carbon-steel wire for interior walls and hot-dip galvanized, (Class B-2, 1.5 oz. zinc coating per Sq. Ft.), carbon-steel wire for exterior walls.
1. Wire Size for Side Rods: W1.7 or 0.148-inch (3.8-mm) diameter.
 2. Wire Size for Cross Rods: W1.7 or 0.148-inch (3.8-mm) diameter.
 3. Single-Wythe Masonry: Use ladder type with single pair of side rods and cross rods spaced 16 inches (407 mm) o.c.
 4. Multiwythe Masonry: Use ladder type with perpendicular cross rods spaced 16 inches (407 mm) o.c. and 1 side rod for each face shell of hollow masonry units more than 4 inches (100 mm) in width, plus 1 side rod for each wythe of masonry 4 inches (100 mm) or less in width.
 5. For Cavity wall masonry, provide type as follows:
 - a. Adjustable (2-piece) type with single pair of side rods and cross ties spaced 16 inches o.c. and with separate adjustable veneer ties engaging the cross ties. Cross ties are either U-shaped with eyes or rectangular. Space side rods for embedment within each face shell of backup wythe and size adjustable ties to extend at least halfway through outer wythe but with at least 5/8-inch cover on outside face.
- C. Provide joint reinforcement at the top and bottom of all banding. When different materials are used in conjunction with each other a differential movement may occur. Provide reinforcement at these situations as recommended per the Masonry Institute of Michigan.

2.5 TIES AND ANCHORS

- A. Materials, General: As follows, unless otherwise indicated:
1. Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating for exterior walls and Class 1 coating for interior walls.

2. Galvanized Steel Sheet: ASTM A 366/A 366M cold-rolled, carbon-steel sheet hot-dip galvanized after fabrication to comply with ASTM A 153, at exterior walls; and ASTM A 653/A 653M, G60 (Z180), commercial-quality, steel sheet zinc coated by hot-dip process on continuous lines before fabrication at interior walls.
- B. Bent Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide, made from 3/16-inch- (4.8-mm-) diameter, galvanized steel wire.

2.6 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing and Accessories: Fabricated to complying with requirements specified in the following requirements:
 1. Stainless Steel: Fabricate from stainless steel flashings in thicknesses indicated, but not less than 0.0156 inch thick.
 2. Fabricate metal drip flashings from sheet metal indicated above. Extend out from face of the wall, with a hemmed outer edge bent down 45 degrees an up face of back-up a minimum of 2 inches.
- B. Asphalt-Coated Copper Flashing: Manufacturer's standard product consisting of sheet copper of weight indicated below, coated with flexible asphalt.
 1. Weight: 3 oz./sq. ft. and 5 oz./sq. ft.
 2. Application: Use 5 oz./sq. ft. over stainless steel at all horizontal wall openings and 3 oz./sq. ft. only at wall base flashing.
- C. Solder for Sheet-Metal Flashings: Stainless steel, as recommended by manufacturer of flashing material for use indicated.
- D. Bituminous Coating: Cold applied asphalt mastic, SPCC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components and other impurities.
- E. Adhesives, Primers, and seam Tapes for Flashing: Flashing manufacturer's standard products or products recommended by the flashing manufacturer for bonding flashing sheets to each other and to substrates.
 1. Flashing Terminations: 1/8 inch by 1 inch stainless steel termination bars.
- F. Products: Subject to compliance with requirements, provide one of the following:
 1. Metal Flashing (stainless steel)
 - a. Hohmann and Barnard, Inc.
 - b. Heckmann Building Products, Inc.
 - c. Sandell Manufacturing Company, Inc.
 2. Asphalt-Coated Copper Flashing:
 - a. Cop-A-Cote; AFCO Products, Inc.
 - b. Type ACC-Asphalt Bituminous Coated; Phoenix Building Products.
 - c. Coated Copper Flashing; Sandell Manufacturing Co., Inc.
 - d. Copperseal; York Manufacturing Inc.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene or urethane.
- B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- C. Cavity Drainage Material: Thickness as required to fill the width of the airspace by ten inches high, free-draining mesh; made from polyethylene strands.
 1. Available Products:

- a. Advanced Building Products, Inc.; Mortar Break.
 - b. CavClear; CavClear Masonry Mat.
 - c. Mortar Net USA, Ltd.; Mortar Net.
 - d. Polytite Manufacturing Corp.; Mortar Stop.
- D. Vertical Control and Expansion Joints: The sealant for the vertical joint shall match the brick/block color as selected and approved by the Architect.
- E. Horizontal Joints: The sealant for the horizontal joint shall match the mortar color as selected and approved by the Architect.
- F. Weep Hole Insert: Provide a 2-1/2" high, rectangular weep hole insert manufactured from polypropylene in a honeycomb design similar to #QV-Quadro-Vent by Hohmann & Barhard, Inc. Color to be Gray.
- G. Adhesives for Thin Brick: Recommended adhesives include, Loctite Power Grab or Liquid Nails Marble and Granite.

2.8 CAVITY-WALL INSULATION

- A. Extruded-Polystyrene Board Insulation with Increased R-Value: Rigid, cellular, polystyrene thermal insulation with closed cells and integral high-density skin; formed by the expansion of polystyrene base resin with a carbon-black filler in an extrusion process to comply with ASTM C 578, Type IV, but with an aged thermal resistance (R-value) for 1-inch (25-mm) thickness of 5.6 deg F x h x sq. ft./Btu at 75 deg F (1.0 K x sq. m/W at 24 deg C) at 5 years.
1. Manufacturer: Dow Chemical
 2. Product: Cavitymate Ultra
 3. Thickness: 1-3/4 inch.
- B. Adhesive: Type recommended by insulation board manufacturer for application indicated.

2.11 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of 1/2-cup (0.14-L) dry measure tetrasodium polyphosphate and 1/2-cup (0.14-L) dry measure laundry detergent dissolved in 1 gal. (4 L) of water.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, unless otherwise indicated. Do not use calcium chloride in mortar or grout.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification.
1. Extended-Life Mortar for Unit Masonry: Mortar complying with ASTM C 1142 may be used instead of mortar specified above, at Contractor's option.
 2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
 3. For masonry below grade, in contact with earth, and where indicated, use Type M.
 4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls, use Type S.
 5. For interior load-bearing walls, use Type S.
 6. For un-reinforced interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
 7. For reinforced non load-bearing partition walls, use Type S.
- C. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 5 of ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143.

2.13 SOURCE QUALITY CONTROL

- A. Brick Tests: For each type and grade of brick indicated, units will be tested according to ASTM C 67.
- B. Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cut masonry units with motor-driven saws. 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.
- B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
- C. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:
 1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet (6 mm in 6 m), nor 1/2 inch (12 mm) maximum.
 2. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 feet (6 mm in 6 m), nor 1/2 inch (12 mm) maximum.

3.2 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Lay exposed masonry in bond pattern indicated; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
 1. One-half running bond with vertical joints in each course centered on units in courses above and below.
 2. "Stacked" bond pattern for glazed concrete masonry units and where indicated on drawings.
- C. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- D. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- E. Stopping and Resuming Work: In each course, rack back 1/2 unit length for one-half 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.
- F. Fill collar joint between glazed concrete masonry units with grout full height of collar joint. Fill cores of concrete masonry unit where collar joint is filled solid.
- G. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

- H. Where intersecting interior walls are installed, the second wall built shall have the abutting mortar joint raked back and the void filled with a backer rod and joint sealant similar to a control joint.
- I. Provide joint reinforcing at all wall intersections.
- J. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- K. Fill hollow metal frames at masonry wall solidly with grout, unless otherwise indicated.
 - 1. At exterior frames, fill hollow metal frames with foam insulation to act as a thermal break between frame and masonry.

3.3 MORTAR BEDDING AND JOINTING

- A. Lay hollow 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 pilasters, 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.
- B. Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
 - 1. At cavity walls, bevel beds away from cavity, to minimize mortar protrusions into cavity.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.

3.4 CAVITIES

- A. Keep cavities clean of mortar droppings and other materials during construction.
 - 1. Use wood strips temporarily placed in cavity to collect mortar droppings. As work progresses, remove strips, clean off mortar droppings, and replace in cavity.
- B. Coat cavity face of backup wythe to comply with Division 7 Section "Bituminous Dampproofing."

3.5 MASONRY JOINT REINFORCEMENT

- A. Provide continuous masonry joint reinforcement as indicated. Install with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
- B. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections.

ANCHORING MASONRY

- C. Anchor masonry veneers to concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
 - 1. Fasten each anchor section to concrete and masonry backup with two metal fasteners of type indicated.
 - 2. Embed tie sections, connector sections and continuous wire in masonry joints. Provide not less than 2 inches (50 mm) of air space between back of masonry veneer and face of sheathing.
 - 3. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and 24 inches (610) o.c. horizontally with not less than 1 anchor for each 2.67 sq. ft. (0.25 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.

3.6 LINTELS

- A. Refer to Division 5 Section "Metal Fabrication" for steel lintels.
- B. Provide minimum bearing as indicated on lintel schedule, at each jamb. See Structural Drawings.

3.7 FLASHING, WEEP HOLES, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows:
 - 1. At masonry-veneer walls, extend flashing from exterior face of veneer, through the veneer, up face of back-up at least 2 inches. Provide asphalt-coated flashing over wall and flat portion of drip flashing, stop material 1/2 inch from drip edge. Terminate asphalt coated flashing on masonry back-up with 1/8 by 1 inch stainless steel termination bar
 - 2. Provide a continuous bead of sealant between flashing and steel lintel.
- C. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
 - 1. Form weep holes by keeping head joints free and clear of mortar.
 - 2. Space weep holes 16 inches o.c.
 - 3. Place cavity drainage material immediately above flashing in cavities.
 - 4. Install weep hole inserts with screens.
- D. Install reglets and nailers for flashing and other related construction where shown to be built into masonry.

3.8 MASONRY INSULATION INSTALLATION

- A. Cavity Wall Insulation Installation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
 - 1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.
- B. Foam insulation shall be by a manufacturer certified applicator and in accordance with the manufacturer's methods and instructions.
 - 1. Mix two component materials using resin and foaming agent, properly ratioed as per manufacturer's instructions.

2. Install foam insulation in no greater lifts than 4 feet.

3.9 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.
 1. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.10 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as 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. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake joints in exposed faces.
- C. Form expansion joints in brick made from clay or shale as follows:
 1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints, if any.
 2. Build flanges of factory-fabricated, expansion-joint units into masonry.
 3. Build in joint fillers where indicated.
 4. Form open joint of width indicated, but not less than 3/8-inch for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants." Keep joint free and clear of mortar.
- D. Build in horizontal, pressure-relieving joints where indicated; construct joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 7 Section "Joint Sealants".
 1. Locate horizontal pressure-relieving joints minimum 8" from wall openings, full height, approximately 20'-0" on centers.

3.11 CLEANING

- A. Clean unit masonry by dry brushing to remove mortar fins and smears before tooling joints, as work progresses.
- B. After mortar is thoroughly set and cured, clean exposed masonry as follows:
 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 2. Protect adjacent surfaces from contact with cleaner.
 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
 4. Clean brick by the bucket-and-brush hand-cleaning method described in BIA Technical Notes No. 20, using job-mixed detergent solution.
 5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.

3.12 MASONRY WASTE DISPOSAL

- A. 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.

END OF SECTION 048100

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Shear wall panels.
4. Wood blocking, cants, and nailers.
5. Wood furring and grounds.
6. Plywood backing panels.
7. Platform Framing Requirements For Golf Simulator System.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Engineered wood products.
3. Shear panels.
4. Power-driven fasteners.
5. Powder-actuated fasteners.
6. Expansion anchors.
7. Metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship for the following:

1. Dimension lumber framing.
2. Laminated-veneer lumber.
3. Parallel-strand lumber.
4. Rim boards.
5. Miscellaneous lumber.

- B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Provide dressed lumber, S4S, unless otherwise indicated.
- C. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less, 19 percent for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.
- D. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
 - 1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWWA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
 - 5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not

extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. Application: Treat items indicated on Drawings, and the following:
1. Concealed blocking.
 2. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions: Construction or No. 2 or better grade.
1. Application: Interior partitions not indicated as load-bearing.
 2. Species:
 - a. Mixed southern pine; SPIB.
 - b. Northern species; NLGA.
 - c. Eastern softwoods; NeLMA.
 - d. Western woods; WCLIB or WWPA.
- B. Framing Other Than Non-Load-Bearing Interior Partitions: Construction or No. 2 grade.
1. Application: Framing other than interior partitions not indicated as load-bearing.
 2. Species:
 - a. Hem-fir (north); NLGA.
 - b. Southern pine; SPIB.
 - c. Douglas fir-larch; WCLIB or WWPA.
 - d. Mixed southern pine; SPIB.
 - e. Spruce-pine-fir; NLGA.
 - f. Douglas fir-south; WWPA.
 - g. Hem-fir; WCLIB or WWPA.
 - h. Douglas fir-larch (north); NLGA.
 - i. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
- C. Framing Other Than Non-Load-Bearing Interior Partitions: Any species and grade with a modulus of elasticity of at least 1,300,000 psi (8970 MPa) and an extreme fiber stress in bending of at least 850 psi (5.86 MPa) for 2-inch nominal (38-mm actual) thickness and 12-inch nominal (286-mm actual) width for single-member use.

2.5 ENGINEERED WOOD PRODUCTS

- A. Engineered Wood Products, General: Products shall contain no urea formaldehyde.
- B. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.

1. Extreme Fiber Stress in Bending, Edgewise: 2600 psi (17.9 MPa) for 12-inch nominal- (286-mm actual-) depth members.
 2. Modulus of Elasticity, Edgewise: 1,900,000 psi (13 050 MPa)
- C. Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Provide units complying with material requirements of and with structural capacities established and monitored according to ASTM D 5055.
1. Web Material: Either oriented strand board or plywood, complying with DOC PS 1 or DOC PS 2, Exposure 1.
 2. Structural Properties: Provide units with depths and design values not less than those indicated.
 3. Provide units complying with APA PRI-400, factory marked with APA trademark indicating nominal joist depth, joist class, span ratings, mill identification, and compliance with APA standard.
- D. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research/evaluation report for I-joists.
1. Material: product made from any combination solid lumber, wood strands, and veneers.
 2. Thickness: 1 inch (25 mm), 1-1/8 inches (28 mm) and 1-1/4 inches (32 mm).
 3. Provide performance-rated product complying with APA PRR-401, rim board grade, factory marked with APA trademark indicating thickness, grade, and compliance with APA standard.

2.6 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
 2. Nailers.
 3. Furring.
 4. Grounds.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine; No. 2 grade; SPIB.
 2. Eastern softwoods; No. 2 Common grade; NeLMA.
 3. Northern species; No. 2 Common grade; NLGA.
 4. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.

2.7 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.
1. Plywood shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.8 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
- B. Power-Driven Fasteners: NES NER-272.
- C. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

2.9 METAL FRAMING ANCHORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cleveland Steel Specialty Co.
 - 2. KC Metals Products, Inc.
 - 3. Phoenix Metal Products, Inc.
 - 4. Simpson Strong-Tie Co., Inc.
 - 5. USP Structural Connectors.
- B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 - 1. Use for interior locations unless otherwise indicated.

2.10 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- D. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Shear Wall Panels: Install shear wall panels to comply with manufacturer's written instructions.

- F. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- G. Do not splice structural members between supports unless otherwise indicated.
- H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- I. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.

