

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

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

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

§ 7.2 CHANGE ORDERS

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

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

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

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

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

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

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

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

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

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

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

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

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

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

§ 8.2 PROGRESS AND COMPLETION

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be

furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2., for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

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

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the

Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

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

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

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

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

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

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

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

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

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

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

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

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

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

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

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

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

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

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

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

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

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

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

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

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

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

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

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

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

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

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's

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

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

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

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

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

§ 11.3.2 BOILER AND MACHINERY INSURANCE

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

§ 11.3.3 LOSS OF USE INSURANCE

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

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

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

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

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

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

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

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

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

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

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

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

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

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

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

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

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

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

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

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

§ 13.2 SUCCESSORS AND ASSIGNS

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

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

§ 13.3 WRITTEN NOTICE

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

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

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

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

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

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

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

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

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

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

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

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

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

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

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

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

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

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

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

§ 15.2 INITIAL DECISION

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

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

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

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The

party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

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

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

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

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

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

DOCUMENT 004113 - BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)

1.1 BID INFORMATION

- A. Bidder: _____.
- B. Project Name: Ironwood Carnegie Library
- C. Project Location: 235 E Aurora St, Ironwood, MI 49938
- D. Owner: City of Ironwood
- E. Architect: Meyer Group Architecture, P.C.
- F. Architect Project Number: 24-022

1.2 CERTIFICATIONS AND BASE BID

- A. Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Meyer Group Architects, P.C. and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:
 - 1. _____ Dollars (\$_____).
 - 2. The above amount may be modified by amounts indicated by the Bidder on the attached Document 004323 "Alternates Form."
 - 3. General Contract (all trades) shall be to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of this project, according to the requirements of the Procurement and Contracting Documents.

1.3 BID GUARANTEE

- A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within 10 days after a written Notice of Award, if offered within **60** days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid amount above:
 - 1. _____ Dollars (\$_____).
- B. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

1.4 SUBCONTRACTORS AND SUPPLIERS

A. Owner shall be notified of the Sub-Contractors used on this project. Contractor shall state/list the following companies which shall execute subcontracts for the portions of the Work indicated (state firm name and value):

- 1. Site Work: _____ \$ _____.
- 2. Landscaping: _____ \$ _____.
- 3. Concrete Work: _____ \$ _____.
- 4. Masonry Work: _____ \$ _____.
- 5. Roofing Work: _____ \$ _____.
- 6. HVAC Work: _____ \$ _____.
- 7. Plumbing Work: _____ \$ _____.
- 8. Electrical Work: _____ \$ _____.
- 9. Rough Carpentry Work: _____ \$ _____.
- 10. Finish Carpentry Work: _____ \$ _____.

1.5 TIME OF COMPLETION

A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Architect upon approval of the Owner, and the project shall be Substantially Complete by **March 1, 2026** and Final Completion shall be **April 1, 2026**.

1.6 ACKNOWLEDGEMENT OF ADDENDA

A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

- 1. Addendum No. 1, dated _____.
- 2. Addendum No. 2, dated _____.
- 3. Addendum No. 3, dated _____.
- 4. Addendum No. 4, dated _____.

1.7 BID SUPPLEMENTS

A. The following supplements are a part of this Bid Form and are attached hereto.

- 1. Bid Form Supplement - Alternates.
- 2. Bid Form Supplement - Bid Bond Form (AIA Document A310).

1.8 CONTRACTOR'S LICENSE

A. The undersigned further states that it is a duly licensed contractor, for the type of work proposed, in the State of Michigan, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

1.9 ALTERNATES (ATTACH 004323 ALTERNATES FORM)

A. Attach 004323 Alternate Form to the Bid Form.

1.11 SUBMISSION OF BID

Respectfully submitted this ____ day of _____, 2024.

Submitted By: _____
(Name of bidding firm or corporation)

Authorized Signature: _____
(Handwritten signature)

Signed By: _____
(Type or print name)

Title: _____
(Owner/Partner/President/Vice President)

Witness By: _____
(Handwritten signature)

Attest: _____
(Handwritten signature)

By: _____
(Type or print name)

Title: _____
(Corporate Secretary or Assistant Secretary)

Street Address: _____

City, State, Zip _____

Phone: _____

License No.: _____

Federal ID No.: _____

(Affix Corporate Seal Here)

END OF DOCUMENT 004113

DOCUMENT 004313 - BID SECURITY FORMS

1.1 BID FORM SUPPLEMENT

- A. A completed bid bond form is required to be attached to the Bid Form.

1.2 BID BOND FORM

- A. AIA Document A310, "Bid Bond," is the recommended form for a bid bond. A bid bond acceptable to Owner, or other bid security as described in the Instructions to Bidders, is required to be attached to the Bid Form as a supplement.
- B. Copies of AIA standard forms may be obtained from The American Institute of Architects; www.aia.org/contractdocs/purchase/index.htm; email: docspurchases@aia.org; (800) 942-7732.

END OF DOCUMENT 004313

DOCUMENT 004323 - ALTERNATES FORM

1.1 BID INFORMATION

- A. Bidder: _____.
- B. Prime Contract: _____.
- C. Project Name: Ironwood Carnegie Library
- D. Project Location: 235 E Aurora St, Ironwood, MI 49938
- E. Owner: City of Ironwood
- F. Architect: Meyer Group, P.C.
- G. Architect Project Number: 24-022

1.2 BID FORM SUPPLEMENT

A. This form is required to be attached to the Bid Form.

1.3 DESCRIPTION

- A. The undersigned Bidder proposes the amount below be added to or deducted from the Base Bid if particular alternates are accepted by Owner. Amounts listed for each alternate include costs of related coordination, modification, or adjustment.
 - 1. Cost-Plus-Fee Contract: Alternate price given below includes adjustment to Contractor's Fee.
- B. If the alternate does not affect the Contract Sum, the Bidder shall indicate "NO CHANGE."
- C. If the alternate does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."
- D. The Bidder shall be responsible for determining from the Contract Documents the affects of each alternate on the Contract Time and the Contract Sum.
- E. Owner reserves the right to accept or reject any alternate, in any order, and to award or amend the Contract accordingly within 60 days of the Notice of Award unless otherwise indicated in the Contract Documents.
- F. Acceptance or non-acceptance of any alternates by the Owner shall have no affect on the Contract Time unless the "Schedule of Alternates" Article below provides a formatted space for the adjustment of the Contract Time.

1.4 SCHEDULE OF ALTERNATES

- A. **Add Alternate No. 1:** Provide a cost to provide a conditioned crawl space, rat slab, wood joists floor framing, for the addition and breezeway and midspan footings at the addition as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
 - 1. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.
 - 2. _____ Dollars (\$_____).
 - 3. ADD ___ DEDUCT ___; ___ calendar days to adjust the Contract Time for this alternate.
- B. **Add Alternate No. 2:** Provide a cost to demo the existing ramp in its entirety and provide a new ramp as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
 - 4. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.
 - 5. _____ Dollars (\$_____).
 - 6. ADD ___ DEDUCT ___; ___ calendar days to adjust the Contract Time for this alternate.
- C. **Add Alternate No. 3:** Provide a cost to provide a concrete stair at West wall of the breezeway as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.

7. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.
8. _____ Dollars (\$_____).
9. ADD ___ DEDUCT ___; ___ calendar days to adjust the Contract Time for this alternate.
- D. Add Alternate No. 4:** Provide a cost to provide aluminum storefront and glazed wall assembly at the breezeway in lieu of wood framed walls and punched openings as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
10. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.
11. _____ Dollars (\$_____).
12. ADD ___ DEDUCT ___; ___ calendar days to adjust the Contract Time for this alternate.
- E. Add Alternate No. 5:** Provide a cost to increase the width of the concrete stair along the South wall of the addition as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
13. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.
14. _____ Dollars (\$_____).
15. ADD ___ DEDUCT ___; ___ calendar days to adjust the Contract Time for this alternate.
- F. Add Alternate No. 6:** Provide a cost to add lower windows in the East and South walls of the Addition as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
16. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.
17. _____ Dollars (\$_____).
18. ADD ___ DEDUCT ___; ___ calendar days to adjust the Contract Time for this alternate.
- G. Add Alternate No. 7:** Provide a cost to add interior finished carpentry wall base and crown molding as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
19. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.
20. _____ Dollars (\$_____).
21. ADD ___ DEDUCT ___; ___ calendar days to adjust the Contract Time for this alternate.
- H. Add Alternate No. 8:** Provide a cost to provide a Hydronic Unit Ventilator above the dropped ceiling of the addition in lieu of the Gas Furnace and Utility Closet in the addition as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A and described in the Alternate MEP Design-Build Narratives.
22. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.
23. _____ Dollars (\$_____).
24. ADD ___ DEDUCT ___; ___ calendar days to adjust the Contract Time for this alternate.
- I. Add Alternate No. 9:** Provide a cost to provide onsite bituminous parking, concrete sidewalks, shrubbery plantings, and restriping of ADA parking spaces along S Norfolk Street as depicted on alternate sheet AA0.2.
25. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.
26. _____ Dollars (\$_____).
27. ADD ___ DEDUCT ___; ___ calendar days to adjust the Contract Time for this alternate.
- J. Deduct Alternate No. 10:** Provide a cost to provide 1x4 Furring Strips, Metal Lath, Mortar Scratch Coat, Mortar Setting Bed, and Modular Thin Brick in lieu of 1" Air Space and Full Width Modular Face Brick as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
28. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.
29. _____ Dollars (\$_____).
30. ADD ___ DEDUCT ___; ___ calendar days to adjust the Contract Time for this alternate.

1.5 SUBMISSION OF BID SUPPLEMENT

- A. Respectfully submitted this ___ day of _____, 2024.
- B. Submitted By: _____ (Insert name of bidding firm or corporation).
- C. Authorized Signature: _____ (Handwritten signature).

D. Signed By: _____ (Type or print name).

E. Title: _____ (Owner/Partner/President/Vice President).

END OF DOCUMENT 004323

007346 PREVAILING WAGE RATE REQUIREMENTS

1.1 PROJECT INFORMATION

- A. This project is partially funded by the State of Michigan which shall enforce the following as it relates to Prevailing Wages: Comply with all of the applicable provisions contained in **Chapter 408 of the Michigan Statutes**, as they may be amended, modified or replaced from time to time with respect to the Project and the operation of the State Program on or in the Real Property and, if applicable, Facility.

END OF SECTION 007346 - ATTACHMENT TO FOLLOW

Superseded General Decision Number: MI20230120

State: Michigan

Construction Type: Building

County: Gogebic County in Michigan.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<ul style="list-style-type: none"> . Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<ul style="list-style-type: none"> . Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/05/2024
1	04/05/2024
2	06/14/2024
3	07/05/2024

Rates Fringes

ASBESTOS WORKER/HEAT & FROST
INSULATOR.....\$ 37.62 28.95

BOIL0169-002 01/01/2024

Rates Fringes

BOILERMAKER.....\$ 39.65 35.68

BRMI0006-001 05/01/2023

Rates Fringes

BRICKLAYER.....\$ 30.79 24.30
TILE SETTER.....\$ 30.79 24.30

CARP1510-005 06/01/2020

Rates Fringes

MILLWRIGHT.....\$ 30.00 21.48

CARP1510-010 06/01/2023

Rates Fringes

CARPENTER (Acoustical Ceiling
Installation, Drywall
Finishing/Taping, Drywall
Hanging, Form Work, and Soft
Floor Layer - Carpet).....\$ 30.16 22.01

ELEC0219-015 06/01/2019

Rates Fringes

ELECTRICIAN (Excludes Low
Voltage Wiring)
Electrical contracts of
\$180,000 or less.....\$ 31.75 21.73
Electrical contracts over
\$180,000.....\$ 33.94 21.80

ENGI0324-031 05/01/2024

Rates Fringes

POWER EQUIPMENT OPERATOR:
Crane operator, main boom
& jib 120' or longer.....\$ 41.41 25.00
Crane operator, main boom
& jib 140' or longer.....\$ 42.23 25.00
Crane operator, main boom
& jib 220' or longer.....\$ 42.52 25.00
GROUP 1.....\$ 38.11 25.00
GROUP 2.....\$ 34.86 25.00
GROUP 3.....\$ 33.46 12.50

Premium rate: main boom and jib 300 feet or longer is \$1.50
per hour above the 220 ft. boom and jib rate. Main boom and
jib 400 feet or longer is \$3.00 per hour above the 220 ft.
boom and jib rate.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: backhoe, bulldozer; crane, front end loader,
excavator, paver, roller, and scraper (self-propelled and
tractor drawn)

GROUP 2: fork truck
GROUP 3: oiler

IRON0008-008 06/01/2022

Rates Fringes

IRONWORKER, REINFORCING AND
STRUCTURAL

Contracts \$10,000,000 or
greater.....\$ 32.83 27.95
Contracts less than
\$10,000,000.....\$ 32.83 27.95

Paid Holidays: New Year's Day, Memorial Day, July 4th, Labor
Day, Thanksgiving Day & Christmas Day.

LABO1329-005 05/01/2024

Rates Fringes

LABORER

Common or General; Mason
Tender - Brick; Mason
Tender - Cement/Concrete;
and Sandblaster.....\$ 36.99 13.45
Pipelayer.....\$ 30.09 12.95

PAIN1011-001 06/02/2019

Rates Fringes

PAINTER (Insulator Foam Only)....\$ 27.54 13.33

PAIN1011-006 06/02/2019

Rates Fringes

PAINTER (Brush, Roller, and
Spray).....\$ 21.52 13.33

PLAS0016-037 04/01/2014

Rates Fringes

CEMENT MASON/CONCRETE FINISHER...\$ 20.17 10.13

* PLUM0111-002 06/01/2024

Rates Fringes

PIPEFITTER (Excludes HVAC
Pipe & System Installation).....\$ 43.09 27.53
PIPEFITTER (HVAC Pipe
Installation Only).....\$ 34.59 27.53
PLUMBER (Excluding HVAC Pipe
& System Installation).....\$ 34.59 27.53

ROOF0149-014 05/01/2021

Rates Fringes

ROOFER.....\$ 26.50 15.95

SHEE0007-006 07/01/2023

Rates Fringes

SHEET METAL WORKER (Excluding HVAC Duct & System Installation).....	\$ 32.74	29.85
SHEET METAL WORKER (HVAC Duct & System Installation).....	\$ 27.24	29.85

* SUMI2011-045 02/14/2011

	Rates	Fringes
CARPENTER, Excludes Acoustical Ceiling Installation, Drywall Finishing/Taping, Drywall Hanging, Form Work, and Soft Floor Laying-Carpet.....	\$ 13.00 **	1.32
GLAZIER.....	\$ 17.50	2.27
LABORER: Landscape & Irrigation.....	\$ 14.95 **	0.00
OPERATOR: Grader/Blade.....	\$ 24.04	6.03
OPERATOR: Tractor.....	\$ 19.60	7.31
TRUCK DRIVER: Flatbed Truck.....	\$ 17.44	4.51

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

=====

** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.20) or 13658 (\$12.90). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

State Adopted Rate Identifiers

Classifications listed under the ""SA"" identifier indicate that

the prevailing wage rate set by a state (or local) government was adopted under 29 C.F.R. 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 01/03/2024 reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

SECTION 008000 SUPPLEMENTARY GENERAL CONDITIONS

The following supplements modify the "General Conditions of the Contract for Construction," AIA Document A201 – 2007. Additionally, the AIA Document A101 and A201 will not be executed "as-is". Both parties shall negotiate additional provisions prior execution of the Contract for Construction, including, but not limited to choice of law, dispute resolution and other agreed upon provisions.