3.2 PROTECTION

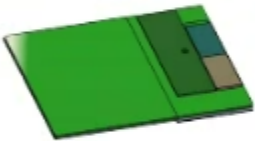
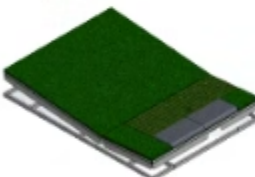
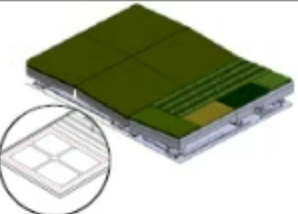



- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

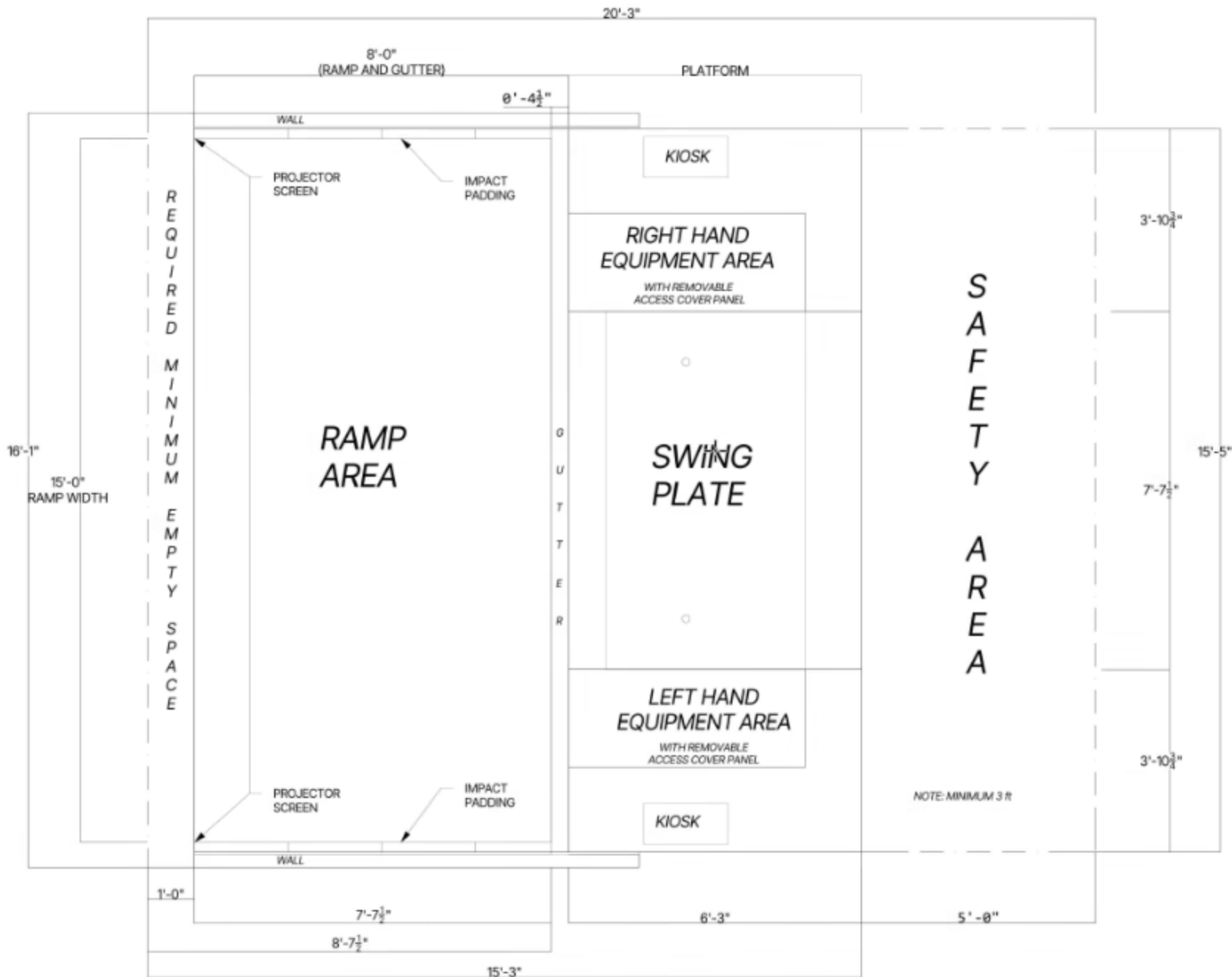
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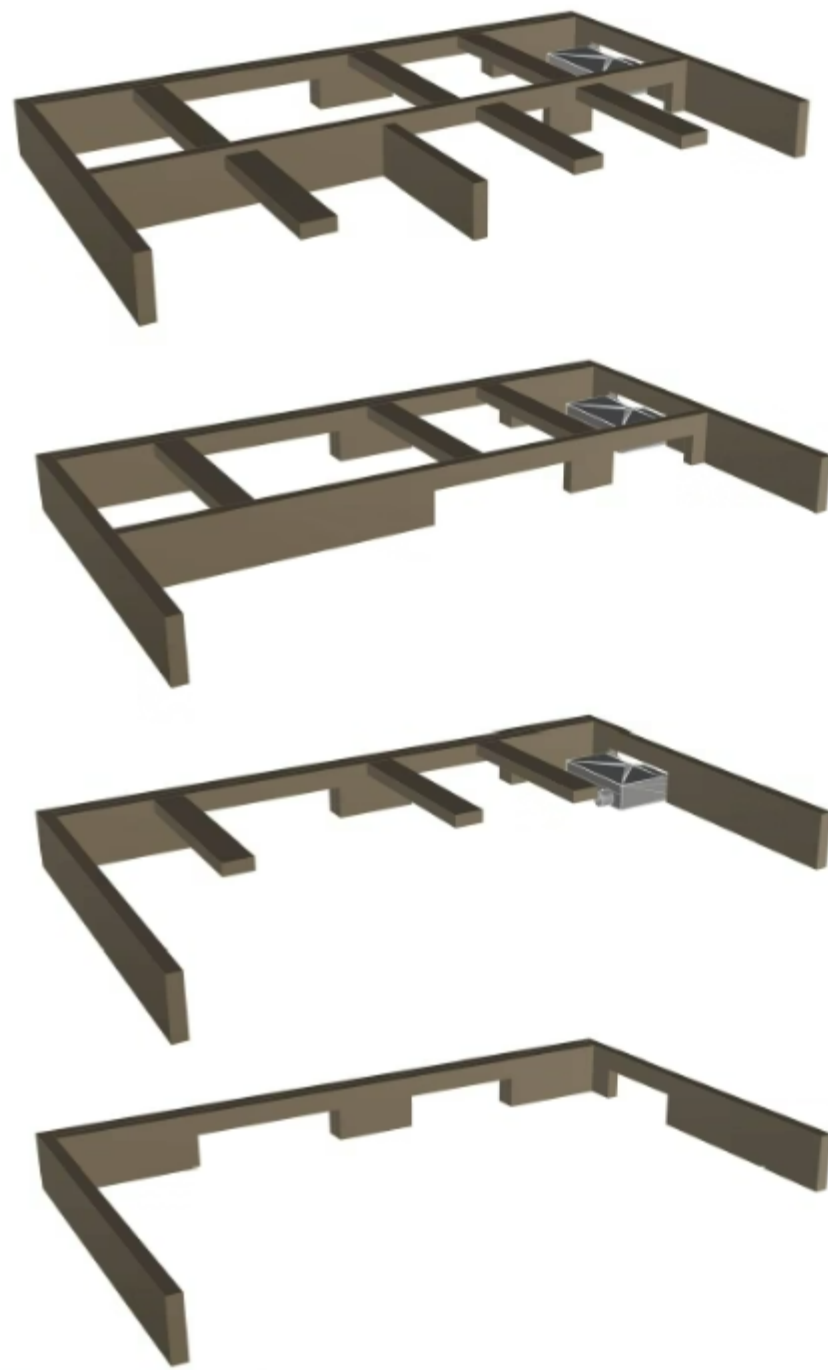


EQUIPMENTS BY GOLFZON:

DIV.	IMAGE	ITEM	QTY.
KIOSK W/SENSOR CAMERA, RS(FOR RIGHT)		KIOSK CASE UPPER & LOWER PART - 545Wx215Dx1,543H - 32" TOUCH MONITOR, 1920x1080 FHD UPPER PART 1. PC SYSTEM: CPU, MB, VGA, RAM, SSD 2. 32" TOUCH MONITOR ASSY - 1920x1080 FHD 3. SWING MOTION CAMERA ASSY(USB) LOWER PART 1. SENSOR CAMERA, RS ASSY - SENSOR 640H 2. SENSOR CAMERA LIGHT ASSY - LIGHT PROTECTION COVER(R) - LIGHT CABLE 2'/10M 3. SENSOR CONTROLLER 4. EQUIPPED LOG-IN ASSY(RFID) 5. HUB, SERIAL & POWER CABLES 6. KIOSK SUPPORTS 7. EARTH CABLE: 3EA 8. CALIBRATION JIG	1 SET
KIOSK W/SENSOR CAMERA, LS(FOR LEFT)		KIOSK CASE LOWER - 545Wx215Dx950H 1. SENSOR CAMERA, LS ASSY - SENSOR HEIGHT 640H 2. SWING MOTION CAMERA ASSY(USB) 3. SENSOR CONTROLLER	1 SET
SENSOR CAMERA, LT/RT @CEILING		1. SENSOR CAMERA, LT/RT ASSY - SENSOR HOLE CUT: D320(12.75") - SENSOR CAM: D370(14.5"), R185(7.25") - SENSOR CAM'S CAP: D420(16.5") 2. SENSOR CAMERA LIGHT ASSY - LIGHT PROTECTION COVER(L/R) - LIGHT CABLE(TOP) 10M/ 15M 3. SENSOR CAMERA BRACKET 4. LAN CABLE(CAMERA TO KIOSK) - UTP STP CAT6: 2M, 10M/ L: 2M, 15M)	1 SET (BOTH HANDED - 2 SETS)
2.0CH SPEAKERS		TYP: BR-1000 - 2.0CH 3.5MM TO PC	1 SET
FRONT(HITTING) SCREEN		1. BASIC TYPE(FIRE RETARDANT) - FRONT & REAR SCREEN(BLACK-OPTIONAL) 2. LOW NOISE SCREEN(FIRE RETARDANT) - FRONT & REAR SCREEN(BLACK-OPTIONAL) 3. INSTALLATION: 2 TYPES - WING VELCROS - GROMMETS W/CLIPS, ZIP TIES	1 SET - 2 TYPES (BASIC&LOW NOISE) * CONSULT W/GOLFZON REP.
PROJECTOR		1. PROJECTOR(FHD 16:10) - 6-13KG, 300-480W(AS PER) 2. PROJECTOR BRACKET 3. HDMI CABLE(TO KIOSK, 15M TYP.)	1 SET

DIV.	IMAGE	ITEM	QTY.
SWING PLATE - 4 TYPES (OPTIONAL)		STANDARD MAT FRAME - 2,888Wx1,302Dx56H(R.H.) - 4,504Wx1,321Dx56H(B.H.) 1. STANCE MAT - 1,188Wx1,302Dx39H(R.H.) - 1,088Wx1,302Dx39H(B.H.) 2. HITTING MAT - 569Wx1,302Dx39H/ 25SETS(B.H.)	1 SET * CONSULT W/GOLFZON REP.
		BASIC SWING PLATE - 1,800Wx1,300D(R.H.) - 2,300Wx1,300D(B.H.) 1. STANCE MAT - 878Wx1,297Dx40H(R.H.) - 1,087Wx1,297Dx40H(B.H.) 2. HITTING MAT - 708Wx1,296Dx65H/ 25SETS(B.H.)	
		DUAL SWING PLATE W/PUTTING GUIDE 1. SLOPE(14 TYPES OF UNDULATION) - 1,800Wx1,300Dx128-322H,~300KG(R.H.) - 2,300Wx1,300Dx128-322H,~380KG(B.H.) 2. DUAL SWING PLATE CONTROLLER - R/B 450Wx290Dx70H 3. LED PUTTING GUIDE - SERIAL PORT(9-PIN)/ USB - 350Wx7Dx13H	
		MOTION SWING PLATE W/BALANCE PLATE 1. SLOPE(112 TYPES OF UNDULATION) - 1,800Wx1,304Dx128-322H,~300KG(R.H.) - 2,297Wx1,308Dx128-322H,~380KG(B.H.) 2. MOTION SWING PLATE CONTROLLER - R/B 462Wx300Dx82H 3. LED PUTTING GUIDE : 350Wx7Dx13H 4. BALANCE PLATE W/FSR - 493Wx505Dx5H / 4EA 5. BALANCE PLATE CONTROLLER - R/B 235Wx132Dx23H / MAX 60FPS	
		COMMONS 1. STANCE MAT(MAX. LOADS ~150KG) 2. HITTING MAT(MAX. LOADS ~80KG) - FAIRWAY MAT(800-1,080Wx350D) RUSSELL 17MM, POLYPROPYLENE 100% - TOUR ROUGH MAT(400Wx230Dx87/85H) - DUAL BUNKER MAT(400Wx230Dx82H) 3. SIDE/ SAFE/ CORNER GUIDE & CABLES	
KEYPAD SYSTEM - 2 TYPES (OPTIONAL)		ATTACHED TYPE - 645Wx260Dx85H/ 10 SILICON BUTTONS	1 SET (BOTH HANDED - 2 SETS)
		BUILT-IN TYPE - 408Wx196Dx32H/ 6 SILICON BUTTONS - OPENING: 410Wx200D(18.25"x8")	1 SET (BOTH HANDED - 2 SETS)
BALL SUPPLY & COLLECTOR SYSTEM		1. AUTO TEE-UP ASSEMBLY - LR 100Wx140Dx140-164H 2. AUTO TEE-UP CONTROLLER(BLUE) - LR 260Wx250Dx65H 3. BALL COLLECTOR(ROTATOR TYPE) - LR 300Wx332Dx87H 4. HOSE: I-TYPE, ID 45x1,200L 5. CABLES: 6M TYP. 6. RUBBER TEE(SLIM TEE)	1 SET (BOTH HANDED - 2 SETS)