ARTICLE 1: GENERAL PROVISIONS

1.1.1 THE CONTRACT DOCUMENTS

Add the following sentence to the end of Subparagraph 1.1.1:

The Contract Documents executed or identified in accordance with Subparagraph 1.5.1 shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic operations involving computers.

1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

Add the following Subparagraph 1.6.2 to Paragraph 1.6:

1.6.2 Contractors Use of Instruments of Service in Electronic Form

1.6.2.1 The Architect may, with the concurrence of the Owner, furnish to the Contractor versions of instruments of Service in electronic form. The Contract Documents executed or identified in accordance with Subparagraph 1.5.1 shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic operations involving computers.

1.6.2.2 The Contractor shall not transfer or reuse instruments of Service in electronic or machine readable form without prior written consent of the Architect.

ARTICLE 11: INSURANCE AND BONDS

11.1.2.2 The insurance required by Sub-Paragraph 11.2.1 shall be not less than the following:

- A. Workmen's Compensation and Occupational Disease Insurance: As required by Law.
- B. Employer's Liability Insurance: Bodily injury by accident, \$1 Million each accident; bodily injury by disease, \$1 Million contract limit; bodily injury by disease, \$1 Million by disease.
 - 1. Employers Liability Insurance Policy shall be amended to include coverage for fire and explosion liability.
- C. Comprehensive General Liability Insurance Covering:
 - 1. Operations - Premises Liability: Including, but not limited to: Bodily injury, including death at any time resulting therefrom, to any person or property damage resulting from execution of the work provided for in this contract or due to or arising in any manner from any act or any omission or negligence of the Contractor and any Subcontractor, their respective employees or agents.
 - 2. Products - Completed Operations Liability: Including, but not limited to, bodily injury including death at any time resulting therefrom to any person or property damage because of goods, products, materials, or equipment used or installed under this contract or because of completed operations which may become evident after acceptance of the building, including damage to the building or its contents. Shall be kept in force for at least two years after date of final completion.

3. Contractual Liability: Each and every policy for liability insurance, carried by each Contractor and Subcontractor as required by this Article shall specifically include contractual liability (hold harmless clause) coverage with respect to Article 3.18 of the AIA General Conditions.
 4. Special Requirements: The insurance required under 11.1.1 of this Article shall specifically include the following special hazards:
 - a. Property damage caused by conditions otherwise subject to exclusions "X, Cu, U", explosion, collapse or underground damage, as defined by the National Bureau of Casualty Underwriters.
 - b. Personal injury liability with employment exclusions deleted.
 - c. Property damage liability coverage shall be broad form coverage, including completed operations.
 - d. "Occurrence" bodily injury coverage in lieu of "Caused by Accident."
 - e. EXCEPTION: Contracts that do not require excavation or underground work are not required to have the above "Special Hazards" insurance coverage under 6a above.
 5. Limits of Liability: The insurance under 1.1.1 of this Article shall be written in the following limits of liability as a minimum:
 - a. Commercial General Liability per occurrence: \$1 Million combined single limit.
 - b. Products/ completed operations aggregate: \$1 Million combined single limit.
 - c. General Aggregate per Project: \$2 Million combined single limit.
 - d. Personal Injury: \$1 Million combined single limit per occurrence.
- D. Comprehensive Automobile Liability Insurance Covering:
1. All owned, hired, or non-owned vehicles used to carry out work of this project including those used to transport materials and equipment to the project site and the loading or unloading thereof.
 2. Special Requirements: The insurance required under 11.1.2 C of this Article shall specifically include the following special hazards:
 - a. "Occurrence" bodily injury in lieu of "Caused by Accident."
 - b. "Occurrence" property damage in lieu of "Caused by Accident."
 3. Limits of Liability: The insurance under 11.1.2. C of this Article shall be written in the following limits of liability as a minimum:
 - a. Combined Automobile, including owned, non-owned, and hired coverage, including pollution liability: \$1 Million combined single limit per occurrence.
- E. Umbrella excess liability, including automobiles and pollution liability: \$1 Million per occurrence.
- F. Umbrella Clause: If an umbrella clause is written to implement the above prime coverages the umbrella clause shall specifically state that the policy is written on an "Occurrence" basis".
- G. The Architect and the Owner assume no responsibility in the event the limits set above are not adequate.

ADD the following after Paragraph 11.1.3:

11.1.3.1 No Contractor, Material Supplier, or Equipment Supplier, shall commence work under this Contract until he has obtained all insurance required under this Section and such insurance has been approved by the Owner and Architect, nor shall any Contractor allow any Subcontractor to commence work on his subcontract until the same insurance has been obtained by the Subcontractor. Unless exception are noted or specified, each and every Contractor and Subcontractor shall maintain all insurance required under 11.1.1, and 11.1.2 of this Section for not less than one year after completion of the Contract.

11.1.3.2 Each Contractor shall file with the Owner and Architect two copies of a Certificate of Insurance on standard AIA-AGC Joint Committee forms. Any certificate submitted and found to be incomplete will be returned as unsatisfactory.

11.1.3.3 If requested by the Owner, Contractor shall furnish the Owner with true copies of each policy required of him or his Subcontractors.

11.1.3.4 Each Contractor shall secure the following endorsements to each of the above policies:

"It is understood and agreed that the insurance company will give not less than thirty days advance written notice of any cancellation nor material change under any of these policies to the Owner."

"In the event that such Notice is not given to the Owner at least thirty days prior to cancellation or material change, the policy will continue in full force and effect for the benefit of the Owner as if such change or cancellation had not occurred."

END OF SECTION

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - ALTERNATES

3.1 SCHEDULE OF ALTERNATES

- A. **Add Alternate No. 1:** Provide a cost to provide a conditioned crawl space, rat slab, wood joists floor framing, for the addition and breezeway and midspan footings at the addition as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
- B. **Add Alternate No. 2:** Provide a cost to demo the existing ramp in its entirety and provide a new ramp as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
- C. **Add Alternate No. 3:** Provide a cost to provide a concrete stair at West wall of the breezeway as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.

- D. **Add Alternate No. 4:** Provide a cost to provide aluminum storefront and glazed wall assembly at the breezeway in lieu of wood framed walls and punched openings as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
- E. **Add Alternate No. 5:** Provide a cost to increase the width of the concrete stair along the South wall of the addition as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
- F. **Add Alternate No. 6:** Provide a cost to add lower windows in the East and South walls of the Addition as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
- G. **Add Alternate No. 7:** Provide a cost to add interior finished carpentry wall base and crown molding as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.
- H. **Add Alternate No. 8:** Provide a cost to provide a Hydronic Unit Ventilator above the dropped ceiling of the addition in lieu of the Gas Furnace and Utility Closet in the addition as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A and described in the Alternate MEP Design-Build Narratives.
- I. **Add Alternate No. 9:** Provide a cost to provide onsite bituminous parking, concrete sidewalks, shrubbery plantings, and restriping of ADA parking spaces along S Norfolk Street as depicted on alternate sheet AA0.2.
- J. **Deduct Alternate No. 10:** Provide a cost to provide 1x4 Furring Strips, Metal Lath, Mortar Scratch Coat, Mortar Setting Bed, and Modular Thin Brick in lieu of 1" Air Space and Full Width Modular Face Brick as depicted on alternate sheets AA0.2 thru AA6.1 and S0.1A thru S5.2A.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 012300 "Alternates" for products selected under an alternate.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A or a facsimile of form provided in Project Manual.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, which will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. Cost information, including a proposal of change, if any, in the Contract Sum.
 - h. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - i. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Owner's Action: If necessary, Owner will request additional information or documentation for evaluation within Seven (7) days of receipt of a request for substitution. Owner will notify Contractor of acceptance or rejection of proposed substitution within Fifteen (15) days of receipt of request, or Six (6) days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use original product specified if Owner does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Bidder shall, at their own expense, engage a qualified testing agency to perform compatibility tests, as recommended by manufacturers to support their request for substitution.

1.6 PROCEDURES

- A. Coordination: Revise and/or adjust any/all affected work as required to fully integrate the approved substituted material(s) into the project scope.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than Fifteen (15) days prior to time required for preparation and review of related submittals.
 1. Conditions: Owner will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated design results.
 - b. Substitution request is fully documented and properly submitted as outlined above.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals, in writing, of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated and documented with other portions of the Work directly affected.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution shall be coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved, inclusive all related costs associated with same.
- B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Owner, thru the Architect, shall issue Supplemental Instructions authorizing minor changes in the Work which do not involve adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Owner, thru the Architect, will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Owner are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or Fourteen (14) days when not otherwise specified, after receipt of Proposal Request, Contractor shall submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a detailed, break down list of quantities of products, quantities, labor and material required or eliminated, as well as unit costs, with total amount of purchases and credits to be made. As requested, furnish necessary survey data to substantiate quantities.
 - b. Indicate all applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in scheduled activity duration, start and finish times, and any activity relationships for sub-contractors. Use any available or scheduled total float time prior requesting an extension of the stated Contract Time.
 - e. Quotation Form: Use forms acceptable to Owner or AIA Form G709-2001.
- B. Contractor-Initiated Proposals: If latent or changed conditions have been agreed upon and require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Owner, thru the Architect's Office as follows:
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. As requested, furnish necessary survey data to substantiate quantities.
3. Indicate all applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: form acceptable to Owner or AIA Form G709-2001.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's written approval of a Work Changes Proposal Request, Owner, through the Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Owner, through the Architect, may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion into a formal Change Order.
 1. Construction Change Directive shall contain a complete description of change in the Work. It shall also designate a method to be followed in determining the agreed upon change to the Contract Sum or the Contract Time.
- B. Documentation: Contractor and their Sub-Contractor(s) shall maintain detailed records on a time and material basis of work required by the issued Construction Change Directive.
 1. After completion of the work, Contractor shall submit an itemized account and all supporting data necessary to substantiate the requested cost and time adjustments to the Contract for the work directed.

PART 2 - PRODUCTS (Not Used)

END OF SECTION 012600

SECTION 012900 – PAYMENT PROCEDURES

PART 1 GENERAL

1.01. CONDITIONS OF THE CONTRACT

- A. The Conditions of the Contract (General, Supplementary and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this section. The article contained in this Section may delete, modify, or add to the provisions of the Conditions of the Contract and shall take precedence over the Conditions of the Contract.
- B. The conditions of this Section shall apply to the Technical Sections of Division 2 through 16.

1.2 SECTION INCLUDES

- A. Schedule of Values
- B. Application for Payments
- C. Retainage
- D. Final Payment
- E. Change Orders

1.3 SCHEDULE OF VALUES

- A. Supplement the General Conditions:
- B. **THE CONTRACTOR** shall prepare a schedule of values for their Work on AIA Document G702 and G703 and submit three copies to the Architect for approval at least fourteen days prior to the submission of the first Application for Payment.
- C. The value of the Work shall generally be itemized by specification Section. Separate materials and delivery from site handling and installation.
- D. Items of a general or temporary nature, such as bond premiums or temporary heat, shall be itemized in insufficient detail so that payment may be made as the item of work is complete.
- E. Each item in the schedule of values shall contain its proper share of overhead and profit.
- F. **ROUND OFF ALL FIGURES TO THE NEAREST DOLLAR.**

1.4 APPLICATIONS FOR PAYMENT

- A. Supplement the General Conditions as follows:
- B. Based upon Applications for Payment submitted by the Contractor, the Owner, shall make progress payments on account of Contract Sum to the Contractor as provided in the Contract Documents for the period ending the last day of each month as follows:
- C. Not later than the last day of each month, the Contractor shall submit to the Architect five (5) copies of Application for Payment for work performed through the end of the month, for (a) the value of the all labor and materials incorporated into the Work as computed on the basis of the approved schedule of values, prices and allowable quantities of Work; and (b) to the extent allowable by the Contract Documents, the value of materials not incorporated in the Work, but delivered and suitably stored at the project site, less the aggregate of previous payments made by the Owner.
- D. The Contractor shall submit an itemized Application for Payment, based upon the approved schedule of values, on AIA Documents G702 and G703, supported by such data substantiating the Contractor's right to payment as the Architect may require and reflecting the retainage provided for in the Contract Documents.
- E. Upon review and approval, the Architect will sign forward three (3) copies to the Owner with their recommendations.
- F. Monthly and final payments will be made to the Contractor from the Owner.

- G. Round off all figures on all progress payments to the nearest dollar, any adjustment required shall be made on the final application for payment.
- H. No payment will be made to a contractor on account of materials and equipment in transit or stored at off site locations unless prior approval is received from the Owner and Architect. Proof of proper insurance must be submitted for materials stored off site before approval will be considered.
- I. With submission of the final payment request, or upon request for reduction of retainage, the General Contractor shall provide lien waivers from all subcontractors and suppliers covering all dollar amounts for which a lien waiver has not yet been submitted.

1.5 RETAINAGE

- A. To insure the proper performance of the Contract, the Owner will retain **FIVE PERCENT** of the amount of each Certificate for Payment issued by the Architect. Such amount will be retained by the Owner until Substantial Completion. At substantial completion the withholding amount will be reduced to Five Percent.
- B. In event of a very minor amount of work, incomplete or not corrected due to weather, unsuitable conditions for testing or similar conditions preventing the General Contractor from proceeding, the retained amount may be reduced to three times the value of the incomplete work upon recommendation of the Architect and approved by the Owner.

1.6 FINAL PAYMENT

Refer to Section 017700 - Project Close-out, for final payment.

1.7 CHANGE ORDERS

- A. Supplement Article 7 of the General Conditions.
- B. If a change in the Work is desired by the Owner, the Architect will notify the General Contractor and provide a written description, in the form of drawings or otherwise, of the change.
- C. The General Contractor shall promptly submit in writing a firm proposal for any change in the Contract Sum and Contract Time resulting from the proposed change to the Architect. This proposal shall be broken down as follows:
 - 1. Labor (hours x rate per hour)(if labor burden is applied to rates than an additional overhead and profit may not be added).
 - 2. Materials (further breakdown major items as requested by the Owner or Architect).
 - 3. Equipment (Individually described and listed).
 - 4. Overhead and Profit.
- D. The Owner shall have ten (10) days, or such other items as may be agreed upon, in which to accept or reject the General Contractor's proposal after its submission, and the General Contractor shall not modify or withdraw the proposal during this period. Work shall not proceed until approval is obtained from the Owner.
- E. Add the following Subparagraphs under Paragraph 7.3.6:
 - 6. The percentages allowed for overhead, profit or commission listed below shall be deemed to include, and no further addition allowed for:
 - 1) field and office supervision and administration, including the field superintendent and foremen;
 - 2) general insurance, except that listed as the labor burden;
 - 3) use or replacement of tools;
 - 4) shop burden;
 - 5) equipment rental (other than specifically required additional hoisting equipment,

required excavating equipment or similar equipment necessary solely as a result of the Change)

- 6) engineering and estimating costs;
 - 7) cost of safety measures (including those imposed by OSHA);
 - 8) shipping, drayage and demurrage;
 - 9) parking charges;
 - 10) clean up and debris removal;
 - 11) testing;
 - 12) permits, unless a new permit type is required;
 - 13) or any other costs except those enumerated below.
7. The maximum that will be allowed for overhead, profit or commission shall be as follows, expressed as a percentage of the actual basic cost of the change. The percentages for profit, overhead and commission allowed by the Owner may be less, depending on the nature, extent or complexity of the change, where the percentage is not commensurate with the responsibility and administration involved (such as the General Contractor merely processing a substantial Change Order to a Subcontractor) but in no event shall they exceed the following:
- | OVERHEAD/PROFIT | COMMISSION |
|---|------------------|
| a) To the Contractor for materials supplied to and/or work performed by his own forces: | 15%. |
| b) To the Contractor for work performed by other than his own forces (subcontractor quotes under \$10,000): | COMMISSION - 7%. |
| c) To the Contractor for work performed by other than his own forces (subcontractor quotes of \$10,000 and over): | COMMISSION- 5%. |
8. Not more than three percentages for overhead, profit and commission will be allowed. The mark-up on any part of the Work a Subcontractor subcontracts will be limited to one overhead figure and one profit figure, in addition to the General Contractor's commission. The Subcontractor and Sub-contractor may divide the overhead and profit amount as they agree upon.
9. For changes involving both extra and credit amounts, the overhead and profit, or commission, shall be applied only to net difference where the extra exceeds the credit.
10. For changes resulting in a credit in the basic costs, a reasonable allowance for overhead, profit or commission may be required to be credited the Owner, as approved by the Architect. In general, no credit for overhead, profit or commission will be required where the net change credit is minor or where the change in Work indicates it is reasonable that no credit be allowed to the Owner due to the effort, cost or responsibility of the Contractor. In the event of substantial subcontract credits, or for Work not performed by the Contractor, a reasonable overhead, profit or commission credit shall be allowed to the Owner.

END OF SECTION

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. Requests for Information (RFIs).
 - 4. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 2. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: *AIA Form G705-2001*. Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: *AIA Form G807-2001*. Within Fifteen (15) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in project meeting room, in temporary field office, and as indicated be Owner. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Pre-Installation conferences as directed by Architect for key elements and components identified through the Pre-Construction meeting or as contained in the specified sections of the work.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. Owner will return RFIs submitted to Owner by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. RFI number, numbered sequentially.
 6. RFI subject.
 7. Specification Section number and title and related paragraphs, as appropriate.
 8. Drawing number and detail references, as appropriate.
 9. Field dimensions and conditions, as appropriate.
 10. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 11. Contractor's signature.
 12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

- a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716-2004
 - 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Owner's Action: Owner will review each RFI, determine action required, and respond. Allow Seven (7) working days for Owner's response for each RFI. RFIs received by Owner after 1:00 p.m. will be considered as received the following working day.
 - 1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Owner's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 - 2. Owner's action may include a request for additional information, in which case Owner's time for response will date from time of receipt of any additional information.
 - 3. Owner's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Owner/Architect in writing within Ten (10) days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log at weekly project meetings to Owner.
 - 1. Project name.
 - 2. Name and address of Contractor.
 - 3. RFI number including RFIs that were returned without action or withdrawn.
 - 4. RFI description.
 - 5. Date the RFI was submitted.
 - 6. Date Owner's response was received.
- F. On receipt of Owner's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Owner within Seven (7) days if Contractor disagrees with response.
 - 1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 - 2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.7 PROJECT MEETINGS

- A. Preconstruction Conference: Owner/Architect shall schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner, but no later than Fifteen (15) days after execution of the Agreement.
 - 1. Conduct the conference to review responsibilities and personnel assignments.
 - 2. Attendees: Authorized representatives of Owner and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.

- c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for RFIs.
 - h. Procedures for testing and inspecting.
 - i. Procedures for processing Applications for Payment.
 - j. Distribution of the Contract Documents.
 - k. Submittal procedures.
 - l. Preparation of record documents.
 - m. Use of the premises and existing building.
 - n. Work restrictions.
 - o. Working hours.
 - p. Owner's occupancy requirements.
 - q. Responsibility for temporary facilities and controls.
 - r. Procedures for moisture and mold control.
 - s. Procedures for disruptions and shutdowns.
 - t. Construction waste management and recycling.
 - u. Parking availability.
 - v. Office, work, and storage areas.
 - w. Equipment deliveries and priorities.
 - x. First aid.
 - y. Security.
 - z. Progress cleaning.
4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- B. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner, but no later than Ninety (90) days prior to the scheduled date of Substantial Completion.
- 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 - 2. Attendees: Authorized representatives of Owner and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of record documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Requirements for preparing operations and maintenance data.
 - e. Requirements for delivery of material samples, attic stock, and spare parts.
 - f. Requirements for demonstration and training.
 - g. Preparation of Contractor's punch list.
 - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - i. Submittal procedures.
 - j. Coordination of separate contracts.
 - k. Owner's partial occupancy requirements.
 - l. Installation of Owner's furniture, fixtures, and equipment.
 - m. Responsibility for removing temporary facilities and controls.
 - 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

- C. Progress Meetings: Owner will schedule and conduct progress meetings at weekly intervals.
1. Attendees: In addition to representatives of Owner, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Quality and work standards.
 - 11) Status of correction of deficient items.
 - 12) Field observations.
 - 13) Status of RFIs.
 - 14) Status of proposal requests.
 - 15) Pending changes.
 - 16) Status of Change Orders.
 - 17) Pending claims and disputes.
 - 18) Documentation of information for payment requests.
 3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

END OF SECTION 013100

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Owner and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.

- c. Submittal category: Action; informational.
- d. Name of subcontractor.
- e. Description of the Work covered.
- f. Scheduled date for Owner's final release or approval.
- g. Scheduled date of fabrication.
- h. Scheduled dates for purchasing.
- i. Scheduled dates for installation.
- j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 - 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Owner reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owner's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow Fifteen (15) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Owner will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Resubmittal Review: Allow Fifteen (15) days for review of each resubmittal.
- C. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Owner.
 - 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Construction Manager/Owner.
 - d. Name of Contractor.
 - e. Name of subcontractor.
 - f. Name of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.

- 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Owner observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Owner will discard submittals received from sources other than Contractor.
 - a. Transmittal Form for Paper Submittals: Use AIA Document G810 or other form approved by Owner.
 - b. Transmittal Form for Paper Submittals: Provide locations on form for the following information:
 - 1) Project name.
 - 2) Date.
 - 3) Destination (To:).
 - 4) Source (From:).
 - 5) Name of Construction Manager/Owner.
 - 6) Name of Contractor.
 - 7) Name of firm or entity that prepared submittal.
 - 8) Names of subcontractor, manufacturer, and supplier.
 - 9) Category and type of submittal.
 - 10) Submittal purpose and description.
 - 11) Specification Section number and title.
 - 12) Specification paragraph number or drawing designation and generic name for each of multiple items.
 - 13) Drawing number and detail references, as appropriate.
 - 14) Indication of full or partial submittal.
 - 15) Transmittal number, numbered consecutively.
 - 16) Submittal and transmittal distribution record.
 - 17) Remarks.
 - 18) Signature of transmitter.
- D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Owner.
 4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:

- a. Project name.
 - b. Date.
 - c. Name of Construction Manager/Owner.
 - d. Name of Contractor.
 - e. Name of firm or entity that prepared submittal.
 - f. Names of subcontractor, manufacturer, and supplier.
 - g. Category and type of submittal.
 - h. Submittal purpose and description.
 - i. Specification Section number and title.
 - j. Specification paragraph number or drawing designation and generic name for each of multiple items.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.
 - m. Related physical samples submitted directly.
 - n. Indication of full or partial submittal.
 - o. Transmittal number, numbered consecutively.
 - p. Submittal and transmittal distribution record.
 - q. Other necessary identification.
 - r. Remarks.
- E. Options: Identify options requiring selection by Owner.
 - F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
 - G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Owner's action.
 - H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installer(s), authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
 - I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Owner's action.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Submit electronic submittals via email as PDF electronic files.
 - 2. Action Submittals: Submit Three (3) paper copies of each submittal unless otherwise indicated. Owner will return Two (2) copies. Alternatively, submit via email.
 - 3. Informational Submittals: Submit Two (2) paper copies of each submittal unless otherwise indicated. Owner will not return copies. Alternatively, submit via email.
 - 4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Submit Product Data in one of the following formats:
 - a. PDF electronic file.
 - b. Three (3) paper copies of Product Data unless otherwise indicated. Owner will return Two (2) copies.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
 3. Submit Shop Drawings in one of the following formats:
 - a. PDF electronic file.
 - b. Two (2) opaque (bond) copies of each submittal. Owner will return One (1) copy.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit One (1) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Owner will return submittal with options selected.
6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit Three (3) sets of Samples. Owner will retain Two (2) Sample sets; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least Three (3) sets of paired units that show approximate limits of variations.
- E. Coordination Drawing Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."
- F. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."
- G. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Owner.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 OWNER'S ACTION

- A. Action Submittals: Owner will review each submittal, make marks to indicate corrections or revisions required, and return it. Owner will mark appropriately each submittal to indicate an action as follows:
 - 1. Approved
 - 2. Approved as Corrected
 - 3. Revise and Resubmit
 - 4. Rejected
- B. Informational Submittals: Owner will review each submittal and will not return it, or will return it if it does not comply with requirements. Owner will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Owner.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Owner without action.

END OF SECTION 013300

SECTION 014000 - QUALITY CONTROL

PART 1 GENERAL

1.1 CONDITIONS OF THE CONTRACT

- A. The Conditions of the Contract (General, Supplementary, and other Conditions) and the General Requirements (Section of Division 1) are hereby made a part of this Section. The articles contained in this Section may delete, modify, or add to the provisions of the Conditions of the Contract and shall take precedence over the Conditions of the Contract.
- B. The Conditions of this Section shall apply to all Technical Sections of Division 2 through 16.

1.2 SECTION INCLUDES:

- A. Quality assurance and control of installation.
- B. References.
- C. Labels.
- D. Field samples.
- E. Mock-up.
- F. Inspection and testing laboratory services.
- G. Manufacturers' field services and reports.

1.3 RELATED SECTIONS

- A. Section 01300 - Submittals: Submission of Manufacturers' Instructions and Certificates.
- B. Section 01600 - Material and Equipment: Requirements for material and product quality.

1.4 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. The Prime Contractor shall monitor quality control of their own work, the work of their subcontractors, suppliers, manufacturers, products, services, site conditions, and workmanship to produce Work of specified quality.
- B. The Contractor and each Subcontractor shall inspect the Work of others which will receive or is adjacent to his work. Report in writing to the Architect/Engineer, through the Prime Contractor, any conditions detrimental to his work. Do not proceed until conditions which would result in less than a first class installation are satisfactorily corrected. Commencing work shall be construed as acceptance of the work of others by the Contractor or Subcontractor as satisfactory to receive his work.
- C. Comply fully with manufacturers' instructions, including each step in sequence. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement. Completed work shall be left plumb, true to line or place, anchored securely in place free from damage.
- E. Unless otherwise called for, all pieces of material used shall be as large a stock size as in conformity with standard good practice of the trade.
 - I. Upon completion of installation and/or after final mechanical or electrical hook-up, the installing contractor shall lubricate and adjust all moving parts to provide smooth and proper operation.

1.5 REFERENCES

- A. Conform to reference standard by date of issue current on date for receiving bids or date specified in product Sections.
- B. Obtain copies of standards when required by Contract Documents.
- C. Should specified reference standards conflict with Contract Documents, request clarification for Architect/Engineer before proceeding.
- D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.6 UNDERWRITERS LABORATORIES LABEL

- A. Where applicable all materials and equipment for which Underwriters' Laboratories, Inc., or other testing service, standards have been established and their label service available, shall bear the appropriate Label.

1.7 INSPECTION AND TESTING LABORATORY SERVICES

- A. This Section describes the responsibilities for scheduling and payment of all inspections and test required.
- B. **The Owner**, at their discretion, may select and retain an independent testing laboratory with Special Inspector to inspect construction and identify materials in connection with firestopping, door labeling and other items of work as directed by the Owner and the Architect/Engineer, to see that they conform with the Construction Documents, codes, and standards. Acceptability shall be based on visual classification and laboratory tests.
- C. The following work is specified under other sections:
 - 1. Additional inspection and testing in connection with mechanical and electrical work is specified in Divisions 15 and 16.
 - 2. Inspection and testing in connection with other work, other than that included in this Section, is specified in appropriate sections.
- D. Duties of the Independent Testing Laboratory:
 - 1. Cooperate with Architect, Owner, Prime Contractor, and Sub-Contractors; provide qualified personnel after due notice.
 - 2. Perform specified inspections, sampling and testing of materials and methods of construction as directed by the Architect.
 - a. Comply with specified standards.
 - b. Ascertain compliance of materials with requirements of Contract Documents.
 - 3. Promptly notify Architect, Owner, Prime Contractor, and Sub-Contractor of observed irregularities or deficiencies of work or products.
 - 4. Promptly submit copies of written report of each test and inspection to Architect, Owner and Prime Contractor. Include in each report the following:
 - a. Date issued
 - b. Project title and number
 - c. Testing laboratory name, address, telephone number
 - d. Name and signature of sampling or inspection
 - e. Date and time of sampling or inspection
 - f. Record of temperature and weather conditions
 - g. Date of test
 - h. Identification of product and specification section
 - i. Location of sample or test in the project
 - j. Type of inspection or test
 - k. Results of test and compliance with Contract Documents
 - l. Interpretation of test results, when requested by Architect
 - 5. Perform additional tests as required by Architect, Prime Contractor, or Owner.
- E. Detailed Requirements - Independent Testing Laboratory and Special Inspector
 - 1. General: Provide inspection of work required by the Michigan Building Code, and the Technical Sections of these Specifications; submit written reports of inspection and tests to Owner, Architect and General Contractor.
 - 2. Records:
 - a. Keep record of general progress of the work including quality and quantity of concrete, materials, the mixing and placing and curing of concrete, and the placing of reinforcing steel.
 - b. Keep record of temperatures and of the protection given to concrete when temperature falls below 40 degrees F or rises above 90 degrees F.
 - c. Keep required records available to Owner, Architect and Prime Contractor during progress of the work and two years thereafter.
 - 3. Test Contractor's materials for compliance with Specifications. Review and check Contractor's proposed mix designs. Conduct strength test of concrete and mortar in accordance with the procedures outlined in Sections 03300 and 04100.
 - 4. Miscellaneous:
 - a. Provide other special inspection required by Building Code for structural work, or requested by Owner.