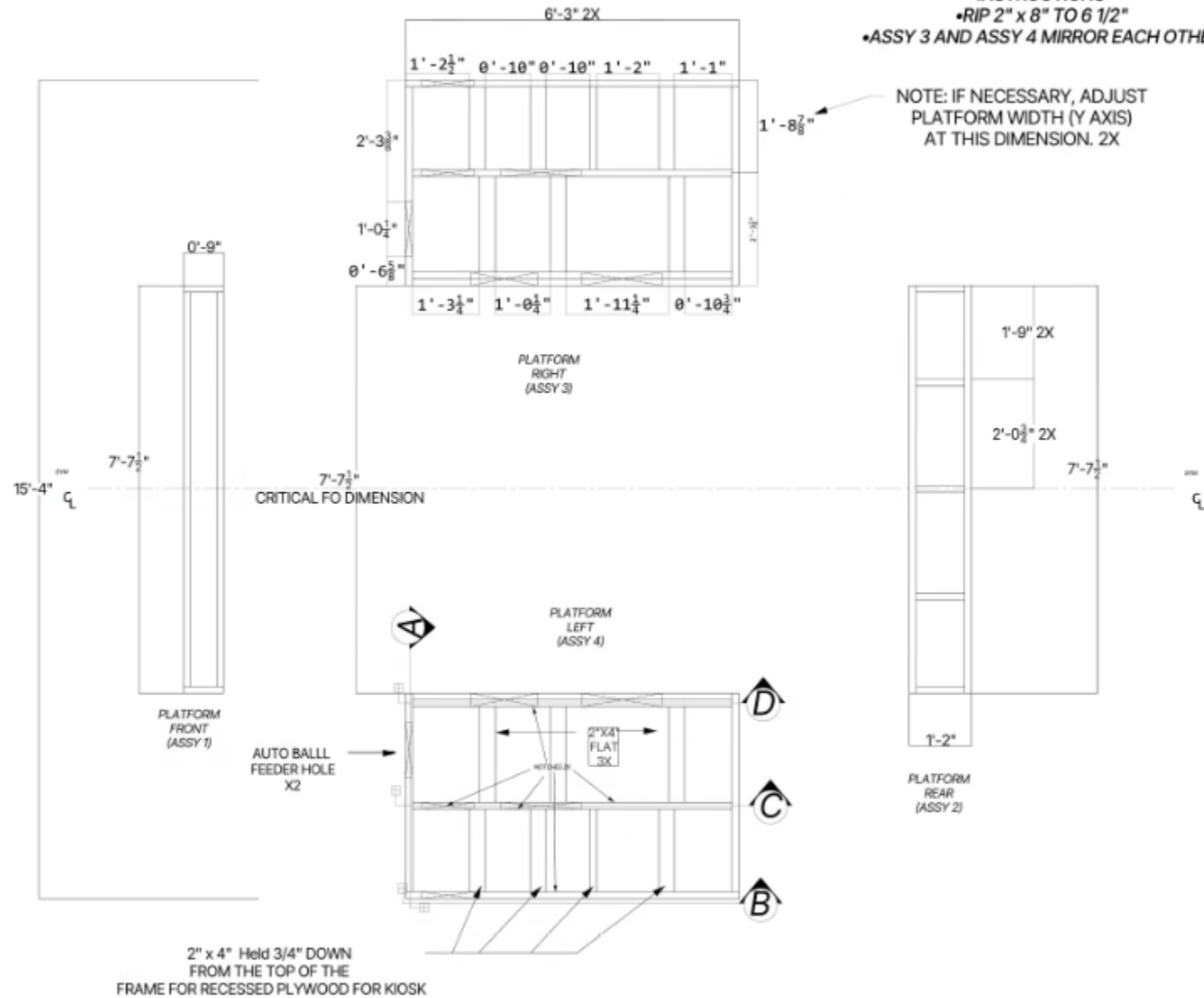
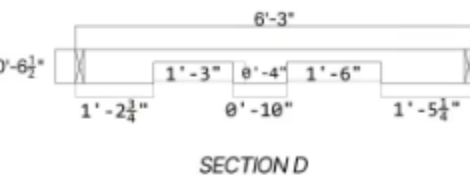
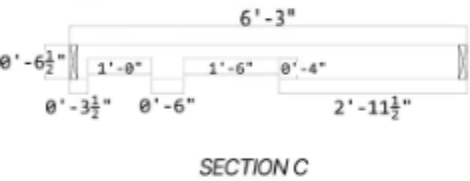
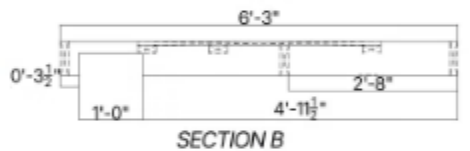
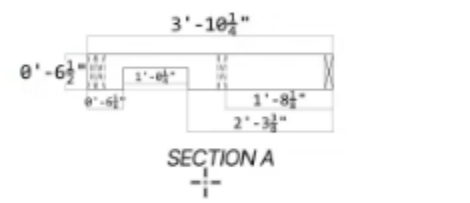




IMPORTANT:

91 1/2" FO IS A CRITICAL DIMENSION AS SWING PLATE DIMENSIONS ARE FIXED AT 91" X 51 1/2" ANY AND ALL DIMENSIONAL ADJUSTMENTS FOR FLOOR COVERINGS MUST BE DETERMINED PRIOR TO FRAMING.

- NOTE:**
- SEMI-EXPLODED VIEW. BUILD EACH OF 4 ASSEMBLIES SEPARATELY
 - ASSEMBLE UNIT ACCORDING TO INSTRUCTIONS
 - RIP 2" x 8" TO 6 1/2"
 - ASSY 3 AND ASSY 4 MIRROR EACH OTHER



NOTE: IF NECESSARY, ADJUST PLATFORM WIDTH (Y AXIS) AT THIS DIMENSION. 2X

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FRAMING PLAN/VIEW / PLATFORM (TUB WALL RETURN)

DRAWN BY: PH

CHECKED BY:

REV: FEB-17-26

DATE: JAN-05-26

SCALE: 1" = 10'

SHEET NO.:

S404

NOTE:

1. ALL DIMENSIONS: TYPICAL 2X

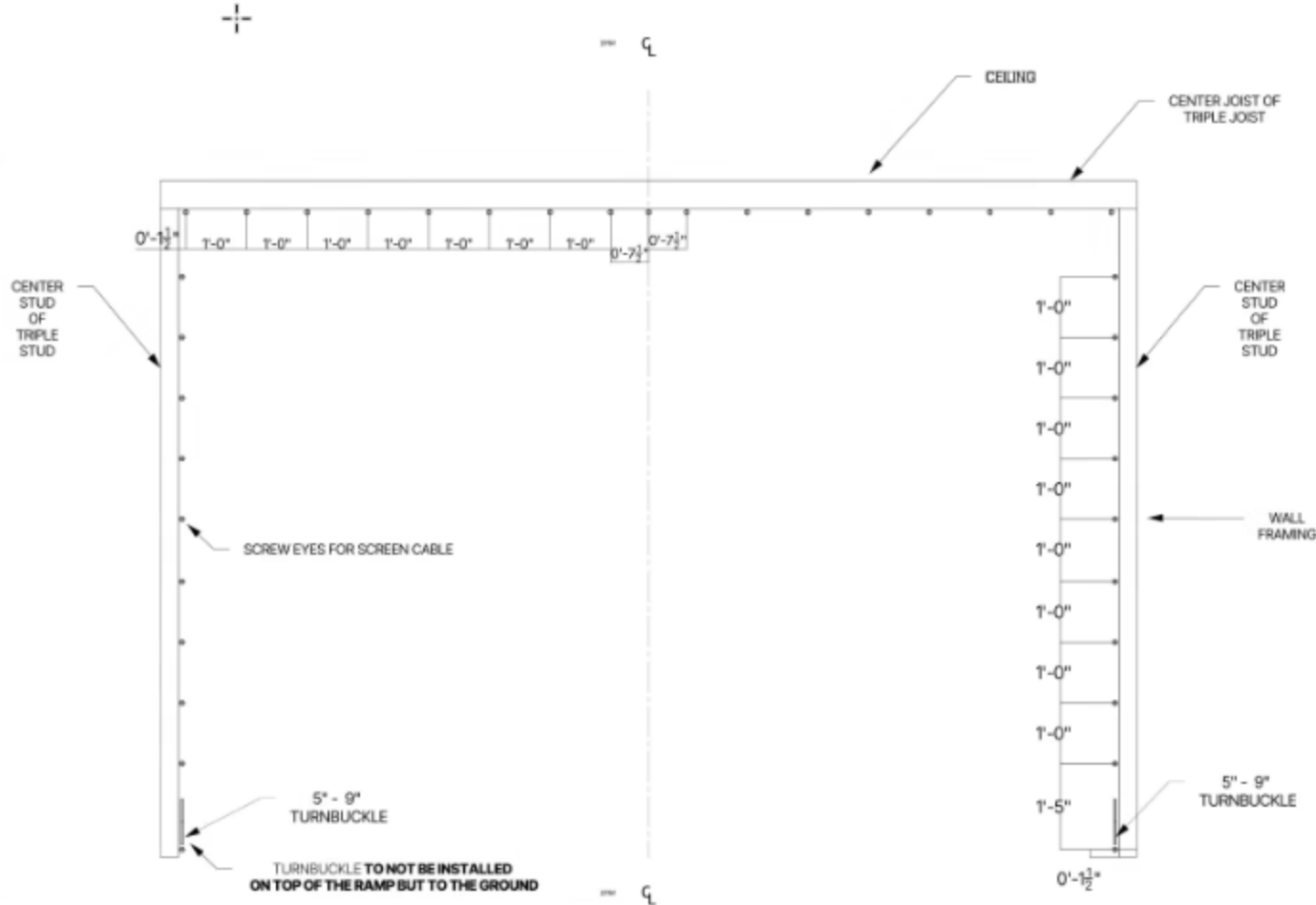
2. SCREW EYES ARE ATTACHMENT POINTS FOR SCREEN WHEN IT'S INSTALLED

3. SCREW EYES: 3/16" X 2" ZINC PLATED LAG THREAD SCREW EYE: 41X

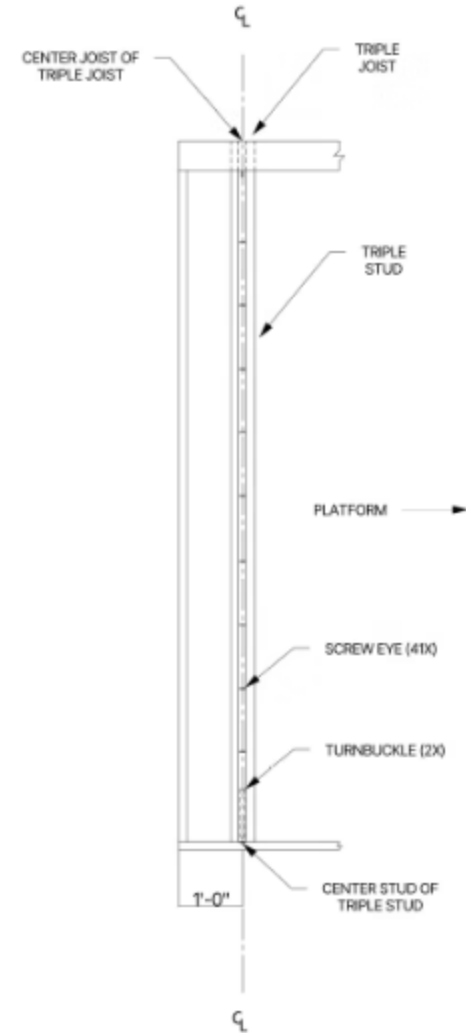
4. INSTALL SCREW EYES AT CENTER OF CENTER STUDS

AND CENTER JOIST OF TRIPLE STUDS AND TRIPLE JOISTS RESPECTIVELY

5. TURNBUCKLES: 2X



FRONT ELEVATION



LEFT SIDE ELEVATION

V. CRITICAL ITEMS TO REVIEW

Critical Requirements, Dimensions, Specifications, Materials, & System Activation

POWER REQUIREMENTS –

- 120V 60Hz – Dedicated 20AMP circuit per booth (see pages 38 and 39 for the power consumption chart)

CONDUITS –

- Customer required to install 2" conduit
- One dedicated 2" conduit per ceiling sensor (1 or 2 total) from under platform to above ceiling with a pull string per booth
- One dedicated 2" conduit for the projector.
- Conduits to terminate within the hatched opening on the right side of the platform and 6" to 12" within the ceiling sensors and the projector
- EMT or PVC type electrical conduit is highly recommended

OUTLETS (per booth) -

See required location of electrical outlets on pages 36 and 37.

T4VBD and NX requirements: (Dual Handed with Swing Plate)

1. 10 outlets under platform (4 on the left side and 6 on the right side)
 1. (2 quads and 1 duplex).
 2. 2 outlets near the projector (1 duplex)
- * T4V only requires 4 outlets on the right.
 - * T4VD only requires 6 outlets on the right.
 - * T4VB only requires 4 outlets on the right and 4 outlets on the left.

SCREEN

- Golfzon will order the screen once the customer has the walls framed and eye screws are installed.
- The customer will send the Golfzon PM the screen dimensions:
- **SEE PAGE 22 FOR MEASURING INSTRUCTIONS**
- Screens are custom manufactured and take approximately 4 weeks from the day the order is placed to on-site arrival

Screen Hardware (Provided by customer)

- See **pages 21-25**
- Eye screws spaced 12" apart vertically and horizontally and 6" apart in the corners.
- Turn buckles at bottom
- Top corner closer together
- 3/16" galvanized wire through eye bolts

PROJECTORS

General Mounting Location – Customer is responsible for creating the mounting surface.

- **Epson Standard:** Location of projector is 16"-18" off right wall and depth is approx. **1.5 x screen width**
- **Sony & Epson Short Throw:** Location of projector is 16"-18" off right wall and depth is approximately **.9 x the screen width**
- **Mounts:** Must have a solid ceiling or ceiling feature to mount the projector. The projectors weigh about 26 pounds and do require adequate framing (3/4" plywood) or a Unistrut. If mount extensions are necessary, mount extensions must be 1.5" NPT threaded pipe. **See Page 26.**
- **Projector Height:** The projector should be located at approximately the same height as the ceiling pads (interior ceiling height of the booth).

CEILING SENSORS

- 12.5" hole directly above the front corner of the dual swing plate
- Both ceiling sensors and the projector require an access panel/hatch for installation and maintenance (we recommend 16"x16")
- Requires a minimum of 8" of space in the ceiling to allow for the housing of the sensors and wiring
- Maximum Height of ceiling sensors is 11 feet from the floor and not the platform surface
- Minimum Height of ceiling sensors is 10' 8" feet from the floor and not the platform surface

Ceiling Sensor with trim cover



12.5" Rough Opening



7" minimum required ceiling space



SECTION 061600 SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wall sheathing.
 - 2. Roof sheathing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preserved treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For following products, from ICC-ES:
 - 1. Preservative-treated plywood.
 - 2. Fire-retardant-treated plywood.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory

2.2 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Certified Wood: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
 - 1. Plywood.
- C. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.

2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction, Use Category UC3b for exterior construction.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 WALL SHEATHING

- A. Plywood Wall Sheathing: Exterior, Structural I sheathing.

2.5 ROOF SHEATHING

- A. Plywood Roof Sheathing: Exposure 1, Structural I sheathing.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 - 2. Use Type 304 stainless steel where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or high relative humidity.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
 - 3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."
- D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Wall and Roof Sheathing:
 - a. Nail to wood framing.
 - b. Space panels 1/8 inch (3 mm) apart at edges and ends.

3.3 CEMENTITIOUS BACKER UNIT INSTALLATION

- A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

END OF SECTION 061600

SECTION 0617 0 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wood roof trusses.
 - 2. Wood truss bracing.

1.2 ACTION SUBMITTALS

- A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.
- B. Shop Drawings: Show fabrication and installation details for trusses.
 - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
 - 2. Indicate sizes, stress grades, and species of lumber.
 - 3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
 - 4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
 - 5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
 - 6. Show splice details and bearing details.
- C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Evaluation Reports: For the following, from ICC-ES:
 - 1. Metal-plate connectors.
 - 2. Metal truss accessories.

1.4 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
 - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an

independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction and is certified for chain of custody by an FSC-accredited certification body.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Division 01 Section "Quality Requirements," to design metal-plate-connected wood trusses.
- B. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.

2.2 DIMENSION LUMBER

- A. Certified Wood: For metal-plate-connected wood trusses and permanent bracing, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Provide dry lumber with 19 percent maximum moisture content at time of dressing.
- C. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Division 06 Section "Rough Carpentry".