- F. Limitations of Authority of the Independent Testing Laboratory
 - 1. Laboratory is not authorized to:
 - a. Release, revoke, alter or enlarge on requirements of Contract Documents.
 - b. Approve or accept any portion of the Work.
 - c. Perform any duties of the Contractor.
- G. Prime Contractor's and Subcontractor's Responsibilities:
 - 1. Cooperate with laboratory personnel, provide access to Work, to manufacturer's operations.
 - 2. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
 - 3. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.
 - 4. Furnish copies of products test reports as required.
 - 5. Furnish incidental labor and facilities.
 - a. to provide access to work to be tested
 - b. to obtain and handle samples at the Project site or at the source of the product to be tested
 - c. to facilitate inspections and test
 - 6. Notify the laboratory 24 hours in advance for on-site testing and 48 hours in advance for off-site testing to allow for laboratory assignment of personnel and scheduling of tests.
 - 7. Make arrangements with Contractor's/Subcontractors selected laboratory and pay for additional samples and tests required for Contractor's convenience.
 - 8. Employ and pay for the services of the independent testing laboratory, to perform additional inspections, sampling and testing required when initial tests indicate work does not comply with Contract Documents.
 - 9. Furnish labor as necessary to obtain and handle samples at the project, or at other sources of material, repair structures from which samples of solid materials have been taken.
 - 10. Furnish all electrical power, turning, or moving of members, hoisting staging and other facilities for inspection.
 - 11. Load Tests: Should concrete test cylinders fail to meet specified strength requirements, Contractor shall furnish materials, equipment and labor to perform additional tests as directed by Architect/Engineer and as required by Code authorities.
- H. Qualification Testing: In addition to test specified, should the Contractor or Subcontractor propose a product, material, method of assembly that is of unknown or questionable quality to Architect/Engineer, the Architect/Engineer may require and order suitable tests to establish a basis for acceptance or rejection of a proposed product, material, or method of assembly that is of unknown or questionable quality. Such tests will be paid for by the Contractor or Subcontractor. "Standard" test reports or reports on "similar" material will not be accepted.
- I. Miscellaneous Inspections:
 - 1. Where Specifications, Architect's/Engineer's instructions, laws, ordinances, or any public authority require any work to be inspected or approved, give timely notice of its readiness for inspection and a reasonable date fixed for such inspection.
 - 2. If any work should be covered up without approval or consent of approving agency, or Architect or Engineer, it must be uncovered for examination at the Contractor's expense.
- J. Payment:
 - 1. All on-site inspections, tests and reports required shall be scheduled and coordinated by the General Contractor, **and paid for by the Owner.**
 - 2. All off-site inspections, tests, and reports required shall be scheduled and paid for by **the Owner.**
 - 3. The Prime Contractor/Subcontractor shall pay for additional inspections and tests required because of ill-timed notices or defective work, re-inspections following final inspection, and laboratory services required to qualify non-specified materials.

1.10 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. Submit qualifications of observer to Architect/Engineer, through Prime Coordination Administrator, 30 days in advance of required observations. Observer shall be subject to approval of the Architect/Engineer and Owner.
- B. When specified in individual Specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment, etc. as applicable, and to initiate instructions when necessary.
- C. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Submit report in triplicate within 30 days of observation to Architect for review.

PART 2 PRODUCTS

{THIS PART IS LEFT BLANK INTENTIONALLY}

PART 3 EXECUTION

{THIS PART IS LEFT BLANK INTENTIONALLY}

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, Specification Section 015713 Temporary Erosion & Sedimentation Control apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 USE CHARGES

- A. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations. Restoration of temporary connection back to original working conditions is by the Contractor.
- B. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations. Restoration of temporary connection back to original working conditions is by the Contractor.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading. Confirm and verify location with Owner.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures. Provide in Field Office and provide minimum of one per floor of addition once building is framed/enclosed.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Connect to Owner's existing water service facilities for limited use. Note that existing water service is a low-flow well and only small amounts of water are available for use. Coordinate with Owner on usage amounts. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Sanitary Facilities: Provide temporary wash facilities and drinking water for use of construction personnel. Provide portable toilet(s) on site and available for use by construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- G. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.

2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
 - C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants.
 - D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
 - E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 2. Remove snow and ice as required to minimize accumulations.
 - F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 1. Identification Signs: Provide Project identification signs as indicated by Owner.
 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 3. Maintain and touchup signs so they are legible at all times.
 - G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
 - H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: See Section 015713 for additional requirements. Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.

4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- D. Stormwater Control: See Section 015713 for additional requirements. Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of storm water from heavy rains.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- G. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- H. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- I. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 1. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 2. Protect air-handling equipment.
 3. Provide walk-off mats at each entrance through temporary partition.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace, or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.

2. Use permanent HVAC system to control humidity.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for (48) hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for (48) hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove materials that cannot be completely restored to their manufactured moisture level within (48) hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 015713 - TEMPORARY EROSION & SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections and Specification Sections 01500 Temporary Facilities & Controls and Section 322573 Storm Water Management, apply to this Section.

1.2 SUMMARY

- A. This Section includes general implementation of the Construction Activities Stormwater Management Plan (CASWMP) and City of Ironwood Permit submittal (if required by City) as approved by the Owner. Prior start of any construction, the Contractor shall review the Contract Documents and develop a plan, for approval by the Owner and to be submitted to City of Ironwood for their review and approval, which mitigates and protects the site and its surrounding areas from excessive runoff and contaminates from the construction project, materials delivery to site and the stockpiling of stored construction materials on site.
- B. This Section shall include all material, labor and equipment necessary to construct, install and maintain all necessary silt fences, curtains, weeps, straw barriers, existing catch basin filter bags and site traffic mitigation methodology which will meet or exceed requirements set forth by the State of Michigan Guidelines.
- C. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
 - 2. Site Plan and Civil Engineering Plan(s).
 - 3. Section 322573 Storm Water Management

1.3 QUALITY ASSURANCE

- A. Comply with MPCA, State, and City guidelines.
- B. Minimum requirements as outlined in details, shown on Contract Documents or contained within State of Michigan Standard Plate details for water, silt and erosion control. MI DOT Standard Specifications with associated detail plates, shall apply to this section.

1.4 PROJECT CONDITIONS

- A. Temporary Silt Fences: Shall be set in accordance with Contract Documents and as specified. Perimeter of the construction site shall be completely surrounded with a fabric & hay bale fence. Maintain integrity of a Category 3 erosion control blanket throughout the construction duration.
- B. Any/All On-Site Catch Basins shall receive a silt fence ring and rock filter berm to protect them from excessive run off. Rock log or Compost logs may be used on curbed drain locations.
- C. ENVIRONMENTAL PROTECTION: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified herein and in Section 322573 Storm Water Management.
- D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
 - F. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

PART 2 - PRODUCTS

2.1 TEMPORARY FENCES

- A. SILT: Provide a geotextile fabric and/or erosion control fabric equal to DOT Type C. Staple in rows with six inch staples at 18 inches maximum spacing in rows and 24 inch spacing between rows. Leading and trailing edges shall be stapled approximately 6 inches from the edge. Provide wood or metal stakes to provide vertical support, using wire or nylon cinch ties to secure.
- B. FABRIC: A geotechnical fabric fence consisting of ST Fabric SFC 200, DOT Type A. Comply with Section 322573.
- C. STRAW BALE/BLANKET: Use for ditch control and silt control where indicated. Bales shall be set 4 inches into the ground. Use in conjunction with fabric where indicated.
- D. SAFETY: Orange Safety Fence, 4 feet in height. Stake as required to maintain vertical. Surround material storage area and all open construction areas.
- E. PROTECT EXISTING: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor shall familiarize themselves with the site conditions. Review the erosion control plans with Tribal Construction Staff and develop an evaluation drawing indicating locations and methods used to control the construction site from adjoining and adjacent property, infrastructure and utilities. Make an evaluation of all erosion and sediment control measures currently on the project site. Maintain and protect same. Key elements shall include but are not limited to:
 1. Creation of a project log to be filled and stored on site which includes the name and emergency phone number of the Contractor's responsible individual, dates and descriptions of all inspections and spills and correspondence and other documentation pertinent to this section, inclusive of rain events greater than 1 inch.
 2. Weekly inspection of all erosion and sediment control measures and additional inspections immediately after all rainfall events.
 3. Training of all subcontractors in the proper disposal of hazardous materials, project waste facilities, concrete washouts and other practices which may impact the site.
- B. The Contractor is responsible for maintaining all erosion and sediment control measures shown on the documents for this site and conducting all inspections and training contained in the CASWMP and agreed upon through this Contract. No sediment or mud shall be allowed to be tracked off the project site, either on public roads or to any other portion of the adjacent public right of way.

3.2 REMOVAL OF PRODUCTS

- A. The Contractor shall not remove the erosion and sediment control measures shown on the CASWMP or agreed upon the Contract Documents until the site has been stabilized, as confirmed by the Architect

and Owner. Following stabilizing the site, the erosion and sediment control measures shall be removed and disposed of and the Contractor shall provide written documentation to the Architect and Owner that appropriate authorities have approve final site stabilization and approve removal of temporary measures.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

3.4 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015713

SECTION 015715 - DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and other Division 01 Specification Sections, Specification Section 015000 Temporary Facilities and Controls; Section 015713 Temporary Erosion & Sedimentation Control apply to this Section.

1.2 SUMMARY

- A. The work consists of the removal of surface water and ground water as necessary to perform the construction required by the contract in accordance with the specifications. It shall include: (1) constructing, installing, building, and maintaining all necessary temporary water containment facilities, channels, and diversions; (2) furnishing, installing, and operating all necessary pumps, piping, and other facilities and equipment; and (3) removing all such temporary works and equipment after their intended function is no longer required.

1.3 DIVERTING SURFACE WATER

- A. The contractor shall install, maintain, and operate all cofferdams, channels, flumes, sumps, and all other temporary diversion and protective works needed to divert streamflow and other surface water through or around the construction site. Control of surface water shall be continuous during the period that damage to construction work could occur. Unless otherwise specified and/or approved, the diversion outlet shall be into the same drainage way that the water would have reached before being diverted
- B. The contractor shall furnish the contracting officer, in writing, a proposed plan for diverting surface water before beginning any construction activities for which a diversion is required. Acceptance of this plan or the waiving of the plan requirement will not relieve the contractor of the responsibilities related to this activity during the process of completing the work as specified.

1.4 DEWATERING CONSTRUCTION SITE

- A. Foundations, cutoff trenches, and all other parts of the construction site shall be dewatered and kept free of standing water and muddy conditions as necessary for the proper execution of the work. The contractor shall furnish, install, operate, and maintain all drains, sumps, pumps, casings, well points, and all other equipment required to properly dewater the site as specified. Dewatering systems that cause a loss of soil fines from the foundation areas will not be permitted.
- B. The contractor shall furnish **Owner** Project Manager and Architect, in writing, a proposed plan for dewatering before commencing with any construction activity for which dewatering shall occur. Acceptance of this plan or the waiving of the plan requirement will not relieve the contractor of the responsibilities for completing the specified construction work.

1.5 DEWATERING EXCAVATION AREAS

- A. The contractor shall maintain all excavated foundation and footing areas free of surface water or otherwise provide for timely and effective removal of surface and subsurface water that accumulates within the excavations. Excavated areas shall be processed as necessary to achieve proper and uniform moisture content at the time of construction of footings and foundations.
- B. Pumping to dewater excavation areas shall be included in the Bidders bid schedule, each pump discharge pipe shall be equipped with a water meter. The meter shall be such that the measured quantity of water is accurate within 3 percent of the true quantity. The contractor shall provide necessary support to perform accuracy tests of the water meter when requested by **Owner** Project Manager and Architect.

1.6 EROSION and POLLUTION CONTROL

- A. Removal of water from the construction site, including any borrow areas, shall be accomplished so that erosion and the transporting of sediment and other pollutants are minimized. Pollution control activities

shall not conflict with the requirements of Construction Specification 015713 Temporary Erosion and Sediment Control as a part of this contract

1.7 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate dewatering pumps, pipes and discharges where they will best serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Section 015713.
- B. Provide equipment and services ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 REMOVAL of TEMPORARY WORK

- A. When temporary works are no longer required, the Contractor shall remove and return the area to a condition similar to that which existed before construction. Areas where temporary works were located shall be graded for appearance and conformance with new contours with no obstruction to natural surface water flows or the proper functioning and access to the works of improvement installed. The Contractor shall exercise extreme care during the removal stages to minimize the loss of soil sediment and debris that was trapped during construction.
- B. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- C. Pipes, casings, and any other material used to dewater the site shall be removed from temporary wells. The wells shall be filled to ground level with clean gravel or other suitable material approved by the contracting officer. The contractor shall exercise extreme care to prevent pollution of the ground water by these actions.

3.3 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of dewatering facilities.
- B. Maintenance: Maintain dewatering devices and system components in operating condition until removal.
 - 1. Maintain operation of dewatering system on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage and delays to new construction.
- C. Termination and Removal: Along with Section 3.2 above, remove the dewatering system when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Repair any and all site damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances

that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015715

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Installation of the Work.
 - 3. Cutting and patching. (Included only as reference and utility work)
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.
 - 2. Section 017700 "Closeout Procedures" for recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
 - 3. Section 024119 "Selective Structure Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least ten (10) days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to any structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - 3. Products: Provide a list of products to be used for patching and firms or entities that will perform patching work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, notify Owner of locations and details of cutting and await directions from Owner before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety.
 - a. Primary operational systems and equipment.
 - b. Mechanical systems piping and ducts.
 - c. Communication systems.
 - d. Electrical wiring systems.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Equipment supports.
 - d. Piping, ductwork, vessels, and equipment.
 - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Owner's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Owner for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities. Provide Architect with any discovered discrepancy prior commencing work.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Owner according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Owner promptly.
- B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- C. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Owner.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect and/or to meet ADA requirements.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Pre-installation Conferences: Include Owner's construction personnel at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
 - 6. Liquidated Damages
- B. Related Requirements:
 - 1. Section 017300 "Execution" for progress cleaning of Project site.