2.3 METAL CONNECTOR PLATES

- A. Manufacturers: Subject to compliance with requirements, provide products by the one of the following:
 - 1. Alpine Engineered Products, Inc.; an ITW company.
 - 2. Cherokee Metal Products, Inc.; Masengill Machinery Company.
 - 3. CompuTrus, Inc.
 - 4. Eagle Metal Products.
 - 5. Jager Building Systems, Inc.; a Tembec/SGF Rexfor company.
 - 6. MiTek Industries, Inc.; a subsidiary of Berkshire Hathaway Inc.
 - 7. Robbins Engineering, Inc.
 - 8. Truswal Systems Corporation; an ITW company.
- B. General: Fabricate connector plates to comply with TPI 1.
- C. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); **G60 (Z180)** coating designation; and not less than **0.036 inch (0.9 mm)** thick.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
- B. Nails, Brads, and Staples: ASTM F 1667.

2.5 FABRICATION

- A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
 - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- B. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- F. Securely connect each truss ply required for forming built-up girder trusses.
- G. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
 - 1. Install bracing to comply with Division 06 Section "Rough Carpentry."
 - 2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- H. Install wood trusses within installation tolerances in TPI 1.
- I. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- J. Replace wood trusses that are damaged or do not meet requirements.

END OF SECTION 061700

SECTION 064000 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior standing and running trim.

B. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips unless concealed within other construction before woodwork installation.

1.2 SUBMITTALS

A. Product Data: For solid-surfacing material, cabinet hardware and accessories and finishing materials and processes.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

C. Samples:

1. Lumber and panel products for transparent finish, for each species and cut, finished on one side and one edge.

2. Lumber and panel products with shop-applied opaque finish, for each finish system and color, with exposed surface finished.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of woodwork.

B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards."

1. Provide AWI Quality Certification Program labels and certificates for woodwork, including installation.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 WOODWORK FABRICATORS

A. Fabricators: Subject to compliance with requirements, provide interior architectural woodwork by one of the following:

2.2 MATERIALS

- A. Wood Species and Cut for stained finish to match existing adjoining construction.
- B. Wood Products:
 - 1. Hardboard: AHA A135.4.

2.3 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

2.4 FABRICATION

- A. General: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
 - 1. Interior Woodwork Grade: Premium.
 - 2. Shop cut openings to maximum extent possible. Sand edges of cutouts to remove splinters and burrs. Seal edges of openings in countertops with a coat of varnish.
 - 3. Install glass to comply with applicable requirements in Division 08 Section "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.
- B. Interior Standing and Running Trim:
 - 1. For transparent-finished trim items wider than available lumber, use veneered construction. Do not glue for width.
 - 2. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
 - 3. Assemble casings in plant except where limitations of access to place of installation require field assembly.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.
- B. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm). Shim as required with concealed shims.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Scarf running joints and

stagger in adjacent and related members. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.

END OF SECTION 064000

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Foam-plastic board insulation.
 - 2. Glass-fiber blanket insulation.
 - 3. Vapor retarders.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product test reports.
- C. Research/evaluation reports.

PART 2 - PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
 - d. Pactiv Building Products.
 - 2. Type IV, 25 psi (173 kPa). To be used at foundation walls and under slabs, as indicated on drawings.

2.2 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers: subject to compliance with requirements, provide the following:
 - 1. Basis of Design: Knauf EcoBatt or architect approved equal.
- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

2.3 VAPOR RETARDERS

- A. Polyethylene Vapor Retarders: ASTM D 4397, 6 mils (0.15 mm) thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.4 AUXILIARY INSULATING MATERIALS

- A. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF BELOW-GRADE INSULATION

- A. On vertical footing and foundation wall surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
 - 1. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm)
- B. On horizontal surfaces under slabs, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
 - 1. Install insulation under entire concrete slab.

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Foam-Plastic Board Insulation: Seal joints between units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
5. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:
 - a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
 - b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
- D. Loose-Fill Insulation: Apply according to ASTM C 1015 and manufacturer's written instructions. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.
 1. For cellulosic-fiber loose-fill insulation, comply with CIMA's Bulletin #2, "Standard Practice for Installing Cellulose Insulation."
- E. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
 2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.4 INSTALLATION OF VAPOR RETARDERS

- A. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs.
 1. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (406 mm) o.c.
 2. Before installing vapor retarders, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
 3. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.
- C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.
- D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

END OF SECTION 072100

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Building wrap.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive barrier, from ICC-ES.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE BARRIER

- A. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Chemical Company (The); Styrofoam Weathermate Plus Brand Housewrap.
 - b. DuPont (E. I. du Pont de Nemours and Company); Tyvek CommercialWrap.
 - c. Raven Industries Inc.; Fortress Pro Weather Protective Barrier.
 2. Water-Vapor Permeance: Not less than 50 g through 1 sq. m of surface in 24 hours per ASTM E 96/E 96M, Desiccant Method (Procedure A).
- B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

- A. Cover sheathing with water-resistive barrier as follows:
1. Cut back barrier 1/2 inch (13 mm) on each side of the break in supporting members at expansion- or control-joint locations.
 2. Apply barrier to cover vertical flashing with a minimum 4-inch (100-mm) overlap unless otherwise indicated.
- B. Building Wrap: Comply with manufacturer's written instructions.
1. Seal seams, edges, fasteners, and penetrations with tape.
 2. Extend into jambs of openings and seal corners with tape.

END OF SECTION 072500

SECTION 073000 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Asphalt shingles.
2. Felt underlayment.
3. Self-adhering sheet underlayment.
4. Ridge vents.

1.2 PERFORMANCE REQUIREMENTS

A. Solar Reflectance Index: Not less than 29 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.

1.3 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Samples: For asphalt shingles, ridge and hip cap shingles, and ridge vent.
- C. Product test reports.
- D. Research/evaluation reports.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain ridge and hip cap shingles ridge vents felt underlayment and self-adhering sheet underlayment through one source from a single asphalt shingle manufacturer.
- B. Fire-Test-Response Characteristics: Provide asphalt shingle and related roofing materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 1. Exterior Fire-Test Exposure: Class C; ASTM E 108 or UL 790, for application and roof slopes indicated.
- C. Preinstallation Conference: Conduct conference at Project site.

1.5 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials within specified warranty period.
 1. Material Warranty Period: 40 years from date of Substantial Completion, prorated, with first 5 years nonprorated.
 2. Algae-Discoloration Warranty Period: Asphalt shingles will not discolor 10 years from date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of the Section, for the following warranty period.
 1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Laminated-Strip Asphalt Shingles: ASTM D 3462, laminated, multi-ply overlay construction, glass-fiber reinforced, mineral-granule surfaced, and self-sealing.
1. Manufacturers: Subject to compliance with requirements, provide the following:
 - a. Basis of Design: Match Existing Adjoining Construction
 - b. Other Acceptable Manufacturers pending compliance with Basis of Design:
 - 1) Celotex Corporation;
 - 2) GAF Materials Corporation;
 - 3) Georgia-Pacific Corporation;
 - 4) IKO;
 - 5) Owens Corning;
 2. Solar Reflectance Index (SRI): 29.
 3. Strip Size: Manufacturer's standard.
 4. Algae Resistance: Granules treated to resist algae discoloration.
 5. Color and Blends: As selected by Architect from manufacturer's full range.
- B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.3 UNDERLAYMENT MATERIALS

- A. Felts: ASTM D 226, Type I, asphalt-saturated organic felts, nonperforated.
- B. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, minimum of 40-mil- (1.0- mm-) thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing; cold applied.
1. Available Products:
 - a. Carlisle Coatings & Waterproofing, Div. of Carlisle Companies Inc.; Dri-Start "A."
 - b. Grace, W. R. & Co.; Grace Ice and Water Shield.
 - c. Johns Manville International, Inc.; Roof Defender.
 - d. Owens Corning; WeatherLock M.
 - e. Polyguard Products, Inc.; Polyguard Deck Guard.

2.4 RIDGE VENTS

- A. Rigid Ridge Vent: Manufacturer's standard rigid section high-density polypropylene or other UV-stabilized plastic ridge vent with nonwoven geotextile filter strips and with external deflector baffles; for use under ridge shingles.

1. Available Products:
 - a. Air Vent Inc., a CertainTeed Company; ShingleVent II.
 - b. Cor-A-Vent, Inc.; V-Series.
 - c. GAF Materials Corporation; Cobra Rigid Vent II.
 - d. Globe Building Materials, Inc.; SmartAir Ridge Vent.
 - e. Lomanco, Inc.; OR-4.
 - f. Mid-America Building Products; RidgeMaster Plus.
 - g. Obdyke, Benjamin Incorporated; Xtractor Vent X18.
 - h. Owens Corning; VentSure Ridge Vent.
 - i. Ridglass Manufacturing Company, Inc.; Coolvent.
 - j. Solar Group, Inc. (The), a Gibraltar Company; PRV4.
 - k. Trimline Building Products; Trimline Ridge Vent.

2.5 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- B. Roofing Nails: ASTM F 1667; aluminum, stainless-steel, copper, or hot-dip galvanized steel wire shingle nails, minimum 0.120-inch- (3-mm-) diameter, barbed shank, sharp-pointed, with a minimum 3/8-inch- (9.5-mm-) diameter flat head and of sufficient length to penetrate 3/4 inch (19 mm) into solid wood decking or extend at least 1/8 inch (3 mm) through OSB or plywood sheathing.
 1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.
- C. Felt Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized steel wire with low profile capped heads or disc caps, 1-inch (25-mm) minimum diameter.

2.6 METAL FLASHING AND TRIM

- A. Sheet Metal Flashing and Trim: Comply with requirements in Division 7 Section "Sheet Metal Flashing and Trim."
 1. Sheet Metal: Coil-coated aluminum.
- B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

- A. Single-Layer Felt Underlayment: Install single layer of felt underlayment on roof deck perpendicular to roof slope in parallel courses. Lap sides a minimum of 2 inches (50 mm) over underlying course. Lap ends a minimum of 4 inches (100 mm). Stagger end laps between succeeding courses at least 72 inches (1830 mm). Fasten with felt underlayment nails.
 1. Install felt underlayment on roof deck not covered by self-adhering sheet underlayment. Lap sides of felt over self-adhering sheet underlayment not less than 3 inches (75 mm) in direction to shed water. Lap ends of felt not less than 6 inches (150 mm) over self-adhering sheet underlayment.
- B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated or noted herein, lapped in direction to shed water. Lap sides not less than 3-1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Roll laps with roller. Cover underlayment within seven days.

1. Place eave edge and gable edge metal flashings tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails spaced 12 inches o.c.
2. Apply rubberized asphalt/polyethylene sheet eave protection in accordance with manufacturer's instruction.
3. Extend eave protection membrane minimum 4 feet upslope beyond edge of exterior wall below..

3.2 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Division 7 Section "Sheet Metal Flashing and Trim."
 1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

3.3 ASPHALT SHINGLE INSTALLATION

- A. Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip with tabs removed at least 7 inches (175 mm) wide with self-sealing strip face up at roof edge.
 1. Extend asphalt shingles 1/2 inch (13 mm) over fascia at eaves and rakes.
- C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- D. Fasten asphalt shingle strips with a minimum of five roofing nails located according to manufacturer's written instructions.
- E. Woven Valleys: Extend succeeding asphalt shingle courses from both sides of valley 12 inches (300 mm) beyond center of valley, weaving intersecting shingle-strip courses over each other. Use one-piece shingle strips without joints in the valley.
- F. Ridge Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.
- G. Ridge and Hip Cap Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.

PART 4 – INSTALLER’S WARRANTY

4.1 ROOFING INSTALLER’S WARRANTY

A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: _____.
2. Address: _____.
3. Building Name/Type: _____.
4. Address: _____.
5. Area of Work: _____.
6. Acceptance Date: _____.
7. Warranty Period: _____.
8. Expiration Date: _____.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding _____ mph;
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, 20____.

1. Authorized Signature: _____.

2. Name: _____.

3. Title: _____.

END OF SECTION 073000

SECTION 076000 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formed steep-slope roof sheet metal fabrications.
 - 2. Formed wall sheet metal fabrications.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
 - 1. Include details for forming, joining, supporting, and securing sheet metal flashing and trim, including pattern of seams, termination points, fixed points, expansion joints, expansion-joint covers, edge conditions, special conditions, and connections to adjoining work.
- C. Samples: For each exposed product and for each finish specified.
- D. Maintenance data.
- E. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

1.4 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
 - 1. Exposed Coil-Coated Finishes:
 - a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.
 - 2. Color: As selected by Architect from manufacturer's full range.

2.2 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

- B. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 - 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
 - 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).
- C. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

- C. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
- D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- E. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

2.5 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
 - 1. Aluminum: 0.032 inch (0.81 mm) thick.
- B. Valley Flashing: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.
- C. Drip Edges: Fabricate from the following materials:
 - 1. Aluminum: 0.032 inch (0.81 mm) thick.
- D. Eave, Rake, Ridge, and Hip Flashing: Fabricate from the following materials:
 - 1. Aluminum: 0.032 inch (0.81 mm) thick.

2.6 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches (150 mm) beyond each side of wall openings. Form with 2-inch- (50-mm-) high, end dams where flashing is discontinuous. Fabricate from the following materials:
 - 1. Stainless Steel: 0.016 inch (0.40 mm) thick.
- B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:
 - 1. Aluminum: 0.032 inch (0.81 mm) thick.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).
- B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement so that completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight. Use fasteners, solder, welding rods,

protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 5. Install sealant tape where indicated.
 6. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
1. Coat back side of uncoated aluminum sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
- D. Seal joints as shown and as required for watertight construction.
- E. Rivets: Rivet joints in uncoated aluminum where indicated and where necessary for strength.

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch (75-mm) centers.
- C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with sealant.
- D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.4 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of through-wall flashing is specified in Division 04 Section "Unit Masonry."
- C. Opening Flashings in Frame Construction: Install continuous head, sill and jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION 076000

SECTION 074623 - WOOD SIDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes Wood Siding
- B. Wood Boards
- C. Wood Trim

All NEW construction wood siding, wood trim, wood corners shall match the sizes, species, stain color and profiles that are installed on the existing construction. It is the trade responsibility to verify existing trim in the field.

END OF SECTION 074623

CURRIE WEST CLUBHOUSE EXPANSION

SECTION 079000 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Latex joint sealants.
 - 4. Acoustical joint sealants.

1.2 PRECONSTRUCTION TESTING

- A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers eight samples of materials that will contact or affect joint sealants. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples: For each kind and color of joint sealant required.
- C. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.
- D. Product test reports.
- E. Preconstruction compatibility and adhesion test reports.
- F. Preconstruction field-adhesion test reports.
- G. Field-adhesion test reports.
- H. Warranties.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.
- B. Mockups: Build mockups incorporating sealant joints, as follows, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution:

1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

1.5 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.
 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
 1. Architectural Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- B. Exterior sealant shall be non-shrinking positive design for exterior use.
- C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
 1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

2.2 SILICONE JOINT SEALANTS

- A. Mildew-Resistant, Acid-Curing Silicone Joint Sealant SS-1: ASTM C 920.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation.
 - b. GE Advanced Materials - Silicones.
 - c. Tremco Incorporated.
 2. Type: Single component (S).
 3. Grade: nonsag (NS).

4. Class: 25.
 5. Uses Related to Exposure: Nontraffic (NT).
- B. Neutral-Curing Silicone Joint Sealant SS-2: ASTM C 920.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation; 795.
 - b. GE Silicones; Silglaze II SCS2800.
 - c. Tremco; Tremsil 600.
 - d. Pecora Corporation; Pecora 895
 2. Type: Single component (S).
 3. Grade: nonsag (NS).
 4. Class: 25.
 5. Uses Related to Exposure: Nontraffic (NT).