1.3 ACTION SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and state reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of Ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Assemble and submit all maintenance material submittals specified in individual Sections, including any tools, spare parts, extra materials, and similar items, and deliver to Owner. Label with manufacturer's name and model number where applicable.
 5. Retain, assemble and submit "Schedule of Maintenance Material Items" as directed below. Maintenance material items and Scheduled Maintenance of same shall be collected and submit as required below for the Project.
 6. Assemble & submit all test/adjust/balance records for the HVAC System.
 7. Assemble & submit changeover information related to Owner's occupancy. Assemble and submit to Owner the use, operation, and maintenance manual(s) for this project.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of Ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner in operation, adjustment, and maintenance of products, equipment, and systems.
 6. Advise Owner of changeover in heat and other utilities.
 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 8. Complete final cleaning requirements, including touchup painting.
 9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of Ten (10) days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner or Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Owner, that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for final completion.

1.6 LIQUIDATED DAMAGES

- A. In the event of a delay to the **Ironwood Carnegie Library** Completion Date; Substantially Complete by **March 1, 2026** and Final Completion by **April 1, 2026**. as established by this Contract Schedule for which Contractor is solely responsible, Contractor shall pay Liquidated Damages to Owner at a rate of a \$1,000.00 per day.
- B. Such Liquidated Damages shall be deemed to be a genuine pre-estimate of the foreseeable damages incurred by Owner due to delay and shall be Owner's sole recourse for late performance by Contractor under the Contract.
- C. For the purpose of calculating such Liquidated Damages, a grace period of ten (10) days shall be observed from the stated completion date, or the actual construction contract start date stated in the official notice to proceed documents and the Contract Schedule shall be extended by any additional time or delays outside the sole control of Contractor or delay not caused by Contractor, including but not limited to suspension by Owner or by the Contractor in accordance with the Contract, approved/agreed upon weather downtime, delay due to Force Majeure, and any construction time spent or lost on additional, approved change order work.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
 - 1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
 - 2. Certified List of Incomplete Items: Submit certified copy of Owner's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Owner. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 - 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Owner.
 - d. Name of Contractor.
 - e. Page number.
 - 4. Submit list of incomplete items in the following format:
 - a. Three (3) paper copies. Owner will return Two (2) copies.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Owner for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within Fifteen (15) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents and Owner Operations & Maintenance Manual(s) into an orderly sequence based on the table of contents of Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES & OEM," Project name, and name of Contractor.
- D. Provide additional copies of each Warranty to include in Operation and Maintenance Manuals, three (3) copies are required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions and Owner's Representative.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - q. Leave Project clean and ready for occupancy.

- C. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls." Recycle appropriate content where applicable and possible.

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction as instructed by Architect. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Requirements:
 - 1. Section 017700 "Closeout Procedures" for general closeout procedures.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit One (1) set of marked-up record prints.
- B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.

- h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Owner's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
 5. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as paper copy.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as a paper copy.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for project construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 020450 - CUTTING AND PATCHING

PART 1 GENERAL

1.1. CONDITIONS OF THE CONTRACT

- A. The Conditions of the Contract (General, Supplementary and other Conditions) and the General Requirements (Sections of Division 0 and 1) are hereby made a part of this Section. The articles contained in this Section may delete, modify, or add to the provisions of the Conditions of the Contract and shall take precedence over the Conditions of the Contract.
- B. The Conditions of this Section shall apply to all technical sections of Divisions 2 through 33

1.2. DESCRIPTION

- A. Execute cutting, fitting or patching of Work, required to:
 - (1) Make several parts fit properly;
 - (2) Uncover Work to provide for installation of ill-timed work;
 - (3) Remove and replace defective Work;
 - (4) Remove and replace Work not conforming to requirements of Contract Documents;
 - (5) To make connection(s) to existing facility from BP-1 and BP-2 scopes of work.
- B. Each contractor or subcontractor shall pay for costs caused by ill-timed or defective Work, or Work not conforming to Contract Documents, including costs for additional services of Architect/Engineer.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Replacement of Work removed: comply with specifications and details for the type of Work to be done. Materials not indicated nor defined shall be equal to that of the area where work is being performed and shall match existing as close as practical.
- B. Finish shall be smooth in transition and visually unnoticeable from new when completed.
- C. Temporary Dust and Noise protection walls shall be constructed in all areas where work is being performed adjacent to or within spaces occupied by Library Staff and Patrons. See section 025600 for specific requirements.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions or Work, including elements subject to movement or damage during cutting and patching. Confirm using existing documents where practical.
- B. After uncovering all Work, inspect conditions affecting installation of any required and/or new products.
- C. After uncovering the work, obtain approval from Owner or Architect prior proceeding with additional work. Photograph and log "before" and "after" work.

3.2 PREPARATION PRIOR TO CUTTING

- A. The Contractor Carrying Out the Cutting and Demolition Shall:
 - 1. Provide shoring, bracing, and support as required to maintain structural integrity of Project.
 - 2. Provide protection for other portions of Project.
 - 3. Provide protection from dust, dirt and the elements.
 - 4. Install and maintain negative, HEPA air system(s).

3.3 CUTTING

- A. All cutting and patching work shall be under the supervision of the Prime Contractor.
- B. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs and new work.
- C. The respective Contractor will be responsible for the drilling of all holes in floors, walls, ceilings, etc., required for installation of their work.

3.4 DISPOSITION OF REMOVED MATERIALS

A. UNSALVAGABLE MATERIALS:

1. Remove all unsalvageable materials in a manner that will avoid damage to materials or equipment which will remain. Completely remove from the site and legally dispose.

3.5 PATCHING

- A. Patch or otherwise restore disturbed construction as otherwise required to restore the work and surfaces. Where existing construction is removed, cut or otherwise disturbed by Work of the Project, patch defective and incomplete surfaces. Repair any damage to construction which is to remain.
- B. Patching work shall be done by skilled mechanics experienced in the particular type of work involved. Patching work shall conform to the standards of the Specifications where applicable and where not specified, work shall conform to the highest standards of the trade.
- C. Construction that has been damaged as a result of the Work shall be repaired to an extent and as required to match adjacent existing undamaged construction.

3.6 CLEANING

- A. Perform periodic and final cleaning as specified in Section 01700 - Project Close Out.
 1. Clean Owner-occupied areas daily.
 2. Clean spillage, overspray, dirt and dust from all areas immediately.
- B. At completion of work of each trade, clean area and make surfaces ready for work of successive trades.

END OF SECTION

SECTION 022000 SITE PREPARATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Building demolition.
- B. Selective demolition of built site elements.
- C. Clearing and protection of vegetation.
- D. Removal of existing debris.
- E. Abandonment and removal of existing utilities and utility structures.

1.2 RELATED SECTIONS

- A. Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- B. Section 023100 - Grading: Topsoil removal.
- C. Section 023160 - Fill and Backfill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.3 REFERENCES

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2000.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Fill Material: As specified in Section 02316 - Fill and Backfill
- B. Erosion Control: Conform with the requirements of **MIDOT**.

PART 3 EXECUTION

3.1 EXISTING UTILITIES

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone;

identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.2 VEGETATION

- A. Do not remove or damage vegetation beyond the limits indicated on drawings.
- B. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.
- C. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
 - 1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
 - 2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
 - 3. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.
 - 4. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
- D. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.
- E. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.3 EXISTING BUILT ELEMENTS

- A. Scope:
 - 1. Remove existing concrete patio as shown on drawings.
 - 2. Remove or relocate existing trees as shown on drawings.
 - 3. Relocate existing boulder with carving as shown on drawings.
 - 4. Remove other items indicated, for salvage, relocation, and recycling.
 - 5. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as required so that required rough grade elevations do not subside within one year after completion.
- B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 3. Provide, erect, and maintain temporary barriers and security devices.
 - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 5. Do not close or obstruct roadways or sidewalks without permit.
 - 6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 - 7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- C. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.

3.4 DEBRIS

- A. Remove debris, junk, and trash from site.

END OF SECTION

SECTION 02223 MINOR DEMOLITION FOR REMODELING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Removal of designated building, equipment, and fixtures.
- B. Removal of designated construction.
- C. Disposal of materials.
- D. Materials to removed and reinstalled.
- E. Disconnect/Reconnection of utilities required for addition to occur; Mechanical, Electrical and Low Voltage.

1.2 REGULATORY REQUIREMENTS

- A. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection. See section 025600 for temporary control requirements.
- B. Obtain required permits from authorities.
- C. Do not close or obstruct egress from any building exit. See section 025600 for installing and maintaining access barriers and control.
- D. Do not disable or disrupt building fire or life safety systems without 3 days' prior written notice to Owner. Provide dust protection for existing system components prior and demolition.
- E. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered. Notify Architect and Owner on discovery.

1.3 SCHEDULING

- A. Schedule work to coincide with new construction.

1.4 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.

PART 2 PRODUCTS - NOT USED.

PART 3 EXECUTION

3.1 PREPARATION

- A. Erect and maintain temporary partitions as prescribed in Section 025600 in order to prevent spread of dust, odors, and noise to permit continued building occupancy. Install required negative HEPA air machines and maintain negative pressure throughout BP-2 work.
- B. Protect existing materials and finishes that are not to be demolished. Notify Owner a minimum of 48 hours in advance of demolition into existing building and any occupied spaces. Assist Owner in dust protection efforts to minimize equipment conflict and downtime.
- C. Notify Owner and any affected utility companies before starting work and comply with their requirements.
- D. Mark location and termination of utilities and life safety equipment feeds which may be affected by the work being performed in BP-2.
- E. Provide appropriate temporary signage including signage for exit or building egress. See section 025600 for additional requirements governing same.

3.2 DEMOLITION

- A. Identify and mark, disconnect, cap, any and all designated utilities within demolition areas.
- B. Demolish in an orderly and careful manner. Protect existing supporting structural members and walls and finishes to remain.
- C. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- D. Remove materials as demolition progresses. Upon completion of demolition, leave areas in clean condition.

E. Remove temporary facilities.

3.3 SCHEDULES

- A. Remove, store and protect the materials and equipment as noted on the drawings for reinstallation.
- B. Protect the following materials and equipment to remain in place:
 - 1. Existing finishes as noted on the drawings.

END OF SECTION

SECTION 023100 GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Removal of topsoil.
- B. Rough grading the site.
- C. Finish grading.

1.2 RELATED SECTIONS

- A. Section 022000 – Site Preparation.
- B. Section 312300 - Earthwork.
- C. Section 023160 - Fill and Backfill: Filling and compaction.

- D. Section 329119 - Topsoil

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with [State of Michigan, Highway Department standards](#).

1.4 PROJECT CONDITIONS

- A. Protect above- and below-grade utilities that remain.
- B. Protect plants, lawns, and other features to remain as a portion of final landscaping.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from grading equipment and vehicular traffic.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Topsoil: See Section 023160.
- B. Other Fill Materials: See Section 023160.
- C. Erosion Control: Contractor shall conform to the requirements of [MIDOT](#) for Erosion control and shall furnish all materials necessary to conform to these requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect utilities that remain, from damage.

3.3 ROUGH GRADING

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
- E. When excavating through roots, perform work by hand and cut roots with sharp axe.

- F. See Section 02316 for filling procedures.
- G. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

3.4 SOIL REMOVAL

- A. Stockpile topsoil to be re-used on site; remove remainder from site.
- B. Stockpile subsoil to be re-used on site; remove remainder from site.
- C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.5 FINISH GRADING

- A. Before Finish Grading:
 - 1. Verify building and trench backfilling have been inspected.
 - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.
- C. Where topsoil is to be placed, scarify surface to depth of 3 inches.
- D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.
- E. Place topsoil to the following compacted thicknesses:
 - 1. Areas to be Sodded: 3 inches.
- F. Place topsoil during dry weather.
- G. Remove roots, weeds, rocks, and foreign material while spreading.
- H. Near plants and buildings spread topsoil manually to prevent damage.
- I. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

3.6 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 1/2 inch.

3.7 FIELD QUALITY CONTROL

- A. See Section 02316 for compaction density testing.

3.8 CLEANING AND PROTECTION

- A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 023150 EXCAVATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Excavating for building volume below grade, footings, and slabs-on-grade.

1.2 RELATED SECTIONS

- A. Section 023160 - Fill and Backfill: Fill materials, filling, and compacting.

1.3 PROJECT CONDITIONS

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.

3.2 EXCAVATING

- A. Excavate to accommodate new structures and construction operations.
- B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- D. Do not interfere with 45 degree bearing splay of foundations.
- E. Cut utility trenches wide enough to allow inspection of installed utilities.
- F. Hand trim excavations. Remove loose matter.
- G. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 023160.
- H. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- I. Remove excavated material that is unsuitable for re-use from site.
- J. Remove excess excavated material from site.

3.3 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

3.4 PROTECTION

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

END OF SECTION

SECTION 023160 FILL & BACKFILL

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED SECTIONS

- A. Section 03300 - Cast-In-Place Concrete.

1.3 REFERENCES

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 1997.
- B. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 1996a.
- C. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2000.
- D. ASTM D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN m/m³)); 2000.
- E. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2000.
- F. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 1996.

1.4 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: 4 inches below finish grade elevations indicated on drawings, unless otherwise indicated.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Fill Composition Test Reports: Results of laboratory tests on actual materials used.
- C. Compaction Density Test Reports.

1.6 PROJECT CONDITIONS

- A. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials on site in advance of need.
- B. Verify that survey bench marks and intended elevations for the Work are as indicated.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Granular Fill: pipe bedding and encasement stone and sand; free of shale, clay, friable material and debris.
 - 1. Graded in accordance with ASTM D 2487 Group Symbol.
 - a. 1 inch sieve: 100 percent passing
 - b. 3/4 inch sieve: 90 - 100 percent passing.
 - c. 3/8 inch sieve: 50 to 90 percent passing.
 - d. No. 4 sieve: 35 to 80 percent passing.
 - e. No. 10 sieve: 20 - 65 percent passing.
 - f. No. 40 sieve: 0 - 35 percent passing.
 - g. No. 200 sieve: 0 to 10 percent passing.
- B. Granular Fill - Pea Gravel - Fill Type for DRAINTILE: Natural stone; washed, free of clay, shale, and organic matter.
 - 1. Graded in accordance with ASTM C 136, within the following limits:
 - a. Minimum Size: 1/4 inch.
 - b. Maximum Size: 5/8 inch.
- C. Sand - Fill Type within the building, and under over excavated footings: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
 - 1. Graded in accordance with ASTM C 136; within the following limits:
 - a. No. 4 sieve: 100 percent passing.
 - b. No. 14 sieve: 10 to 100 percent passing.
 - c. No. 50 sieve: 5 to 90 percent passing.
 - d. No. 100 sieve: 4 to 30 percent passing.
 - e. No. 200 sieve: 0 to 5 percent passing.
- D. Drainage Fill: Fine filter aggregate shall be a free draining mineral product, excluding crushed carbonate quarry rock, crushed concrete and /or salvaged bituminous mixture and shall meet or exceed requirements of MIDOT.
 - 1. Grade in accordance as follows:
 - a. 3/4": 100 percent.
 - b. #4: 90-100 percent.
 - d. #10: 45 – 90 percent.
 - e. #40: 5-35 percent.
 - f. #200: 0-3 percent.
- E. Topsoil - Fill Type Planting and Lawn areas: Topsoil excavated on-site.
 - 1. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
 - 2. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.
 - 3. Any and all site cast topsoil scheduled for re-use shall be screened on site prior to installation and shall meet the above criteria.

2.2 ACCESSORIES

- A. Geotextile Fabric: Non-biodegradable, woven, Type III as per MIDOT.
- B. Geotextile Fabric: Non-biodegradable, woven, Type V as per MIDOT. For separation of product Drainage Fill.

2.3 SOURCE QUALITY CONTROL

- A. See Section 01400 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Verify structural ability of unsupported walls to support imposed loads by the fill.

3.2 PREPARATION

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

3.3 FILLING

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- F. Correct areas that are over-excavated.
 - 1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- G. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. At floor slab: 95 percent of maximum dry density.
 - 2. At other locations: 95 percent of maximum dry density.
 - 3. Compaction shall be measured by the Modified Procter Density.
- H. Reshape and re-compact fills subjected to wheeled or foot traffic or other trades installing ancillary construction, conduits, piping or miscellaneous buried materials necessary for this project.

3.4 FILL AT SPECIFIC LOCATIONS

- A. Under Interior Slabs-On-Grade:
 - 1. Use sand.
 - 2. Depth: 4 inches deep.
 - 3. Compact to 95 percent of maximum dry density.
- B. Over Subdrainage Piping at Foundation Perimeter and Under Slabs:
 - 1. Drainage fill:
 - 2. Cover drainage fill with pea gravel.
 - 3. Fill up to 12 inches each side.
 - 4. Compact to 95 percent of maximum dry density.
- C. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches:
 - 1. Bedding: Use granular fill.
 - 2. Cover with granular fill.
 - 3. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.
 - 4. Geotextile filter fabric below riprap.
- D. At Lawn Areas:

1. Fill up to 4 inches below finish grade elevations.
2. Fill up to subgrade elevations.
3. Compact to 95 percent of maximum dry density.
4. See Section 02310 for topsoil placement.

3.5 FIELD QUALITY CONTROL

- A. See Section 01400 - Quality Requirements, for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556 or ASTM D2922.
- C. Evaluate results in relation to compaction curve determined by testing un-compacted material in accordance with ASTM D 1557 ("modified Proctor") or AASHTO T 180.
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests: Under floor slabs and paving - 1 per 1,000 square feet; Outside the building - 1 per side if building.
- F. Proof roll compacted fill at surfaces that will be under slabs-on-grade.

3.6 CLEAN-UP

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

END OF SECTION

SECTION 025600 TEMPORARY BARRIERS and ENCLOSURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Temporary construction barriers, enclosures and passageways.
 - 1. Dust and debris barriers.
 - 2. Security barriers.
 - 3. Temporary chain link fencing.
 - 4. Covered passageways.
- B. Protection of completed Work.
- C. Removal of construction facilities and temporary controls.

1.3 RELATED SECTIONS

- A. Division 0 – Project Conditions.
- B. Division 1 – General Conditions.
- C. Section 015000 – Temporary Facilities and Controls.
- D. Section 017300 - Execution.
- E. Section 017839 – Project Record Documents.
- F. Section 020450 – Cutting and Patching.
- G. Section 022230 – Minor Demolition for Remodeling.

1.4 CODES AND REGULATIONS

- A. Safety Regulations: Comply with requirements of all applicable Federal, State and local safety rules and regulations. Contractor shall be solely responsible for jobsite safety.
- B. Barricades and Barriers: As required by governing authorities having jurisdiction, provide substantial barriers, guardrails and enclosures around Work areas and adjacent to embankments and excavations for protection of workers and the public.

1.5 PROTECTION OF EXISTING CONDITIONS

- A. Protection of Adjacent Facilities: Contractor shall restrict Work to limits indicated on the Drawings and as specified: Protect existing, adjacent facilities from damage, including soiling and debris accumulation.
- B. Protection of Existing Furniture, Fixtures, and Equipment: As applicable, provide temporary enclosures, barriers and covers to protect existing furniture, fixtures and equipment remaining in Project area during construction. Maintain negative, HEPA air pressure equipment to provide and maintain negative pressure in spaces where work is being performed.

1.6 MAINTENANCE OF CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

- A. Maintenance: Use all means necessary to maintain temporary barriers and enclosures in proper and safe condition throughout progress of the Work.
- B. Replacement: In the event of loss or damage, promptly restore temporary barriers and enclosures by repair or replacement at no change in the Contract Sum or Contract Time.

1.7 TEMPORARY BARRIERS, ENCLOSURES AND PASSAGEWAYS

- A. Temporary Barriers, General: Provide temporary fencing and barriers as necessary to provide for public safety, to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
 - 1. Refer to temporary fencing and phasing plan in the Drawings. Comply with requirements indicated. Minimally if not shown or indicated, at Main Entrances to the addition in order to prevent patients, workers and public from entering the Work Zone.
 - 2. Note requirements for continued occupancy and use of existing buildings and site areas during construction. The existing facility shall remain operational throughout the Project.

3. Comply with applicable requirements of OSHA and authorities having jurisdiction, including industrial safety regulations. Review requirements with Owner.
 4. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting.
 5. Paint temporary barriers and enclosures with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard.
 6. Where appropriate and necessary, provide warning lighting, including flashing red or amber lights.
- B. Temporary Chain-Link Fencing: Provide temporary portable chain-link fencing Staging Area and for requirements for layout of fencing/gate limits. Coordinate Staging Area with Owner and Architect prior to mobilization.
1. Portable Chain-Link Fencing: Minimum 2-inches (50-mm) 11-gauge, galvanized steel, chain-link fabric fencing; minimum 8-feet (2.4 m) high with galvanized steel pipe posts; minimum 2-3/8-inches- (60-mm-) OD line posts and 2-7/8-inches- (73-mm-) OD corner and pull posts, with 1-5/8-inches- (42-mm-) OD top and bottom rails.
 - a. Provide concrete or galvanized steel, sand bag weighted bases for supporting posts.
 - b. Provide protective barriers at bases to prevent tripping by pedestrians.
 2. No wind screening is being requested for this project.
- C. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- D. Covered Passageways: Only required where work overhead is being performed and access by workers and/or material delivery is occurring. Instances where there is work overhead and people and/or material is being delivered into the Work Zone, Contractor shall erect a structurally adequate, protective, covered walkways for passage of persons along adjacent passageways.
1. Coordinate installation details with Owner requirements for continuing operations in adjoining facilities.
 2. Review design and details with Owner.
 3. Comply with applicable regulations of authorities having jurisdiction.
 4. Construct covered walkways using scaffold or shoring framing.
 5. Provide wood-plank overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 6. Extend back wall beyond the structure to complete enclosure fence.
- E. Temporary Closures (*TC-1*): Where the new addition has been constructed and where entrance into the existing building is being shown, Contractor shall provide temporary closures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather-tight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate closures with ventilating and material drying or curing requirements to avoid dangerous conditions and effects such as mold.
 2. Vertical openings: Close openings of 25 sq. ft. (2.3 sq. m) or less with plywood or similar materials.
 3. Horizontal openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 4. Install tarpaulins securely using wood framing and other suitable materials.
 5. Where temporary wood or plywood enclosure exceeds 100 sq. ft. (9.2 sq. m) in area, use fire-retardant-treated material for framing and main sheathing.
- F. Temporary Partitions (*TP-1*): Where the new addition has been constructed and where entrance into the existing building is being shown and where trades people may require access into the existing building spaces to make connections to existing services, the Contractor shall erect and maintain temporary partitions and temporary closures to limit dust and dirt migration, including migration into existing facilities, to separate areas from fumes and noise and to maintain fire-rated separations.
1. *Dust barriers (DB-1)*: Construct dustproof, floor-to-concrete plank deck, partitions of not less than nominal 4-inch (100-mm) studs, 2 layers of 3-mil (0.07-mm) polyethylene sheets, inside and outside temporary enclosure.
 - a. Overlap and tape full length of joints.

- b. Include 5/8-inch thick gypsum board at temporary partitions serving as noise barrier.
 - c. Insulate partitions to minimize noise transmission to adjacent occupied areas.
 - d. Seal joints and perimeter of temporary partitions.
- 2. *Dust barrier passages (DB-2)*: Where passage through dust barrier is necessary, provide a gasketed wood framed door of the same construction as the walls, 48" x 96" in size, with self-closing and positive latching.
 - a. Construct a vestibule and airlock at each entrance to temporary enclosure with not less than 48 inches (1219 mm) between doors.
 - b. Maintain walk off foot mats in vestibule where passage leads to existing occupied spaces.
 - c. Equip doors with security locks for closure at end of work day.
- 3. *Fire-rated temporary partitions (FR-T)*: Until the fire sprinkler system is fully functional on each side of the building addition and existing structure, Contractor shall construct and maintain any and all temporary fire-rated separations, including corridor walls and occupancy separations, by construction of stud partitions with gypsum board faces. Areas where this shall be required are indicated on the plan with a designation: FR-T (fire rated – temporary).
 - a. Construction details shall comply with recognized time-rated fire-resistive construction. Typically, 1-hour rated partitions shall be 2x4 wood studs at 16-inches on center or 3-1/2 inch metal studs at 16-inches on center, with 5/8-inch thick Type X gypsum board at both faces, with joints filled, taped and topped.
 - b. Seal partition perimeters with acceptable fire stopping and smoke seal materials.
 - c. Construct fire-rated temporary partitions whenever existing time-rate fire-resistive construction is removed for 12 hours or more.
- G. HVAC Protection: Within 25 feet of the connection entrances indicated on drawings, Contractor(s) shall provide dust barriers at HVAC return grilles and air inlets to prevent spread of dust and clogging of existing equipment filters. Contractor shall temporarily affix a furnace HEPA filter, of sufficient size to cover return grill, one (1") inch in all directions. Contractor shall maintain grilles for seal and change filters periodically (minimum of once), during construction process through Substantial Completion.
- H. Temporary Floor Protection (*TFP-1*): Protect existing floors from soiling and damage.
 - 1. Cover floor with 2 layers of 3-mil (0.07-mm) polyethylene sheets, extending sheets 18 inches (460 mm) up the side walls.
 - 2. Cover polyethylene sheets with 3/4-inch (19-mm) fire-retardant plywood.
 - 3. Provide walk off style floor mats to clean dust from shoes.
- I. Landscape Barriers: Contractor shall provide barriers around all existing trees and planting. This shall include all landscaping installed and all existing facility planting on the facility grounds which may be within 25 feet of the work being scheduled to be completed under this Contract. Coordinate with requirements specified in Section 329300 - Plant Material.
 - 1. Locate barriers as directed outside of drip lines of trees and plants.
 - 2. Protect entire area under trees against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.
 - 3. Contractor shall pay all costs to restore trees and plants within barriers that are damaged by construction activities. Restoration shall include replacement with plant materials of equal quality and size. Costs shall include all fines, if any, levied by authorities having jurisdiction.
- J. Barricades, Warning Signs and Lights, General: On any required or indicated utility trenches, Contractors shall comply with standards and code requirements for erection of structurally adequate barricades. Paint barricades with appropriate colors, graphics and warning signs to inform personnel and the public. Where appropriate and needed provide lighting, including flashing red or amber lights.
- K. Guard Rails: Provide guard rails along tops of embankments and excavations. Along public walkways and areas accessible by the public, adjoining excavations, provide guardrails in addition to fencing.
 - 1. Guardrails shall be substantially and durably constructed of lumber, firmly anchored by posts embedded in concrete, and complying with Code requirements for temporary barriers.
- L. Security Closures and Lockup: Contractors shall work with the Owner to provide substantial temporary closures of openings in exterior surfaces and interior areas as appropriate to prevent unauthorized entrance, vandalism, theft and similar violations of security. On any and all enclosures, Contractor shall provide doors

with self-closing hardware and locks. Doors are temporary for the security of this requirement and can be used doors from other projects. The use of permanent, job required doors shall NOT be permissible unless the space allocation has been reviewed and all parties agree. A photo log of before/after condition is required and any damages will be repaired at no additional cost to the Owner.

1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- M. Temporary Access, Passage and Exit Ways: Construct temporary stairs, ramps, and covered walkways, with related doors, gates, closures, guardrails, handrails, lighting and protective devices, to maintain access and exit ways to existing facilities to remain operational.
1. Design and location of temporary construction shall be by Contractor, subject to review by Owner and authorities having jurisdiction.
 2. Provide temporary lighting, illuminated interior exit signage, non-illuminated directional and instructional signage, and temporary security alarms for temporary exits and exit passageways.
 3. Temporary measures shall suit and connect to existing building systems, and shall be approved by Owner and authorities having jurisdiction.

1.8 PROTECTION OF INSTALLED WORK

- A. Contractor will be responsible for the protection of Installed Work and the existing facility. In General: Provide temporary protection for installed products. Control traffic in immediate area to minimize any potential damage.
- B. Protective Coverings: Provide protective coverings at walls, projections, jambs, sills, and soffits of openings as necessary to prevent damage from construction activities, such as coatings applications, and as necessary to prevent other than normal atmospheric soiling.
- C. Traffic Protection:
1. Protect finished floors, stairs and other surfaces from traffic, soiling, wear and marring.
 2. Provide temporary covers of plywood, reinforced kraft paper or temporary rugs and mats, as necessary. Temporary covers shall not slip or tear under normal use.
 3. Prohibit traffic and storage on waterproofed and roofed surfaces and on landscaped areas.
 4. Protect newly fine graded, seeded and planted areas with barriers and flags to designate such areas as closed to pedestrian and vehicular traffic.

1.9 REMOVAL OF TEMPORARY BARRIERS AND ENCLOSURES

- A. Removal of Temporary Barriers and Enclosures: Unless otherwise mutually agreed by Owner and Contractor, remove temporary materials, equipment, services, and construction prior to Contract Completion review. Coordinate removal with requirements.
- B. Cleaning and Repairs: Clean and repair damage, soiling and marring caused by installation or use of temporary barriers and enclosures.

PART 2 - PRODUCTS

Not applicable to this Section.

PART 3 - EXECUTION

Not applicable to this Section.

END OF SECTION

SECTION 026200 SUBDRAINAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Building Perimeter Drainage Systems.