2.3 URETHANE JOINT SEALANTS

- A. Urethane Joint Sealant US 1: ASTM C 920.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pecora Corporation; Urexpam NR-201.
 - b. Polymeric Systems Inc.; Flexiprene 952.
 - c. Tremco; Tremflex S/L.
 - d. Tremco; Vulkem 45.
 - e. Sonneborn Building Products, Div., ChemRex Inc.; SL 1.
 - f. Pecora Corporation.
 - g. Polymeric Systems, Inc.
 - h. Tremco Incorporated.
 2. Type: Single component (S).
 3. Grade: Pourable (P).
 4. Class: 25.
 5. Uses Related to Exposure: Traffic (T) and Nontraffic (NT).

2.4 LATEX JOINT SEALANTS

- A. Latex Joint Sealant LS-1: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pecora Corporation.
 - b. Sonneborn, Division of ChemRex Inc.; Sonolac.
 - c. Tremco Incorporated.

2.5 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Joint Sealant AS-1: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through

perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.

2.6 JOINT SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
 1. Remove laitance and form-release agents from concrete.
 2. Clean nonporous 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.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction 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.

3.2 INSTALLATION

- A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 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. 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 and fully 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.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs 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.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
- F. Acoustical Sealant Installation: Comply with ASTM C 919 and with manufacturer's written recommendations.
- G. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.3 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 1 test per each floor per elevation.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
- B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.4 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces US-1.
 - 1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces SS-2.

1. Joint Locations:
 - a. Control and expansion joints in unit masonry.
 - b. Joints in glass unit masonry assemblies.
 - c. Joints between metal panels.
 - d. Perimeter joints between materials listed above and frames of doors windows and louvers.
 - e. Control and expansion joints in ceilings and other overhead surfaces.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces US-1.
1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces SS-2 or LS-1.
1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Vertical joints on exposed surfaces of interior unit masonry and partitions.
 - d. Joints on underside of plant-precast structural concrete beams and planks.
 - e. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces SS-1.
1. Joint Sealant Location:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints in toilet rooms.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces AS-1.
1. Joint Location:
 - a. Acoustical joints where indicated.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION 079000

SECTION 083100 – ACCESS DOORS AND FRAMES

PART 1 - GENERAL

SUMMARY

- A. Section includes access doors and frames for walls and ceilings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 Closeout submittals

- A. Manufacturer's Installation Instructions and Operation & Maintenance: Indicate installation, operation and maintenance requirements and rough-in dimensions.

1.4 QUALITY ASSURANCE

- A. Specify single source supplier for consistent appearance throughout the building.
- B. Deliver materials to Project site ready use.
 - 1. Exercise proper care in handling of Work so as not to disrupt finished surfaces.
 - 2. store materials under cover in a dry and clean location off the ground.

1.5 WARRANTY

- A. Provide manufacturer's standard warranty.

2.0 PRODUCTS

- A. Flush Access panel with drywall flangen
 - a. Size as indicated on drawings
 - b. DOOR PANEL: Recessed 5/8" with metal lath over 16 gauge steel.
 - c. FRAME: 14 gauge steel with 2-3/4" wide flange with metal lath and 3/4" deep plaster stop for a plaster application to the edge of the door.
 - d. FINISH: White powder coat paint.
 - e. HINGE: Continuous recessed hinge mounted on the long side of panels.
 - f. LOCK: Flush screwdriver-operated steel cam standard

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 83100

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Storefront framing.
2. Manual-swing entrance doors.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
3. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
4. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.

- C. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
2. Include point-to-point wiring diagrams.

- D. Samples: For each type of exposed finish required.

- E. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

- F. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.
- B. Product test reports.
- C. Source quality-control reports.
- D. Field quality-control reports.
- E. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated and accredited by the International Accreditation Service or the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement as complying with ISO/IEC 17025.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C. Structural Loads:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
 - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 13 feet 6 inches (4.1 m) or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19.1 mm), whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.
 - a. Operable Units: Provide a minimum 1/16-inch (1.6-mm) clearance between framing members and operable units.
 - 3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:

- a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 11 feet 8-1/4 inches (3.6 m) or 1/175 times span, for spans of less than 11 feet 8-1/4 inches (3.6 m).
- E. Structural: Test according to ASTM E 330/E 330M as follows:
1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
 2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
 - a. Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
 2. Entrance Doors:
 - a. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. (2.54 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
- G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
- H. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas as a system shall have U-factor of not more than 0.41 Btu/sq. ft. x h x deg F (2.33 W/sq. m x K) as determined according to NFRC 100.
 2. Condensation Resistance: Fixed glazing and framing areas as a system shall have an NFRC-certified condensation resistance rating of no less than 45 as determined according to NFRC 500.
- I. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 STOREFRONT SYSTEMS

- A. Basis of Design: Subject to compliance with requirements, provide **TUBELITE T14000** Series or comparable products by one of the following:
1. EFCO Corporation.
 2. Kawneer North America; an Alcoa company.
 3. Oldcastle BuildingEnvelope™.
 4. TRACO.
 5. YKK AP America Inc.
- B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Exterior Framing Construction: Thermally broken.
 2. Interior Vestibule Framing Construction: Nonthermal.
 3. Glazing System: Retained mechanically with gaskets on four sides.
 4. Finish: Clear anodic and Color anodic finish. Refer to drawings for finish locations.
 5. Fabrication Method: Field-fabricated stick system.
 6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 7. Steel Reinforcement: As required by manufacturer.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.3 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
 2. Door Design: Wide stile; 5-inch (127-mm) nominal width.
 3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.

2.4 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."

2.5 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.
 - 1. Sealant shall have a VOC content of 250 g/L or less.

2.6 MATERIALS

- A. Sheet and Plate: ASTM B 209 (ASTM B 209M).
- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
- C. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
- D. Structural Profiles: ASTM B 308/B 308M.
- E. Steel Reinforcement:
 - 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
 - 4. Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
- F. Regional Materials: Products shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.

2.7 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from exterior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
- F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
- G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
- B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
1. Color: Dark bronze. Refer to drawings for extent and location of each color.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
1. Comply with manufacturer's written instructions.
 2. Do not install damaged components.
 3. Fit joints to produce hairline joints free of burrs and distortion.
 4. Rigidly secure nonmovement joints.
 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
 6. Seal perimeter and other joints watertight unless otherwise indicated.
- B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
- F. Install glazing as specified in Section 088000 "Glazing."
- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.
1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Perform a minimum of two tests in areas as directed by Architect.
 2. Air Infiltration: ASTM E 783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. (0.45 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
 - a. Perform a minimum of two tests in areas as directed by Architect.
- C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 084113

CURRIE WEST CLUBHOUSE EXPANSION

SECTION 085200 - WOOD WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes aluminum-clad wood-framed windows.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide wood windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of test size required by AAMA/WDMA 101/I.S.2/NAFS.
- B. Structural Performance: Provide wood windows capable of withstanding the effects of the following loads based on testing units representative of those indicated for Project that pass AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Structural Test:
 - 1. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour (meters per second) at 33 feet (10 m) above grade, according to ASCE 7, Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
 - a. Basic Wind Speed: 90 mph (40 m/s).
 - b. Importance Factor: 1.15.
 - c. Exposure Category: B.
 - 2. Deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch (19 mm), whichever is less, at design pressure based on testing performed according to AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Deflection Test or structural computations.
- C. Windborne-Debris Resistance: Provide glazed windows capable of resisting impact from windborne debris, based on the pass/fail criteria as determined from testing glazed windows identical to those specified, according to ASTM E 1886 and testing information in ASTM E 1996 or AAMA 506 and requirements of authorities having jurisdiction.

1.3 SUBMITTALS

- A. Product Data: For each type of wood window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, and installation details.
- C. Samples: For each exposed finish.
- D. Product Schedule: Use same designations indicated on Drawings.
- E. Product test reports.
- F. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Installer: A qualified installer, approved by manufacturer to install manufacturer's products.
- B. Manufacturer Qualifications: A qualified manufacturer who is certified for chain of custody by an FSC-accredited certification body.
- C. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

- D. Preinstallation Conference: Conduct conference at Project site.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace wood windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
 - c. Deterioration of wood, metals, vinyl, other materials, and finishes beyond normal weathering.
 - d. Failure of insulating glass.
 - 2. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing: 10 years from date of Substantial Completion.
 - c. Revise subparagraph below if finish warranties are available for wood or vinyl cladding.
 - d. Metal Finish: 10 years from date of Substantial Completion.
 - e. Labor: 2 years from date of Substantial Completion

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Aluminum-Clad Wood Windows:
 - a. Pella Corporation.
 - b. Marvin Windows
 - c. JELD-WEN Windows
 - d. Substitutions may be submitted for review/approval

2.2 MATERIALS

- A. Wood: Clear ponderosa pine or another suitable fine-grained lumber; kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch (0.8 mm) deep by 2 inches (51 mm) wide; water-repellent preservative treated.
- B. Aluminum Extrusions and Rolled Aluminum for Cladding, Baked-Enamel Finish: Manufacturer's standard Clad finish.
 - 1. Color: Color to match adjoining construction

2.3 WINDOW

- A. Window Type: Fixed
- B. Comply with AAMA/WDMA 101/I.S.2/NAFS.
- C. Thermal Transmittance: Provide wood windows with a whole-window, U-factor maximum indicated at 15-mph (24-km/h) exterior wind velocity and winter condition temperatures when tested according to NFRC 100.
 - 1. U-Factor: .30 or less.

- D. Solar Heat-Gain Coefficient (SHGC): Provide wood windows with a whole-window SHGC maximum of .24, determined according to NFRC 200 procedures.

2.4 GLAZING

- A. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal and complies with requirements for windborne-debris resistance.
 - 1. Type:
 - a. Double-Pane Glazing System: 5/8-inch, fully tempered, dual-seal insulating glass, silicone-glazed multi-layer Low-E coated with argon. Interior-hinged glass panel set in veneer covered aluminum frame, fitted to sash with continuous gasket seal.
 - b. Where indicated on drawings provide obscure dual-seal insulating glass, silicone glazed.

2.5 FABRICATION

- A. Fabricate wood windows that are reglazable without dismantling sash or ventilator framing.
- B. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.
- C. Factory machine windows for openings and for hardware that is not surface applied.
- D. Glazing Stops: Provide nailed or snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

2.6 WOOD FINISHES

- A. Factory-Finished Windows: Provide manufacturer's standard factory finish complying with WDMA T.M. 12. Apply finish to exposed exterior and interior wood surfaces.
 - 1. Color: Finish to match adjoining construction

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Rough opening dimensions to be adjusted to allow for a 3/8" shim space at the perimeter of windows and the jambs of doors. Allow for a total of 1/2" to the height of the doors.
- B. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- C. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- D. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- F. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- G. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- H. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

- I. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 085200

SECTION 087000 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Refer to "General and Special Conditions", and "Instructions to Bidders", Division 1 of Specifications. Requirements of these Sections and the project drawings shall govern work in this section.

1.2 SUMMARY

- A. Furnish all items of Door Hardware specified, scheduled, shown or required herein except those items specifically excluded from this section of the specification.
- B. Related Sections include the following:
 - 1. Division 6 - Section "Rough Carpentry"
 - 2. Division 7 - Section "Joint Sealants"
 - 3. Division 8 - Section "Aluminum-Framed Entrances and Storefronts"
 - 4. Section 16000 – Electrical rough-in, conduit junction boxes, wiring, primary power and final hook-up of all finish hardware components requiring electrical connections.
- C. Specific Omissions: Hardware for the following is specified or indicated elsewhere, unless specifically listed in the hardware sets:
 - 1. Windows
 - 2. Cabinets of all kinds, including open wall shelving and locks.
 - 3. Toilet accessories of all kinds including grab bars.
 - 4. Operable panel partitions, except cylinders where detailed.
 - 5. Corner guards
 - 6. Access doors and panels
 - 7. Overhead coiling doors

1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. Furnish finish hardware to comply with the requirements of laws, codes, ordinances, and regulations of the governmental authorities having jurisdiction where such requirements exceed the requirements of the Specifications.
 - 2. Furnish finish hardware to comply with the requirements of the regulations for public building accommodations for physically handicapped persons of the governmental authority having jurisdiction and to comply with Americans with Disabilities Act.
 - 3. Provide hardware for fire-rated openings in compliance with NFPA 80 and state and local building code requirements. Provide only hardware that has been tested and listed by UL for types and sizes of doors required and complies with requirements of door and door frame labels.
 - 4. Where emergency exit devices are required on fire-rated doors that carry supplementary marking on the doors UL labels indicating "Fire Door to be equipped with Fire Exit Hardware" provide UL label on exit devices indicating "Fire Exit Hardware".
- B. Hardware Supplier:

1. Shall be an established firm dealing in contract builders' hardware. He must have adequate inventory, qualified personnel on staff and be located within 100 miles of the project. Only domestic manufacturers are acceptable and the distributor must be a factory-authorized dealer for all materials required. The supplier shall be or have in employment an Architectural Hardware Consultant. (AHC).
- C. Electrified Door Hardware Supplier:
1. Shall be an experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.
 2. Shall prepare data for electrified door hardware, including shop drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this project.
 3. Shall have experience in providing consulting services for electrified door hardware installations.
- D. Pre-construction Meeting:
1. Prior to development of the Hardware Schedule, a Finish Hardware Meeting will be held at the Architect's office. The Construction Manager and the Hardware Supplier's personnel, directly responsible for preparing the Hardware Schedule, shall meet with the Architect and the Architect's Hardware Consultant. The purpose of the meeting is to review the contract documents' hardware schedule requirements and will include, but not be limited to the following:
 - a. Review specification requirements for hardware schedule, formats, hardware locations, opening descriptions, and other information specified.
 - b. Review products specified versus products proposed.
 - c. Hardware Supplier shall distribute, at the meeting, samples of schedules from other projects of similar nature prepared by the same person as will prepare schedule for this project.
- E. Pre-installation Meeting:
1. Before hardware installation, Construction Manager shall request a hardware installation seminar be conducted on the installation of hardware; specifically that of locksets, closers, exit devices, overhead stops and coordinators. Manufacturer's representatives of the above products, in conjunction with the hardware supplier for the project, shall present the seminar. Seminar will be held at job site and attended by installers of hardware for aluminum, hollow metal and wood doors. Seminar to address proper coordination and installation of hardware, per finish hardware schedule for this specific project, by using installation manuals, hardware schedule, templates, physical product samples and installation video's.
 2. When any electrical or pneumatic hardware is specified this meeting shall also include the following trades/installers: Electrical, Security, Alarm systems and Architect.
 3. Convene one week prior to commencing work of this Section
 4. The Hardware Supplier shall include the cost of this seminar in his proposal.
- F. Manufacturer:
1. Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.
 2. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.

1.4 SUBMITTALS

A. Hardware Schedule

1. Submit proper number of Hardware Schedules to allow the Architect to retain two copies for his use, plus the number of copies required by the Contractor for his distribution and use. In any event, do not submit more than six copies.
2. Include the following:
 - a. Preface sheet listing category only and manufacturer's names of items being furnished as follows:

CATEGORY	SPECIFIED	SCHEDULED
Hinges	Manufacturer A	Manufacturer B
Lock sets	Manufacturer X	Manufacturer X
Kick Plates	Open	Manufacturer Z

3. Hardware Locations: Refer to Article 3.1 B2 Locations.
4. Opening Description: Single or pair, number, room locations, hand, active leaf, degree of swing, size, door material, frame material, and UL listing.
5. Hardware Description: Quantity, category, product number, fasteners, and finish.
6. Headings that refer to the specified Hardware Set Numbers.
7. Scheduling Sequence shown in Hardware Sets.
8. Product data of each hardware item, and shop drawings where required, for special conditions and specialty hardware.
9. Electrified hardware system operation description.
10. "Vertical" scheduling format only. "Horizontal" schedules will be returned "Not Approved."
11. Typed Copy.
12. Double-Spacing.
13. 8-1/2 x 11 inch sheets
14. U.S. Standard Finish symbols or BHMA Finish symbols.

B. Product Data:

1. Submit, in booklet form using supplier's schedule covers as binders. Product data of items of hardware listed in supplier's schedule.
2. Submit product data concurrently with hardware schedule.

C. Inspection Report:

1. Submit inspection report specified in 3.1.C2 for locksets, exit devices, ADA special closers, door closers and all electrical hardware.

D. Samples:

1. Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample, if required, of each type of exposed hardware unit, finished as required and tagged with full description for coordination with schedule.
2. Samples will be returned to the supplier. Units, which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work, within limitations of keying coordination requirements.

E. Elevation and Wiring Drawings:

1. Submit elevation drawing showing relationship of all electrical and pneumatic hardware components to door and frame. Indicate number and gage of wires required.
2. Submit wiring drawing showing point to point wire hook up for all components.

3. Submit system operations descriptions for each type of opening; describe each possible condition.
- F. Submit to Construction Manager, two copies each of parts and service manuals and two each of any special installation or adjustment tools. Include for locksets, exit devices, door closers and any electrical products.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Label each item of hardware with the appropriate door number and Hardware Schedule heading number, and deliver to the installer so designated by the contractor.

1.6 WARRANTY

- A. Mortise locksets shall carry manufacturer's 3-year warranty against manufacturing defects and workmanship.
- B. Closers shall carry manufacturer's 10-year warranty against manufacturing defects and workmanship.
- C. Exit devices shall carry manufacturer's 3-year warranty against manufacturing defects and workmanship.
- D. Continuous gear hinges shall carry manufacturer's Lifetime warrantee to be free from defects in material and workmanship.
- E. Balance of items shall carry a manufacturer's 1-year warranty against manufacturing defects and workmanship.
- F. During the warranty period, replace defective work, including labor, materials and other costs incidental to the work. Inspect the work within 24 hours after receipt of notice from the Owner. Replace work found to be defective as defined in the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Furnish each category with the products of only one manufacturer unless specified otherwise; this requirement is mandatory whether various manufacturers are listed or not.

2.2 PRODUCTS

- A. Provide the products of manufacturer designated or if more than one manufacturer is listed, the comparable product of one of the other manufacturers listed. Where only one manufacturer or product is listed, "no substitution" is implied.
- B. Hinges
 1. Furnish hinges of cuts and size as listed in Hardware Sets.
 2. Where hinges are specified at openings with "existing frames", provide size and weight to match existing preparations, regardless of the hinge specified in the Hardware Set.
 3. Numbers used are Ives. Equal products of BHMA members are acceptable.
- C. Locksets and Latchsets:
 1. Function numbers listed are Falcon.
 2. Provide 2-3/4 inch backset.

3. Provide strikes with extended lips where required to protect trim from being marred by latch bolt. Provide strike lips that do not project more than 1/8" beyond doorframe trim at single doors and have 7/8" lip to center at pairs of 1-3/4" doors.
 4. Locksets and Latchsets:
 - a. Falcon T Series/W Series
 5. Lockset Trim:
 - a. Falcon Quantum
- D. Closers
1. Refer to door and frame details and furnish accessories such as drop plates, panel adapters, spacers and supports as required to correctly install door closers. State degree of door swing in the hardware schedule.
 2. Acceptable manufacturers and types:
 - a. LCN series as listed in sets.
- E. OVERHEAD HOLDERS and STOPS
1. Type, function and fasteners must be same as Glynn-Johnson specified. Size per manufacturer's selector chart. Plastic end caps, hold open mechanisms and shock blocks are not allowed. End caps must be finished same as balance of unit.
 2. Manufacture products using base material of Brass/Bronze for US3, US4, & US10B finished products and 300 Stainless Steel for US32 & US32D finished products.
 3. Type, function, and fasteners must be the same as Glynn-Johnson specified. Size per manufacturer's selector chart.
 - a. Glynn-Johnson
- F. KICK PLATES
1. Furnish .050 inches thick, beveled 4 sides, 10" high x door width less 2" at single doors and less 1" at pairs. Where glass or louvers prevent this height, supply with height equal to height of bottom rail less
 2. Kickplates shall be drilled and counter sunk for oval head, counter sunk screws. Pan head not acceptable.
 3. Any BHMA manufacturing product meeting above is acceptable.
- G. Bumpers:
3. Wrought, forged, or cast, approximately 2-1/2 inch diameter, convex or concave rubber center, concealed fasteners.
 - a. Ives WS406/WS407 series
 - b. BHMA L02101.
- H. THRESHOLDS
1. Styles and profiles as specified in sets. Cope at jambs.
 2. Furnish full wall opening width when frames are recessed.
 4. Furnish with non-ferrous Stainless Steel Screws and Lead Anchors.
 - a. Zero as listed in sets
 - b. Equal by NGP or Reese.
- I. MISCELLANEOUS
1. Furnish items not categorized in the above descriptions but specified by manufacturer's names in Hardware Sets.
- J. FASTENERS
1. Furnish fasteners of the proper type, size, quantity and finish. Use machine screws and expansion shields for attaching hardware to concrete or masonry, and wall grip inserts at hollow wall construction. Furnish machine screws for attachment to

reinforced hollow metal doors and frames and reinforced aluminum doors and frames. Furnish full thread wood screws for attachment to solid wood doors and frames. "TEK" type screws are not acceptable.

2. Sex bolts will not be permitted on reinforced metal doors or wood doors where blocking is specified.

K. Exit Devices:

1. Exit devices shall be a wide-stile crossbar type, fabricated of brass, bronze, or stainless-steel and plated to the standard architectural finishes to match the balance of the door hardware.

2. Strikes shall be roller type and come complete with a locking plate to prevent movement.

3. All exit devices shall be designed to meet or exceed ANSI A156.3, 1994, Grade 1 test standards and certified by an independent testing laboratory.

4. Exit devices shall be UL listed panic exit hardware. All exit devices for fire rated openings shall be UL labeled fire exit hardware.

5. Von Duprin 88 Series. Series and function numbers as listed in sets.

6. Trim: As listed in hardware sets.

2.3 FINISHES

A. Generally, Dull Chrome, US26D / BHMA 626. Provide finish for each item as indicated in sets.

2.4 TEMPLATES AND HARDWARE LOCATION

A. Furnish hardware made to template. Supply required templates and hardware locations to the door and frame manufacturers.

B. Furnish metal template to frame/door supplier for continuous hinge.

C. Refer to Article 3.1 B2, Locations, and coordinate with templates.

2.5 CYLINDERS KEY CONTROL AND KEYING

A. All cylinders for this project will be supplied by one supplier regardless of door type and location.

B. Provide a cylinder for all hardware components capable of being locked.

C. Provide cylinders to match existing owners cylinders.

D. Provide disposable or keyed construction cores for use during construction period.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install hardware according to manufacturers installations and to manufacturers template dimensions. Attach all items of finish hardware to doors, frames, walls, etc. with fasteners furnished and required by the manufacture of the item.

2. Provide blocking/reinforcement for all wall mounted hardware.

3. Reinforced hollow metal doors and frames and reinforced aluminum door and frames: drilled and tapped machine screws.

4. Solid wood doors and frames: full thread wood screws. Drill pilot holes before inserting screws.
5. Continuous gear hinges attached to hollow metal doors and frames and aluminum doors and frames: 12-24 x 1/2" #3 Phillips Keenform self-tapping. Use #13 or 3/16 drill for pilot.
6. Continuous Gear Hinges require continuous mortar guards of foam or cardboard 1/2" thick x frame height, applied with construction adhesive.
7. Install weather-strip gasket prior to parallel arm closer bracket, rim exit device or any stop mounted hardware. Gasket to provide a continuous seal around perimeter of door opening. Allow for gasket when installing finish hardware. Door closers will require special templating. Exit devices will require adjustment in backset.

B. Locations:

1. Dimensions are from finish floor to center line of items.
2. Include this list in Hardware Schedule.

<u>CATEGORY</u>	<u>DIMENSION</u>
Hinges	Door Manufacturer's Standard
Levers	Door Manufacturer's Standard

C. Final Adjustment:

1. Provide the services of a representative to inspect material furnished and its installation and adjustment, to make final hardware adjustment, and to instruct the Owner's personnel in adjustment, care and maintenance of hardware.
2. Locksets, closers and exit devices shall be inspected by the factory representative and adjusted after installation and after the HVAC system is in operation, to insure correct installation and proper adjustment in operation. The manufacturer's representative shall prepare a written report stating compliance, and also recording locations and kinds of noncompliance. The original report shall be forwarded to the Architect with copies to the Contractor, hardware distributor, hardware installer and building owner.

D. Technical and Warranty Information

1. At the completion of the project, the technical and warranty information coalesced and kept on file by the General Contractor/Construction Manager shall be given to the Owner or Owner's Agent. In addition to both the technical and warranty information, all factory order acknowledgement numbers supplied to the General Contractor/Construction Manager during the construction period shall be given to the Owner or Owner's Agent. The warranty information and factory order acknowledgement numbers shall serve to both expedite and properly execute any warranty work that may be required on the various hardware items supplied on the project.
2. Submit to General Contractor/Construction Manager, two copies each of parts and service manuals and two each of any special installation or adjustment tools. Include for locksets, exit devices, door closers and any electrical products.

HARDWARE SETS

Hardware Group No. 01

A100.1

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	PANIC HARDWARE	98-EO	626	VON
1	EA	PANIC HARDWARE	98-NL-OP-110MD	626	VON
2	EA	CYLINDER & CORE (AS REQ'D)	MATCH EXIST'G SYSTEM	626	SCH
2	EA	90 DEG OFFSET PULL	8190EZHD 12" O	630-316	IVE
2	EA	OH STOP	100S	630	GLY
2	EA	SURFACE CLOSER	4021 MC	689	LCN
2	EA	MOUNTING BRKT	4020-18G	689	LCN
1	SET	WEATHER SEAL	(BY FRAME MFR)		
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	65A-223	A	ZER

Hardware Group No. 02

A101.1

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	98-NL-OP-110MD	626	VON
1	EA	CYLINDER & CORE (AS REQ'D)	MATCH EXIST'G SYSTEM	626	SCH
1	EA	90 DEG OFFSET PULL	8190EZHD 12" O	630-316	IVE
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4021 MC	689	LCN
1	EA	MOUNTING BRKT	4020-18G	689	LCN

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Doors.
 - 2. Exterior borrowed lites
 - 3. Interior borrowed lites.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified professional engineer, using the following design criteria:
 - 1. Design Wind Pressures: As indicated on Drawings.
 - 2. Design Snow Loads: As indicated on Drawings.
 - 3. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
 - 4. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
 - 5. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

1.3 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

1.4 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- E. Preconstruction adhesion and compatibility test report.

1.5 QUALITY ASSURANCE

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
 - 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
 - 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
 - 4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance rating in minutes.
- D. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.6 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to

manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
- B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.
- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
 2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
- C. Low-E Coated Vision Glass: ASTM C 1376, coated by vacuum deposition (sputter-coating) process, and complying with other requirements specified.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. PPG Industries; Solarban 70 XL.
 - b. Guardian Industries; SunGuard SuperNatural 54.
 2. Glass: Clear float.

2.3 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 1. Construction: Laminate glass with polyvinyl butyral interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written recommendations.
 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.

2.4 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
 - 1. Sealing System: Dual seal.
 - 2. Spacer: Manufacturer's standard warm-edge spacer material and construction rated for commercial curtain wall design.

2.5 FIRE-PROTECTION-RATED GLAZING

- A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 for window assemblies.
- B. Film-Faced Ceramic Glazing: Clear, ceramic flat glass; 3/16-inch (5-mm) nominal thickness; faced on one surface with a clear glazing film; complying with testing requirements in 16 CFR 1201 for Category II materials.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Nippon Electric Glass Co., Ltd. (distributed by Technical Glass Products); FireLite NT.
 - b. Safti First; SuperLite C/SP.
 - c. Schott North America, Inc.; Filmed Pyran Platinum.
 - d. Vetrotech Saint-Gobain; SGG Keralite FR-F.

2.6 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
 - 1. Neoprene complying with ASTM C 864.
 - 2. EPDM complying with ASTM C 864.
 - 3. Silicone complying with ASTM C 1115.
 - 4. Thermoplastic polyolefin rubber complying with ASTM C 1115.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene, EPDM, silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
 - 1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

2.7 GLAZING SEALANTS

- A. General:
 - 1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D.
 4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
 5. Provide Abuse Resistant Sealant at all inmate occupied areas.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.
1. Available Products:
 - a. GE Silicones; Silglaze II SCS2800
 - b. Tremco; Tremsil 600
 - c. Dow Corning Corporation; 795
- C. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.8 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- E. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- F. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.10 INSULATING-GLASS TYPES

- A. Glass Type "A": Low-e-coated, clear insulating glass at all exterior locations unless indicated otherwise.
1. Overall Unit Thickness: 1 inch (25 mm).
 2. Thickness of Each Glass Lite: 1/4-inch.

3. Outdoor Lite: Float glass.
4. Interspace Content: Argon.
5. Indoor Lite: Float glass.
6. Low-E Coating: Sputtered on second surface.
7. Visible Light Transmittance: 53 percent minimum.
8. Winter Nighttime U-Factor: .24 maximum.
9. Summer Daytime U-Factor: .22 maximum.
10. Solar Heat Gain Coefficient: .27 maximum.

PART 3 - EXECUTION

3.1 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.2 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Apply heel bead of elastomeric sealant.
- F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.3 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.
- F. Atrium interior glass to be installed with gasketed frame so that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.

3.4 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.5 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 088000

CURRIE WEST CLUBHOUSE EXPANSION

SECTION 092000 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples:
 - 1. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Low Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. American Gypsum.
 - 2. CertainTeed Corp.
 - 3. Georgia-Pacific Gypsum LLC.
 - 4. Lafarge North America Inc.
 - 5. National Gypsum Company.
 - 6. USG Corporation.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch (15.9 mm).
 - 2. Long Edges: Tapered.

2.3 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet

2.4 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

2.5 AUXILIARY MATERIALS

A. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing).

D. Acoustical Joint Sealant: ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings as demonstrated by testing according to ASTM E 90.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
- b. Grabber Construction Products; Acoustical Sealant GSC.
- c. Pecora Corporation; AC-20 FTR.
- d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
- e. USG Corporation; SHEETROCK Acoustical Sealant.
- f. Dow Corning Corporation; 795.

2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

F. Vapor Retarder: As specified in Division 07 Section "Thermal Insulation."

2.6 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

B. Non-Aggregate Finish: Pre-mixed, vinyl texture finish for spray application.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. CertainTeed Corp.; ProRoc Easi-Tex Spray Texture.
- b. USG Corporation; BEADDEX FasTex Wall and Ceiling Spray Texture.

2. Texture: Spatter knock-down.

3.1 APPLYING AND FINISHING PANELS

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
 - 1. Aluminum Trim: Install in locations indicated on Drawings or recommended by manufacturer.
 - 2. Control Joints: Install control joints at locations indicated on Drawings according to ASTM C 840 and in specific locations approved by Architect for visual effect and per manufacturers recommendation.
- E. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 5: T panel surfaces that will be exposed to view.
 - a. Primer and its application to surfaces are specified in other Division 09 Sections.
- H. Texture Finish Application: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
- I. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- J. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092000

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes modular carpet tile.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
3. Laboratory Test Reports: For flooring products, indicating compliance with requirements for testing and product requirements of CRI's "Green Label Plus" testing program.
4. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.