1.2 RELATED SECTIONS

- A. Section 023150 - Excavation: Excavating for subdrainage system piping and surrounding filter aggregate.
- B. Section 023160 - Fill and Backfill: Backfilling over filter aggregate, up to subgrade elevation.

1.3 SUBMITTALS

- A. Product Data: Provide data on pipe drainage products, and pipe accessories.

PART 2 PRODUCTS

2.1 PIPE MATERIALS

- A. Corrugated Plastic Tubing: Flexible type; 4 inch diameter, with required fittings. Drainage piping shall be furnished with an integral soil sock.
- B. Use perforated pipe at subdrainage system; unperforated through sleeved walls.

2.2 AGGREGATE AND BEDDING

- A. Filter Aggregate and Bedding Material: Granular fill as specified in Section 02316.

2.3 ACCESSORIES

- A. Pipe Couplings: Solid plastic.
- B. Sleeve: Schedule 40 steel pipe type for footing and wall.

PART 3 EXECUTION

3.1 PREPARATION

- A. Hand trim excavations to required elevations. Correct over-excavation with sand fill.
- B. Remove large stones or other hard matter which could damage drainage piping or impede consistent backfilling or compaction.

3.2 INSTALLATION - DRAINAGE PIPE

- A. Install and join pipe and pipe fittings in accordance with pipe manufacturer's instructions.
- B. Place drainage pipe on clean cut subsoil.
- C. Lay pipe to slope gradients noted on Drawings; with maximum variation from true slope of 1/8 inch in 10 feet.
- D. Place pipe with perforations facing down. Mechanically join pipe ends.
- E. Install pipe couplings.
- F. Install filter aggregate at sides, over joint and top of pipe. Provide top cover compacted thickness of 12 inches.
- G. Place aggregate in maximum 4 inch lifts, consolidating each lift.
- H. Refer to Section 02316 for compaction requirements. Do not displace or damage pipe when compacting.
- I. Connect to sump pits with unperforated pipe, through installed sleeves.
- J. Connect to existing drain tile where new drain tile intersects existing systems.

3.3 PROTECTION

- A. Protect pipe and aggregate cover from damage or displacement until backfilling operation begins.

END OF SECTION

SECTION 031000 CONCRETE FORMS & ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED SECTIONS

- A. Section 032000 - Concrete Reinforcement.
- B. Section 033000 - Cast-In-Place Concrete.

1.3 REFERENCES

- A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 1999.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary; American Concrete Institute International; 2002.
- C. ACI 347R - Guide to Formwork for Concrete; American Concrete Institute International; 2001.

1.4 DESIGN REQUIREMENTS

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

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 347R, ACI 301, and ACI 318.

1.6 REGULATORY REQUIREMENTS

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

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

- A. Form Materials: At the discretion of the Contractor in order to provide finish requirements specified.

2.2 PREFABRICATED FORMS

- A. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- B. Preformed Plastic Forms: Thermoplastic polystyrene form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

2.3 FORMWORK ACCESSORIES

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.
- B. Form Release Agent: Colorless mineral oil that will not stain concrete, absorb moisture, impair natural bonding of concrete finish coatings, or affect color characteristics of concrete finish coatings.

1. Sonneborn - Cast-Off
 2. Sika - Formtex
 3. W.R. Meadows - Duogard II
 4. Tamms: Aquaform
- C. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.

3.3 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

3.4 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

3.5 FORM CLEANING

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

END SECTION

SECTION 032000 CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED SECTIONS

- A. Section 031000 - Concrete Forms and Accessories.
- B. Section 033000 - Cast-In-Place Concrete.
- C. Section 048100 - Unit Masonry.

1.3 REFERENCES

- A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 1999.
- B. ACI 318 - Building Code Requirements For Reinforced Concrete and Commentary; American Concrete Institute International; 2002.
- C. ACI SP-66 - ACI Detailing Manual; American Concrete Institute International; 1994.
- D. ASTM A 185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement; 1997.
- E. AWS D1.4 - Structural Welding Code - Reinforcing Steel; American Welding Society; 1998.
- F. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute; 2001.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301.
- B. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: Deformed bars, ASTM A 996/A 996M Grade 60 (420), Type A.
- B. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gage.
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
 - 3. Provide necessary and required steel frames for all mechanical, electrical and data openings. Provide coordination of all necessary openings for mechanical, electrical and low voltage trades.

2.2 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is permitted only with the specific approval of Architect. Perform welding in accordance with AWS D1.4.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier. Notify General Contractor and repair immediately.
- C. Accommodate placement of formed openings. Verify all Mechanical and Electrical openings and penetrations. Coordinate all plenum, duct, conduit feeds and cable tray openings with respective trades.
- D. Conform to applicable code for concrete cover over reinforcement.

END OF SECTION

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Slabs-on-grade.
 - 2. Suspended slabs.
 - 3. Concrete toppings.
- B. **Related Sections:**
 - 1. Section 023160 "Fill & Backfill" for drainage fill under slabs-on-grade.

1.3 DEFINITIONS

- A. **Cementitious Materials:** Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 ACTION SUBMITTALS

- A. **Product Data:** For each type of product indicated.
- B. **Design Mixtures:** For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. **Steel Reinforcement Shop Drawings:** Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. **Formwork Shop Drawings:** Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
 - 1. **Shoring and Re-shoring:** Indicate proposed schedule and sequence of stripping formwork, shoring removal, and re-shoring installation and removal.
- E. **Construction Joint Layout:** Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Architect.
- F. **Samples:** For water stops, vapor barrier, vapor retarder.

1.5 INFORMATIONAL SUBMITTALS

- A. **Qualification Data:** For concrete Installer, concrete supplier and material testing agency used.
- B. **Welding certificates.**
- C. **Material Certificates:** For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Form materials and form-release agents.
 - 4. Steel reinforcement and accessories.

5. Fiber reinforcement.
 6. Water Stops.
 7. Curing compounds.
 8. Floor and slab treatments.
 9. Bonding agents.
 10. Adhesives.
 11. Vapor retarders.
 12. Semi-rigid joint filler.
 13. Joint-filler strips.
 14. Repair materials.
- D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements and the specifications:
1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity. Include origin of materials used.
 2. Backfill: Provide testing agency sieve testing data to verify adherence with specified product.
- E. Floor surface flatness and levelness measurements indicating compliance with specified tolerances. Tolerances shall comply with ASTM E1155 and ASTM E1155M as well as, comply with ACI 117 for tolerance compliance.
- F. Field quality-control reports. Compile and submit data from each on site pour. Retain in field for final submittal to Architect upon completion of the project.
- G. Minutes of pre-installation conference.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. 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."
- C. Testing Agency Qualifications: An independent agency, Contractor shall submit agency qualifications which are acceptable to Owner and Architect. Agency shall be minimally qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301-10, "Specifications for Structural Concrete," Sections 1 through 5.
 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures to meet or exceed the Specification Requirements. Prior acceptance of submitted Agency is required, prior testing.
- H. Mockups: Cast concrete slab-on-grade and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.
 - 1. Build panel approximately 200 sq. ft. for slab-on-grade and 100 sq. ft. for formed surface in the location indicated or, if not indicated, as directed by Architect or which typifies work to be placed..
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- I. Pre-installation Conference: Prior the first pour, conduct conference at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
 - e. Special concrete finish subcontractor.
 - 2. Review Special Inspection requirements and all testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold and hot weather concrete procedures, curing methods and procedures, review construction contraction and isolation joints, and joint-filler strips, inspect and review forms and form removal limitations, review any required shoring and re-shoring procedures, discuss and review vapor-retarder installation, review anchor rod and anchorage device installation tolerances, confirm steel reinforcement installation, floor and slab flatness and levelness measurement, review and agree to any concrete repair procedures, and discuss and approve methodology for concrete protection.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

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.
 - 1. Plywood, metal, or other approved panel materials.
 - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1 or better.
 - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - c. Structural 1, B-B or better; mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- 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.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation. Reinforce and support as required to eliminate deformation.

- D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.
- E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- H. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- I. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 60 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- D. Galvanized Reinforcing Bars: ASTM A 615/A 615M, Grade 60 ASTM A 706/A 706M, deformed bars, ASTM A 767/A 767M, Class I, zinc coated after fabrication and bending.
- E. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.
- F. Plain-Steel Wire: ASTM A 82/A 82M, as indicated on the Contract Documents or Specified herein.
- G. Deformed-Steel Wire: ASTM A 496/A 496M.
- H. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.
- I. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars, cut true to length with ends square and free of burrs.
- B. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.
- C. 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," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 - 2. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.4 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 II gray.
 - a. Fly Ash: ASTM C 618, Class F or C.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 1. Maximum Coarse-Aggregate Size: 3/4 to 1-1/2 inch nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.
 1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Axim Italcementi Group, Inc.; CATEXOL CN-Cl.
 - b. BASF Construction Chemicals - Building Systems; Rheocrete CNI.
 - c. Euclid Chemical Company (The), an RPM company; ARRMATECT.
 - d. Grace Construction Products, W. R. Grace & Co.; DCI.
 - e. Sika Corporation; Sika CNI.
- D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
 1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. BASF Construction Chemicals - Building Systems; Rheocrete 222+.
 - b. Cortec Corporation; MCI- 2005NS.
 - c. Grace Construction Products, W. R. Grace & Co.; DCI-S.
 - d. Sika Corporation; FerroGard 901.

2.6 WATERSTOPS

- A. Flexible Rubber Waterstops: CE CRD-C 513, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Greenstreak.
 - b. Williams Products, Inc.
 - 2. Profile: Flat, dumbbell with center bulb
 - 3. Dimensions: As required for condition. Minimum: 6 inches by 3/8 inch thick (150 mm by 10 mm thick; non-tapered).
- B. Flexible PVC Waterstops: CE CRD-C 572,[with factory-installed metal eyelets,] for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
- 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. BoMetals, Inc.
 - b. Greenstreak.
 - c. Paul Murphy Plastics Company.
 - d. Vinylex Corp.
 - 2. Profile: Flat, dumbbell with center bulb.
 - 3. Dimensions: 6 inches by 3/8 inch thick (150 mm by 10 mm thick; non-tapered).

2.7 UNDER-SLAB VAPOR RETARDERS & FILLS

- A. Reinforced-Polyethylene Vapor Retarders (under-slab): Two outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/1000 sq. ft., with maximum permeance rating of 0.04 perm. Comply with ASTM E-1745-11.
 - 1. Products: Subject to compliance with requirements, provide the following
 - a. Raven Industries Inc.; DURA-SKRIM 6WW.
 - b. Reef Industries, Inc.; Griffolyn T-65.
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.
- D. Single-Component Non-sag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.
- E. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated. Retain option and insert perm rating in first paragraph below if requiring a stricter perm rating than the 0.3 perms permitted by ASTM E 1745. See Evaluations.
- F. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, 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. Retain paragraph below for a fine-graded granular course at least 3 inches (75 mm) thick. This material may also be used as a thin layer over a granular fill course.
- C. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.8 CURING MATERIALS

- A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- B. Water: Potable.

2.9 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

- B. Semi-rigid Joint Filler: Two-component, semi-rigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80.
- C. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Reglets: Fabricate reglets of not less than 0.022-inch thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- E. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.10 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
 1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

2.11 CONCRETE MIXTURES, GENERAL

- 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.
 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Use fly ash, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent. Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
 1. Fly Ash: 25 percent.
 2. Combined Fly Ash: 25 percent.
 3. Ground Granulated Blast-Furnace Slag: 50 percent.
 4. Combined Fly Ash and Ground Granulated Blast-Furnace Slag: 50 percent Portland cement minimum, with fly ash not exceeding 25 percent.
 5. Silica Fume: 10 percent.
 6. Combined Fly Ash and Silica Fume: 35 percent with fly ash not exceeding 25 percent and silica fume not exceeding 10 percent.
 7. Combined Fly Ash, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash not exceeding 25 percent and silica fume not exceeding 10 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength: 4000 psi at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.50.
 3. Slump Limit: 4 inches (100 mm)] for concrete with verified slump of 2 to 4 inches (50 to 100 mm), plus or minus 1 inch (25 mm).
 4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
- B. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength: 3500 psi at 28 days.
 2. Minimum Cementitious Materials Content: 470 lb/cu. yd.

3. Slump Limit: 4 inches (100 mm).
 4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
 5. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd. (0.90 kg/cu. m).
- C. Suspended Slabs: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
 2. Minimum Cementitious Materials Content: 520 lb/cu. yd.
 3. Slump Limit: 4 inches (100 mm).
 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.
 5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
 6. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd.
- D. Concrete Toppings: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
 2. Minimum Cementitious Materials Content: 520 lb/cu. yd. (309 kg/cu. m)
 3. Slump Limit: [4 inches (100 mm)] [5 inches (125 mm)], plus or minus 1 inch (25 mm).
 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm)] nominal maximum aggregate size.
 5. Synthetic Macro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 4.0 lb/cu. yd. (2.4 kg/cu. m).

2.13 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice." See Contract Documents and Structural Documents for sizes and spacing.

2.14 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Collect, assemble and furnish batch ticket information to Architect.
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. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
1. Foundation Walls, 1/8 inch (3.2 mm) for formed finished surfaces.
 2. Footings, 1/4 inch (6 mm) for formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
1. Install keyways, reglets, recesses, and the like, for easy removal.
 2. Do not use rust-stained steel form-facing material.

- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of any permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

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. Verify and confirm with all trades and Contract Documents.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 48 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

- A. Comply with ACI 318 (ACI 318M) and ACI 301 for design, installation, and removal of shoring and re-shoring.
 - 1. Do not remove shoring or re-shoring until measurement of slab tolerances is complete.
- B. In multistory construction, extend shoring or re-shoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

- C. Plan sequence of removal of shores and re-shore to avoid damage to concrete. Locate and provide adequate re-shoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches (150 mm) and seal with manufacturer recommended tape.
- B. Granular Course: Cover vapor retarder with a graded, granular material. Moisten and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).
 - 1. Place and compact a 1/2-inch- (13-mm-) thick layer of fine-graded granular material over granular fill.

3.6 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.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- F. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.

3.7 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.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
 - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 5. Space vertical joints in walls 250 lineal feet maximum or at 50 cubic yards of daily pour. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 8. Provide water bar at all jointed conditions.

- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated on Contract Documents. 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 groove 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.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 WATERSTOPS

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

3.9 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. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. 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. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.10 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.
- 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.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D. 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.