- C. Shop Drawings: For carpet tile installation, plans showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

- D. Samples: For each exposed product and for each color and texture required.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.7 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: 10 years from date of Substantial Completion.

1.8 ATTIC STOCK

- A. Provide the Owner with 3% attic stock.

PART 2 - PRODUCTS

AS INDICATED ON DRAWINGS.

2.1 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

- 1. Adhesives shall have a VOC content of 50 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Concrete Slabs:

1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

3.2 PREPARATION

- A. General: Comply with CRI's "CRI Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns as indicated.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.
- I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.
- J. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 098433 - SOUND-ABSORBING WALL UNITS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Shop-fabricated, cementitious wood fiber plank acoustical wall panel system and installation accessories.
 - 2. Shop-fabricated, sound-absorbing acoustical panel units tested for acoustical performance.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For unit assembly and installation.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Manufacturer's installation instructions.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 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 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: Submit a written warranty, executed by the manufacturer, agreeing to repair or replace components of acoustical wall panel system that fail in materials or workmanship within the specified warranty period.
- C. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GOLF SIMULATOR FOAM PANELS

- A. Manufacturer: FOAMITE
- B. Product: 2" high density golf simulator foam panels
- C. Size 24" X 24"
- D. Material: Open Cell Black Polyurethane
- E. Color: Dark Charcoal

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at penetrations.
- B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate. Screw heads to be finish with panel surface.
- C. Sound-Absorbing Wall Units Only: Align fabric pattern and grain with adjacent units.

3.2 CLEANING

- A. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.
- B. Acoustic Wall Panels:
 - 1. Touch up any minor finish damage.
 - 2. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.
- C. Sound-Absorbing Wall Units:
 - 1. Clean loose threads; remove pills and extraneous materials.

3.3 PROTECTION

- A. Protect installed work from damage due to subsequent construction activity, including temperature and humidity limitations and dust control, so that the work will be without damage and deterioration at the time of acceptance by the Owner.

END OF SECTION 098433

SECTION 09912 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Gypsum board
 - 2. Wood (Stain)

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each finish and for each color and texture required.
 - 1. Submit samples on rigid backing, 8 inches (200 mm) square.
 - 2. Step coats on samples to show each coat required for system.
 - 3. Label each coat of each sample.
 - 4. Label each sample for location and application area.
- C. Product List: For each product indicated.

1.3 QUALITY ASSURANCE

- A. Applicator 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. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.
- C. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 - 2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
 - 3. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

- B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
1. Benjamin Moore & Co. (Benjamin Moore).
 2. Sherwin-Williams Company (The) (Sherman-Williams).
 3. ICI Paints (ICI Paints).
 4. PPG Architectural Finishes, Inc. (Pittsburgh Paints).
 5. Tnemec Company, Inc. (Tnemec).

2.2 PAINT, GENERAL

- A. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Chemical Components of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions; these requirements do not apply to primers or finishes that are applied in a fabrication or finishing shop:
1. Flat Paints and Coatings: VOC content of not more than 50 g/L.
 2. Nonflat Paints and Coatings: VOC content of not more than 150 g/L.
 3. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 4. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.

- w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.
- C. Colors: As selected by Architect from manufacturer's full range.

2.3 BLOCK FILLERS

- A. Concrete Unit Masonry Block Filler: Factory-formulated high-performance latex block fillers.
1. Benjamin Moore; Moorcraft Super Craft Latex Block Filler No. 285 or Moore's IMC Latex Block Filler No. M88: Applied at a dry film thickness of not less than 8.1 mils.
 2. Sherwin-Williams; PrepRite Interior/Exterior Block Filler B25W25: Applied at a dry film thickness of not less than 8.0 mils.
 3. ICI Paint; Bloxfil 4000-1000 Interior/Exterior Heavy Duty Acrylic Block Filler: Applied at a dry film thickness of not less than 7.0 to 14.5 mils.
 4. Pittsburgh Paints; 6-7 SpeedHide Interior/Exterior Masonry Latex Block Filler: Applied at a dry film thickness of not less than 6.0 to 12.5 mils.

2.4 PRIMERS

- A. Interior Masonry Primer: Factory-formulated alkali-resistant acrylic-latex interior primer for interior application.
1. Benjamin Moore; Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer No. 253: Applied at a dry film thickness of not less than 1.2 mils.
 2. Sherman-Williams; PrepRite Masonry Primer B28W300: Applied at a dry film thickness of not less than 3.0 mils.
 3. ICI Paints; 3030-1200 Bond-Prep Interior/Exterior Waterborne Pigmented Bonding Primer: Applied at a dry film thickness of not less than 1.8 mils.
 4. Pittsburgh Paints; 6-2 SpeedHide Interior Quick-Drying Latex Sealer: Applied at a dry film thickness of not less than 1.0 mil.
- B. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.
1. Benjamin Moore; Moore's IMC Alkyd Metal Primer No. M06: Applied at a dry film thickness of not less than 2.0 mils.
 2. Sherwin-Williams; Kem Kromik Universal Metal Primer B50NZ6/B50WZ1: Applied at a dry film thickness of not less than 3.0 mils.
 3. ICI Paints:
 - a. 4130-6130 Devshield Rust Penetrating Metal Primer: Applied at a dry film thickness of not less than 2.2 mils.
 - b. 4160-6130 Devguard Multi-Purpose Tank & Structural Primer: Applied at a dry film thickness of not less than 2.0 mils.
 4. Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 1.5 mils.
- C. Interior Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer.
1. Benjamin Moore; Moore's IMC Acrylic Metal Primer No. M04: Applied at a dry film thickness of not less than 2.0 mils.
 2. Sherwin-Williams; Galvite HS B50WZ30: Applied at a dry film thickness of not less than 3.0 mils.
 3. ICI Paints; 4160-6130 Devguard Multi-Purpose Tank & Structural Primer: Applied at a dry film thickness of not less than 2.0 mils.

4. Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils.
- D. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
 1. Benjamin Moore; Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer No. 253: Applied at a dry film thickness of not less than 1.2 mils.
 2. Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series: Applied at a dry film thickness of not less than 1.6 mils.
 3. ICI Paints:
 - a. 1000-1200 Dulux Ultra Basecoat Interior Latex Wall Primer: Applied at a dry film thickness of not less than 1.2 mils.
 - b. 1030-1200 Ultra-Hide PVA Interior Primer Sealer General Purpose Wall Primer: Applied at a dry film thickness of not less than 1.9 mils.
 4. Pittsburgh Paints; 6-2 SpeedHide Interior Quick-Drying Latex Sealer: Applied at a dry film thickness of not less than 1.0 mil.
- E. Interior Wood Primer for Acrylic-Enamel and Semigloss Alkyd Enamel Finishes: Factory-formulated alkyd- or acrylic-latex-based interior wood primer.
 1. Benjamin Moore; Moorcraft Super Spec Alkyd Enamel Underbody and Primer Sealer No. 245: Applied at a dry film thickness of not less than 1.5 mils.
 2. Sherwin-Williams:
 - a. PrepRite Wall and Wood Primer B49W200 Series: Applied at a dry film thickness of not less than 1.6 mils.
 - b. PrepRite Classic Interior Primer B28W101 Series: Applied at a dry film thickness of not less than 1.6 mils.
 3. ICI Paints; 3210-1200 Ultra-Hide Aquacrylic GRIPPER Stain Killer Primer Sealer: Applied at a dry film thickness of not less than 1.8 mils.
 4. Pittsburgh Paints; 6-855 SpeedHide Latex Enamel Undercoater: Applied at a dry film thickness of not less than 1.0 mil.
- F. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

2.5 EPOXY PRIMERS

- A. General: Interior epoxy primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.
- B. Masonry Substrates:
 1. Benjamin Moore:
 - a. M43-00/M44 Poured Concrete or Brick Acrylic Epoxy Primer.
 - b. M31/M32 Concrete Block Waterborne Epoxy Block Filler.
 2. Pittsburgh Paints:
 - a. 6-603 Poured Concrete or Brick Speedhide Interior/Exterior Acrylic Latex Alkali Resistant Primer.
 - b. 16-90 Concrete Block Pitt-Glaze High Performance Acrylic Latex Block Filler.
 3. Tnemec:
 - a. 54-562 1 Component modified epoxy block filler for dry application.
 - b. 130 2 Component cementitious epoxy block filler for wet application.
 - c. 151 Waterbased epoxy primer for poured concrete or brick application.

2.6 FINISH PAINTS

- A. Interior Flat Acrylic Paint: Factory-formulated flat acrylic-emulsion latex paint for all interior Ceiling applications, unless noted otherwise.
 - 1. Benjamin Moore; Moorcraft Super Spec Latex Flat No. 275: Applied at a dry film thickness of not less than 1.2 mils.
 - 2. Sherwin-Williams; ProMar 200 Interior Latex Flat Wall Paint B30W200 Series: Applied at a dry film thickness of not less than 1.4 mils.
 - 3. ICI Paints; 1200-XXXX Dulux Professional Velvet Matte Interior Flat Latex Wall & Trim Finish: Applied at a dry film thickness of not less than 1.4 mils.
 - 4. Pittsburgh Paints; 6-70 Line SpeedHide Interior Wall Flat-Latex Paint: Applied at a dry film thickness of not less than 1.0 mil.
- B. Interior Low-Luster Acrylic Enamel: Factory-formulated eggshell acrylic-latex interior enamel for all Wall applications, unless noted otherwise.
 - 1. Benjamin Moore; Moorcraft Super Spec Latex Eggshell Enamel No. 274: Applied at a dry film thickness of not less than 1.3 mils.
 - 2. Sherwin-Williams; ProMar 200 Interior Latex Egg-Shell Enamel B20W200 Series: Applied at a dry film thickness of not less than 1.6 mils.
 - 3. ICI Paints; 1200-XXXX Dulux Professional Acrylic Eggshell Interior Wall & Trim Enamel: Applied at a dry film thickness of not less than 1.4 mils.
 - 4. Pittsburgh Paints; 6-400 Series SpeedHide Eggshell Acrylic Latex Enamel: Applied at a dry film thickness of not less than 1.25 mils.
- C. Interior Semi-Gloss Alkyd Enamel for Wood and Metal Surfaces: Factory-formulated semi-gloss alkyd enamel for interior metal and painted wood applications.
 - 1. Benjamin Moore; Moorcraft Super Spec Alkyd Semi-Gloss Enamel No. 271: Applied at a dry film thickness of not less than 1.4 mils.
 - 2. Sherwin-Williams; ProMar 200 Interior Alkyd Semi-Gloss Enamel B34W200 Series: Applied at a dry film thickness of not less than 1.7 mils.
 - 3. ICI Paints; 1516-XXXX Ultra-Hide Alkyd Semi-Gloss Interior Wall & Trim Enamel: Applied at a dry film thickness of not less than 1.7 mils.
 - 4. Pittsburgh Paints; 6-1110 Series SpeedHide Interior Enamel Wall & Trim Semi-Gloss Oil: Applied at a dry film thickness of not less than 1.4 mils.

2.7 EPOXY FINISH PAINTS

- A. Interior Semi-Gloss Epoxy Paint:
 - 1. Benjamin Moore; M43/M44 Acrylic Epoxy Coating with M44-86 Semi-Gloss Catalyst. (All substrates).
 - 2. Pittsburgh Paints; 90-474 Series Pitt-Tech One Pack Interior/Exterior High Performance Waterborne Satin DTM Industrial Enamel. (All substrates).
 - 3. Tnemec; no. 113 Waterbased Acrylic Epoxy Finish. (All substrates).

2.8 STAIN – VARNISH

- A. Interior Stain-Varnish Finish:
 - 1. Benjamin-Moore; Benwood penetrating stain.
 - 2. Stay Clear Acrylic Polyurethane, Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Masonry (CMU): 12 percent.
 - 2. Wood: 15 percent.
 - 3. Gypsum Board: 12 percent.
 - 4. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND APPLICATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
 - 1. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - 2. Touch up bare areas and shop-applied prime coats that have been damaged. Wire brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- G. Wood Substrates:

1. Scrape and clean knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer.
 2. Sand surfaces that will be exposed to view, and dust off.
 3. Prime edges, ends, faces, undersides, and backsides of wood. Prime edges, ends, faces, undersides and back sides of wood, including cabinets, counters, cases, and paneling.
 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 5. Backprime paneling on interior partitions where masonry, plaster or other wet wall construction occurs on back side.
 6. Seal tops, bottoms and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
- H. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.
- I. Apply paints according to manufacturer's written instructions.
1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 4. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of durable paint film.
 5. Provide finish coats that are compatible with primers used.
 6. The term "exposed surfaces" includes areas visible when permanent or built-in-fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 7. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 8. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
 9. Sand lightly between each succeeding enamel or varnish coat.
- J. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions sand between application.
 2. Omit primer over metal surfaces that have been shop primed and touchup painted.
 3. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm and does not deform or feel sticky under moderate thumb pressure and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

- K. Application Procedures: Apply paints and coatings by brush, roller, spray or other applicators according to manufacturer's written instructions.
 - 1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 - 2. Rollers: Use rollers of carpet, velvet-back or high-pile sheep's wool as recommended by manufacturer for material and texture.
 - 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- L. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.
- M. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- N. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- O. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
 - 1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - 2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.
- P. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- Q. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
- R. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.3 FIELD QUALITY CONTROL

- A. Owner reserves the right to engage a testing agency for test procedures at any time and as often as Owner deems necessary during the period when paint is being applied.
- B. Contractor shall provide a "Properly Painted Surface" that is uniform in appearance, color and sheen. It is one that is free of foreign material, lumps, skins, runs, sags, holidays, misses, strike-through or insufficient coverage. It is a surface which is free of drips, spatters, spills or overspray which were caused by the contractor's work force. Comply PDCA, MPI and SSPC Standards and as specified.

3.4 INTERIOR PAINT SCHEDULE

- A. Concrete Masonry Unit:
 - 1. Acrylic Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete masonry unit block filler.
 - b. Finish Coats: Interior low-luster acrylic enamel for wall applications.
- B. Gypsum Board and Plaster
 - 1. Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats:
 - 1) Interior flat acrylic paint at all ceiling applications.
 - 2) Interior low-luster acrylic enamel for wall applications.
- C. Wood:
 - 1. Alkyd-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior wood primer for acrylic-enamel and semi-gloss alkyd-enamel finishes.
 - b. Finish Coats: Interior semi-gloss alkyd enamel for wood and metal surfaces.
- D. Ferrous Metal:
 - 1. Alkyd-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior semi-gloss alkyd enamel for wood and metal surfaces.
- E. Zinc-Coated Metal:
 - 1. Alkyd-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior zinc-coated metal primer.
 - b. Finish Coats: Interior semi-gloss alkyd enamel for wood and metal surfaces.

3.5 INTERIOR EPOXY PAINT SCHEDULE

- A. Gypsum Board:
 - 1. Epoxy Finish: One finish coat over an intermediate coat and gypsum board primer.
 - a. Primer: Interior gypsum board and wood primer applied at spreading rate of 400 to 500 square feet per gallon, as recommended by manufacturer.
 - b. Intermediate Coat: Applied finish coat at spreading rate recommended by manufacturer to achieve a dry film thickness of 2.0 to 3.0 mils.
 - c. Finish Coats: Semi-gloss applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 2.0 to 3.0 mils.