3.11 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 profile amplitude of 1/4 inch (6 mm) in one direction.
 - 1. Apply scratch finish to surfaces to receive concrete floor toppings and 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. Re-straighten, 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 and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten 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 to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system. See room finish schedules to confirm finish floor.
 - 2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.
 - b. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
 - c. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.
 - d. Specified overall values of flatness, F(F) 45; and of levelness, F(L) 35; with minimum local values of flatness, F(F) 30; and of levelness, F(L) 24.
 - 3. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm).
- E. 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.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application. See plans to confirm patterning.
- G. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- H. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- I. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

- J. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.12 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. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. 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 with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 - 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.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
- F. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 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.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 1. Repair finished surfaces containing defects. Surface defects include spalls, pop outs, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

- B. Inspections:
1. Steel reinforcement placement.
 2. Steel reinforcement welding.
 3. Headed bolts and studs.
 4. Verification of use of required design mixture.
 5. Concrete placement, including conveying and depositing.
 6. Curing procedures and maintenance of curing temperature.
 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
 5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 6. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
 - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
 7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
 10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of

concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
 13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents. Contractor shall bear the costs of re-testing any/all failed initial tests.
- D. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 48 hours of finishing.

END OF SECTION 033000

SECTION 048100 – UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete Block
- B. Clay Facing Brick.
- C. Cut Stone Panels
- D. Mortar and Grout.
- E. Reinforcement and Anchorage.
- F. Flashings.
- G. Accessories.

1.2 RELATED SECTIONS

- A. Section 03200 - Concrete Reinforcement: Reinforcing steel for grouted masonry.
- B. Section 03300 - Cast-In-Place Concrete: Concrete for bond beams, grouted cores, etc.
- C. Section 05120 - Structural Steel: Loose steel lintels.
- D. Section 07840 - Firestopping: Firestopping at penetrations of masonry work.
- E. Section 07900 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.3 REFERENCES

- A. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 1997a.
- B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2000.
- C. ASTM C 62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2000.
- D. ASTM C 90 - Standard Specification for Loadbearing Concrete Masonry Units; 2001.
- E. ASTM C 129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2000a.
- F. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar; 1999.
- G. ASTM C 150 - Standard Specification for Portland Cement; 2000.
- H. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes; 1991 (Reapproved 1997).
- I. ASTM C 216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2000.
- J. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2000.
- K. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout; 1997.
- L. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 1997a.
- M. IMIAWC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council; 1993.

- N. IMIAWC (HW) - Recommended Practices & Guide Specifications for Hot Weather Masonry Construction; International Masonry Industry All-Weather Council; current edition.

1.4 MOCK-UP

- A. Prior brick masonry installation and final brick masonry order, Contractor shall submit a dry stack panel to best represent the intended brick masonry “blend” as specified below for Owner acceptance.
- B. Construct a masonry wall as a mock-up panel sized 4 feet long by 4 feet high, which includes mortar and accessories and structural backup.
- C. Locate where directed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. Handle and store ceramic glazed masonry units in protective cartons or trays. Do not remove from protective packaging until ready for installation.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- B. Cold Weather Requirements: Comply with recommendations of IMIAWC (CW).
- C. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.
- D. Hot Weather Requirements: Comply with IMIAWC (HW).

1.7 SAMPLES

- A. Provide full sized physical color samples of all exposed masonry materials.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
 - 2. Special Shapes: Provide non-standard blocks configured for corners, lintels, headers, and control joint edges.
 - 3. Load-Bearing and Non-Load Bearing Units: ASTM C 90, normal weight, 1,500 psi.
 - a. Hollow block, as indicated.
 - b. Type I - Moisture-controlled; normal weight.
 - 4. Non-Loadbearing Units: ASTM C 129.
 - a. Hollow block, as indicated.
 - b. normal weight, 1,500 psi.
 - 5. Burnished Block: Block shall be integrally colored with the ground face of the masonry unit of uniform color, exposure and texture matching the approved sample. Burnished block shall be furnished in 24 x 16 inch, 24 x 8 inch and other sizes as noted on the drawings.

2.2 BRICK UNITS

- A. Facing Brick (Base Mix): ASTM C 216, Type FBS, Grade SW.
 - 1. Color and texture:
 - a. Glen Gary, Red Smooth – Mahoney Series (**NOTE! For Bidding purposes only, brick to be selected by Arch. Contr to provide brick sample submittals**)
 - 2. Nominal size: Modular.
 - 3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
- B. Blending Brick (50% Mix to Base Mix): ASTM C 216, Type FBS, Grade SW.
 - 1. Color and texture:
 - a. Mahogany Velour Mod Run 13-55A
 - 2. Nominal size: Modular.

3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.3 CUT STONE PANELS

- A. Cut Stone Panels: ASTM C97, ASTM C99, ASTM C170.
- B. Size: 23-5/8"x11-5/8"x3-5/8"
- C. Buechel Stone Corp., Texas Cream Panels – Cut Stone. **(NOTE! For Bidding purposes only, stone to be selected by Arch. Contr to provide stone sample submittals)**

2.4 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I; color as required to produce approved color sample.
 1. Hydrated Lime: ASTM C 207, Type S.
 2. Mortar Aggregate: ASTM C 144.
 3. Grout Aggregate: ASTM C 404.
- B. Pigments for Colored Mortar: Iron or chromium oxides with demonstrated stability and colorfastness. Mortar colors shall be as manufactured by one of the following or approved equal:
 1. Solomon Colors
 2. Prism Pigments
 3. Davis Colors
- C. Water: Clean and potable.
- D. Pre-packaged mortar conforming to the above requirements, as manufactured by Spec-Mix is acceptable.

2.5 REINFORCEMENT AND ANCHORAGE

- A. Reinforcing Steel: specified in Section 03200; size as indicated on drawings; uncoated finish.
- B. Single Wythe Joint Reinforcement: Truss type; ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/A 153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
 1. Manufacturers:
 - a. Dur-O-Wal; Product Truss Type: www.dur-o-wal.com.
 - b. Hohmann & Barnard, Inc; Product #120 Truss-Mesh: www.h-b.com.
 - c. Masonry Reinforcing Corporation of America; Product Truss Type Series 300 2-Wire System: www.wirebond.com.
 - d. Substitutions: See Section 01600 - Product Requirements.
- C. Adjustable Multiple Wythe Joint Reinforcement: Truss type with adjustable ties or tabs spaced at 16 in on center and fabricated with moisture drip; ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire; width of components as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from each masonry face.
 1. Vertical adjustment: Not less than 2 inches.
 2. Seismic Feature: Provide lip, hook, or clip on extended leg of wall ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch diameter.
 3. Manufacturers:
 - a. Dur-O-Wal; Product D/A 370 Dur-O-Eye with D/A 360 S Seismic Ladur-Eye and continuous wire in outer wythe: www.dur-o-wal.com.
 - b. Hohmann & Barnard, Inc; Product #170 Truss Type Lox All, with Seismiclip Interlock System and continuous wire in outer wythe: www.h-b.com.
 - c. Masonry Reinforcing Corporation of America; Product Truss Type with Ties Series 900 Cavity Hook & Eye with Wire Bond clip and continuous wire in outer wythe: www.wirebond.com.
 - d. Substitutions: See Section 01600 - Product Requirements.
- D. Provide special corner and partition tie truss type joint reinforcing at all corners and wall intersections.

- E. Masonry Veneer Anchors: for use at wood stud back-up walls:
 1. 1-1/4 inch wide x 14 gauge x length as required to position seismic anchor.
 2. Finish: Hot Dipped Galvanized.
 3. "L" shaped veneer anchor with seismic clip. Provide 3/16 inch seismic wire for use in the outer wythe.
 4. Hole size as required for fasteners into wood stud walls.
 5. Manufacturers:
 - a. Hohmann & Barnard, Inc. - #345 SV Seismic Noth Veneer Anchor w/ 3/16 inch seismic wire.
 - b. Heckman Building Products Inc. - No. 360 L-Type Seismic Anchor w/ 3/16 inch seismic wire.
 - c. Dur-O-Wall, Inc. - D/A 431 Seismic Strap Anchor w/ 3/16 inch seismic wire.

2.6 FLASHINGS

- A. Thru-wall Flashing - shall be a composite sheet consisting of an 8 mil thick cross reinforced polyethylene sheet laminated to a 32 mil thick sheet of rubberized asphalt. Flashing shall be self adhering and shall be furnished with all primers and other accessories required for a complete watertight installation. Flashing shall be as manufactured by one of the following or approved equal:
 1. Sandell Manufacturing Co. - Sando-Seal
 2. Carlisle - CCW-705-TWF
 3. Mirafi - Miradry 400VB
 4. Fiberweb - Aqua Flash 500

2.7 ACCESSORIES

- A. Building Paper: ASTM D 226, Type I ("No.15") asphalt felt.
- B. Weep/Cavity Vents: Polyester mesh.
 1. Color: Match mortar color.
 2. Manufacturer: Mortar Net - Weep Vents.
- C. Cavity Wall Drainage System: Recycled polyester/polypropylene mesh trapezoidal shaped for air flow and drainage while suspending mortar droppings at unequal heights.
 1. Size: 2 inch width.
 2. Manufacturer: Mortar Net.
- D. Expansion Joint & Cover: Provide an expansion joint equal to that as manufactured as CS Industries, 6696 State Route 405, Muncy, PA 17756. Phone: (800) 233-8493 Direct: (570) 546-5941; Series - VF-100.
 1. Impregnated, compressible foam block. Hardness equal to ASTM D2240, Shore A.
 2. Tensile Strength equal or exceed ASTM 3574, 21 psi minimum.
 3. Elongation shall meet or exceed ASTM 3574, 125%.
 4. Color: To be selected from manufacturer's color chart. Intended to match the brick masonry color.
- E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.8 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C 270, using the Proportion Specification.
 1. Masonry below grade and in contact with earth: Type M.
 2. All other masonry: Type S.
 3. Interior, nonload bearing masonry: Type N.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave, except for walls to receive waterproofing or where a base of another material will be applied to the wall, which shall be flush cut.
- D. Brick Units:
 - 1. Bond: Running.
 - 2. Coursing: Three units and Three mortar joints to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.4 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Interlock intersections and external corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled, or where waterproofing is to be applied.
- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.5 WEEP/CAVITY VENTS

- A. Install weep/cavity vents in veneer and cavity walls at 24 inches on center horizontally above through-wall flashing for brick walls, and 24 inches on center for Burnished Block walls with 24 inch wide units. At block walls with 16 inch wide units install weeps 32 inches on center.

3.6 CAVITY WALL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. Special precautions must be taken to achieve smooth faces on the inside of the cavity space and to insure that the bottom of the cavity is clean and free of mortar droppings. Use a smooth mortar bed for the

exterior wythe and bevel the mortar joint away from the cavity so that a smooth upper surface inclined down toward the cavity results. Trowel flat and smooth any mortar fins on the cavity face of either width which may result. Use temporary wood, metal or fiber strips laid on the continuous wall reinforcing and carefully lift them out as the work progresses before the next layer of reinforcement is placed.

3.7 REINFORCEMENT AND ANCHORAGE - GENERAL

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 16 inches horizontally and 16 inches vertically.

3.8 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Lap joint reinforcement ends minimum 6 inches.

3.9 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches on center, at brick veneer walls.
- B. At decorative block veneer walls install horizontal joint reinforcement at the top and bottom of each 16 inch high burnished unit. Where 2 or more 8 inch high units are located adjacent to each other install joint reinforcement 16 inches on center.
- C. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- D. Place continuous joint reinforcement in first and second joint below top of walls.
- E. Lap joint reinforcement ends minimum 6 inches.
- F. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 16 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- G. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 16 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.10 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of openings.
- C. Lap joint reinforcement ends minimum 6 inches.

3.11 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry or turn up at least 4 inches to form watertight pan at non-masonry construction.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Extend laminated flashings to within 1/4 inch of exterior face of masonry.
- C. Lap end joints of flashings at least 4 inches and seal watertight with mastic or elastic sealant.
- D. Extend flashings up the wall a minimum of 8 inches beyond the top of the mortar droppings. At masonry back-up walls turn flashing into the mortar joint to terminate. At stud walls terminate flashing with a galvanized metal reglet and caulk the top edge.

3.12 LINTELS

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.

3.13 GROUTED COMPONENTS

- A. Reinforce bond beams with 2, No. 5 bars, 1 inch from bottom web.
- B. Lap splices minimum 24 bar diameters.
- C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- D. Place and consolidate grout fill without displacing reinforcing.
- E. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.
- F. Concrete block foundation walls shall be completely filled with grout.

3.14 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control and expansion joints.
- B. Control joints shall be formed in the veneer portion of the wall with no mortar in the head joint. Joint shall be backed with foam rod stock and caulked as specified in Section 07900.

3.15 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.16 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- E. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.17 CUTTING AND FITTING

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

3.18 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

3.19 PROTECTION OF FINISHED WORK

- A. Without damaging completed work, provide protective boards at exposed external corners which are subject to damage by construction activities.

END OF SECTION

SECTION 051200 STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural steel framing members, support members.
- B. Base plates shear stud connectors.
- C. Grouting under base plates.

1.2 RELATED SECTIONS

- A. Section 05500 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.3 REFERENCES

- A. AISC M016 - ASD Manual of Steel Construction; American Institute of Steel Construction, Inc.; 1989, Ninth Edition.
- B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.; 2000.
- C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2000.
- D. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2000a.
- E. ASTM A 108 - Standard Specification for Steel Bars, Carbon, Cold Finished, Standard Quality; 1999.
- F. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2000.
- G. ASTM A 325M - Standard Specification for High-Strength Bolts for Structural Steel Joints (Metric); 2000.
- H. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 1999.
- I. ASTM A 514/A 514M - Standard Specification for High-Yield Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding; 2000a.
- J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 1998.
- K. AWS D1.1 - Structural Welding Code - Steel; American Welding Society; 2002.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
 - 2. Connections not detailed.
 - 3. Indicate cambers and loads.
 - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.5 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC "ASD Manual of Steel Construction".
- B. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Michigan.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Angles and Plates: ASTM A 36/A 36M.
- B. Standard Steel I/H Beams: ASTM A-(992/A572-50.
- C. Cold-Formed Structural Tubing: ASTM A 500, Grade B.
- D. Steel Plate: ASTM A 514/A 514M.
- E. Shear Stud Connectors: Made from ASTM A 108 Grade 1015 bars.
- F. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, medium carbon, galvanized.
- G. Welding Materials: AWS D1.1; type required for materials being welded.
- H. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C 1107 and capable of developing a minimum compressive strength of 7,000 psi at 28 days. Grout shall be as manufactured by one of the following or approved equal:
 - 1. Sonneborn: SonogROUT 10K.
 - 2. The Euclid Chemical Company: Dry Pack Grout
 - 3. L & M Construction Chemicals: DuragROUT
 - 4. Sika: SikagROUT 212
 - 5. Tamms: Horn Grout
 - 6. Thoro: MultigROUT
 - 7. Dayton Superior: 1107 Advantage Grout
 - 8. Five Star Grout

2.2 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.
- D. Develop required camber for members.

2.3 FINISH

- A. Shop prime structural steel members. Do not prime surfaces that will be field welded, in contact with concrete, or high strength bolted