3.6 INTERIOR STAIN SCHEDULE

- A. Wood:
 - 1. Stained Wood: ALKYD Varnish over stain and sealer system:
 - a. Stain Coat: Interior Wood Stain.
 - b. Sealer Coat: Clear sanding sealer applied at spreading rate recommended by the manufacturer.
 - c. Finish Coat: Two finish coats, interior varnish, Satin, applied at spreading rate recommended by the manufacturer.

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing site utilities.
7. Temporary erosion- and sedimentation-control measures.

1.2 MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.3 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.
- E. The following practices are prohibited within protection zones:
1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Foot traffic.

4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Division 31 Section "Earth Moving."
 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. General: Protect trees and plants remaining on-site according to requirements in Division 01 Section "Temporary Tree and Plant Protection."
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

3.4 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
- C. Removal of underground utilities is included in Division 33 Sections.

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches (450 mm) below exposed subgrade.
 - 2. Use only hand methods for grubbing within protection zones.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to depth indicated on Drawings in a manner to prevent intermingling with underlying subsoil or other waste materials.

- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses and plants.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete walks, pavements.
5. Subbase course and base course for asphalt paving.
6. Excavating and backfilling for utility trenches.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 QUALITY ASSURANCE

- A. Preexcavation Conference: Conduct conference at Project site.

1.4 PROJECT CONDITIONS

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.
- B. Do not commence earth moving operations until plant-protection measures specified in Division 01 Section "Temporary Tree and Plant Protection" are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.
- B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
 - 1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - 2. Cut and protect roots according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit unless otherwise indicated.
 - 1. Clearance: 12 inches (300 mm) each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for

joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material, 4 inches (100 mm) deeper elsewhere, to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

3.6 SUBGRADE INSPECTION

- A. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.7 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 MPa), may be used when approved by Architect.
 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.8 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 03 Section "Cast-in-Place Concrete."
- D. Trenches under Roadways: Provide 4-inch- (100-mm-) thick, concrete-base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase course. Concrete is specified in Division 03 Section "Cast-in-Place Concrete."
- E. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- G. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.10 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.

3.11 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 2. Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 3. Under turf or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 85 percent.
 4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.13 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 1. Turf or Unpaved Areas: Plus or minus 1 inch (25 mm).
 2. Walks: Plus or minus 1 inch (25 mm).
 3. Pavements: Plus or minus 1/2 inch (13 mm).
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.14 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 - 1. Shape subbase course and base course to required crown elevations and cross-slope grades.
 - 2. Place subbase course and base course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
 - 3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.15 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 - 1. Place drainage course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
 - 2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.16 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes temporary excavation support and protection systems.

1.2 PERFORMANCE REQUIREMENTS

- A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
 - 1. Delegated Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.3 ACTION SUBMITTALS

- A. Shop Drawings: For excavation support and protection system.
- B. Delegated-Design Submittal: For excavation support and protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Survey Work: Engage a qualified and Michigan licensed land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
 - 1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Architect if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.
- C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.
- D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application.
- E. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- F. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Soldier Piles: Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment.
 - 1. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.
 - 2. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.
- B. Sheet Piling: Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches (1500 mm). Accurately align exposed faces of sheet piling to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment. Cut tops of sheet piling to uniform elevation at top of excavation.
- C. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
 - 1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Architect.

2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.2 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
 1. Remove excavation support and protection systems to a minimum depth of 48 inches (1200 mm) below overlaying construction and abandon remainder.
- B. Leave excavation support and protection systems permanently in place.

END OF SECTION 315000

SECTION 321813 - SYNTHETIC GRASS SURFACING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Synthetic grass surfacing.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data:
 - 1. Synthetic grass surfacing.
- B. Shop Drawings: For synthetic grass surfacing.
 - 1. Include sections and details.
 - 2. Show locations of seams and method of seaming.
 - 3. Show layout of game lines, numbers, and letters. Indicate application method of each line and marking.
 - 4. Show location and layout of team logo/graphics.
- C. Samples: For each type of synthetic grass surfacing indicated.
 - 1. Turf Fabric: 12 inches square.

1.4 INFORMATIONAL SUBMITTALS

Retain "Qualification Data" Paragraph below with qualification requirements in Section 014000 "Quality Requirements" and as may be supplemented in "Quality Assurance" Article.

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each synthetic grass surfacing assembly.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For synthetic grass surfacing, including maintenance cleaning instructions, to include in maintenance manuals.

1.6 MAINTENANCE

- A. Extra Materials: Deliver to owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals (Maintenance Materials) Section.
 - 1. Quantity: Furnish quantity of Flooring units equal to 15% of amount installed.
 - 2. Delivery, Storage, and Protection: Comply with owner's requirements for delivery, Storage, and protection of extra materials.
 - 3. Cleaning: Furnish flooring manufacturer's neutral cleaner for initial cleaning and maintenance of the finished floor surface.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Installer experienced in performing work of this section, who has specialized in installation of work similar to that required for this project.
 - 1. Confirmation: When requested, submit confirmation indicating qualification.
- B. Manufacturer's Qualifications: Manufacturer capable of providing field service representation during construction and approving application method.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with Division 1 Product Requirements Sections.
- 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 at temperature and humidity conditions recommended by manufacturer and protect from exposure to harmful weather conditions.

1.9 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for owner's acceptance, manufacturer's standard warranty document, executed by authorized company official.
 - 1. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Synthetic Turf Playing Surfaces: Assembly tested in accordance with ASTM F1551.

2.2 SYNTHETIC GRASS SURFACING

- A. Synthetic Grass Surfacing for Field Sports: Complete surfacing system, consisting of synthetic yarns bound to water-permeable backing and infill indicated, suitable for multipurpose sport playing fields.

- 1. Basis of Design: Centaur Floor Systems: Interval Turf 'Green'
 - a. Substitutions: Refer to section 012500

MANUFACTURER: Ecore A. Address: 715 Fountain Ave., Lancaster, PA 17601; Telephone: (800) 322-1923, (717) 295-3400; Fax: (717) 295-3414; Email: info@ecoreintl.com

DISTRIBUTOR: Centaur Floor Systems
 Address: 715 Fountain Ave., Lancaster, PA 17601; Telephone: (800) 536-9007
 Email: info@centaurfloors.com

- B. PROPRIETARY PRODUCT(S)

- 1. Centaur Interval Turf Rolls with 5mm Vulcanized Composition Rubber Base layer

Centaur Interval Turf Rolls with 5mm 6015H Vulcanized Composition Rubber Base Layer		
Made from a formulation of high-quality, post-consumer Vulcanized Composition Rubber granules encapsulated in a wear and water-resistant elastomeric network, with a fusion bonded Polyethylene turf wear layer		
Performance Criteria	Test Method	Result
Sheet Dimensions	Manufacturer	Turf wear layer pile height: 12mm, fusion bonded to a 5mm rubber 6015H base layer. Total Thickness approx. 17mm (11/16") Width: 72". Length: 35LF minimum.
Sheet Standard Tolerances	Manufacturer	Roll width: +3/4", - 0"; Roll length: +1%, - 0"
Slip Resistance / Coef. of Friction	ASTM D2047	0.87
Force Reduction/ Impact/ Energy Abatement	Deltec Field test, 5 kg mass	30.8%
Energy Restitution	Deltec Field test	46.6%
Vertical Deformation	Deltec Field test	3.8 mm
g-max	Clegg	192
Flammability	ASTM D2859	Pass

- C. Seaming Method: SecureLock.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.
- B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.
- C. Examine base and other conditions, with Installer present, for compliance with requirements for installation tolerances, permeability, and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions for installation.

3.3 FIELD QUALITY REQUIREMENTS

- A. Manufacturer's Field Services: Upon owner's request, provide manufacturer's field service, consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

3.4 INSTALLATION OF SYNTHETIC GRASS SURFACING

- A. Roll out turf fabric and allow to relax at least four hours prior to seaming.
- B. Provide seams flat and snug, with no gaps or fraying. Remove yarns that are trapped within seams. Attach turf fabric to perimeter restraint system as recommended by the manufacturer.

3.5 CLEANING

- A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. 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.

3.6 PROTECTION

- A. Protection: Protect installed product and finish surfaces from damage during construction.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel in proper maintenance procedures for synthetic grass surfacing.

END OF SECTION 321813

SECTION 329113 - SOIL PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes planting soils specified by composition of the mixes.
- B. Related Requirements:
 - 1. Section 311000 "Site Clearing" for topsoil stripping and stockpiling.

1.2 DEFINITIONS

- A. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
- B. Imported Soil: Soil that is transported to Project site for use.
- C. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
- D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- E. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- F. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- G. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- H. USCC: U.S. Composting Council.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. N.A.

C. Samples: For each bulk-supplied material in sealed containers labeled with content, source, and date obtained; providing an accurate representation of composition, color, and texture.

1.5 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

PART 2 - PRODUCTS

2.1 PLANTING SOILS SPECIFIED BY COMPOSITION

A. Planting-Soil Type L1.1: Imported, naturally formed soil from off-site sources and consisting of sandy loam soil according to USDA textures; and modified to produce viable planting soil.

1. Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 4 inches (100 mm) deep, not from agricultural land, bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass.
2. Additional Properties of Imported Soil before Amending: Soil reaction of pH 6 to 7 and minimum of 6 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.
3. Unacceptable Properties: Clean soil of the following:
 - a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
 - b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil.

- c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 2 inches (50 mm) in any dimension.

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 1. Class: T, with a minimum of 99 percent passing through a No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through a No. 60 (0.25-mm) sieve.
 2. Class: O, with a minimum of 95 percent passing through a No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through a No. 60 (0.25-mm) sieve.
 3. Form: Provide lime in form of ground calcitic limestone.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through a No. 40 (0.425-mm) sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Perlite: Horticultural perlite, soil amendment grade.
- E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 (0.30-mm) sieve.
- F. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C33/C33M.

2.3 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
 1. Feedstock: Limited to leaves.
 2. Reaction: pH of 5.5 to 8.
 3. Soluble-Salt Concentration: Less than 4 dS/m.
 4. Moisture Content: 35 to 55 percent by weight.
 5. Organic-Matter Content: 30 to 40 percent of dry weight.
 6. Particle Size: Minimum of 98 percent passing through a 1-inch (25-mm) sieve.

- B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch (13-mm) sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.
- C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture with 100 percent passing through a 1/2-inch (13-mm) sieve, a pH of 6 to 7.5, a soluble-salt content measured by electrical conductivity of maximum 5 dS/m, having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.
- D. Wood Derivatives: Shredded and composted, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.
- E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.4 FERTILIZERS

- A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. (0.5 kg/100 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
- C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

PART 3 - EXECUTION

3.1 GENERAL

- A. Place planting soil and fertilizers according to requirements in other Specification Sections.

- B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

- A. Excavation: Excavate soil from designated area(s) to a depth of 6 inches (150 mm) and stockpile until amended.
- B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- C. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.
- D. Screening: Pass unamended soil through a 2-inch (50-mm) sieve to remove large materials.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches (150 mm). Remove stones larger than 1-1/2 inches (38 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- C. Mixing: Spread unamended soil to total depth of 6 inches (150 mm), but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Amendments: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.
 - a. Mix lime and sulfur with dry soil before mixing fertilizer.
 - b. Mix fertilizer with planting soil no more than seven days before planting.
 - 2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches (200 mm) in loose depth for material compacted by compaction equipment, and not more than 6 inches (150 mm) in loose depth for material compacted by hand-operated tampers.
- D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D698 and tested in-place except where a different compaction value is indicated on Drawings.

- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 APPLYING COMPOST TO SURFACE OF PLANTING SOIL

- A. Application: Apply compost component of planting-soil mix 6 inches (150 mm) of compost to surface of in-place planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Finish Grading: Grade surface to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections:
 - 1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D698. Space tests at no less than one for each 1000 sq. ft. (100 sq. m) of in-place soil or part thereof.
- C. Soil will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.6 PROTECTION AND CLEANING

- A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."
- B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Vehicle traffic.
 - 4. Foot traffic.
 - 5. Erection of sheds or structures.
 - 6. Impoundment of water.
 - 7. Excavation or other digging unless otherwise indicated.

- C. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.
 - 1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 329113

90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches (125 by 125 mm).

- B. Satisfactory Sodded Lawn: At end of maintenance period, healthy, well-rooted, even-colored, viable lawn has is established, free of weeds, open joints, bare areas, and surface irregularities.
- C. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.
- D. Remove erosion-control measures after grass establishment period.

END OF SECTION 329200

SECTION 329200 – TURF AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes seeding.

1.2 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product certificates.
- C. Planting Schedule: Indicating anticipated planting dates.

1.4 QUALITY ASSURANCE

- A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- B. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.

1.5 LAWN MAINTENANCE

- A. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
 - 1. Seeded Lawns: 60 Calendar days from date of Substantial Completion.

2. Sodded Lawns: 30 Calendar days from date of Substantial Completion.

B. Mow lawn as soon as top growth is tall enough to cut. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings.

PART 2 - PRODUCTS

2.1 SEED

A. Seed Species: State-certified seed of grass species, as follows:

B. Lawn Areas:

30% Perennial Ryegrass, 30% Kentucky Bluegrass, 40% Creeping Red Fescue.

2.2 PLANTING MATERIALS

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on-site and supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Verify suitability of stockpiled surface soil to produce topsoil.

2. Topsoil Source: Amend existing in-place surface soil to produce topsoil. Verify suitability of surface soil to produce topsoil. Surface soil may be supplemented with imported or manufactured topsoil from off-site sources.

B. Inorganic Soil Amendments:

1. Lime: ASTM C 602, Class T or O, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.

2. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum 99 percent passing through No. 6 (3.35-mm) sieve and a maximum 10 percent passing through No. 40 (0.425-mm) sieve.

3. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

4. Aluminum Sulfate: Commercial grade, unadulterated.

C. Organic Soil Amendments

1. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8.

2. Peat: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with pH range of 3.4 to 4.8.

3. Peat: Finely divided or granular texture, with pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having water-absorbing capacity of 1100 to 2000 percent.
 4. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
- D. Fertilizer:
1. Chemical Fertilizer: 12:12:12.
- E. Mulches:
1. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
 2. Peat Mulch: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with pH range of 3.4 to 4.8.
 3. Peat Mulch: Finely divided or granular texture, with pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having water-absorbing capacity of 1100 to 2000 percent.

PART 3 - EXECUTION

3.1 LAWN PREPARATION

- A. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- B. Apply chemical fertilizer directly to subgrade before loosening. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
- C. Spread planting soil mix to a depth of 4 inches (100 mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
- D. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:
 1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.

2. Loosen surface soil to a depth of at least of 6 inches (150 mm). Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches (100 mm) of soil. Till soil to a homogeneous mixture of fine texture.
 3. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, trash, and other extraneous matter. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- E. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. 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.
- F. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- G. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

3.2 SEEDING

- A. Sow seed at the rate of 3 to 4 lb/1000 sq. ft. (1.4 to 1.8 kg/92.9 sq. m).
- B. Rake seed lightly into top 1/8 inch (3 mm) of topsoil, roll lightly, and water with fine spray.
- C. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre (42 kg/92.9 sq. m) to form a continuous blanket 1-1/2 inches (38 mm) in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.
- D. Protect seeded areas with slopes exceeding 1:6 with Flexterra FGM as manufactured by Profile, or approved equivalent.

3.3 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer and fiber mulch in water, using equipment specifically designed for hydroseeding application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
 1. Mix slurry with nonasphaltic tackifier.
 2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply mulch at a minimum rate of 1500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate.

3.4 SATISFACTORY LAWNS

- A. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding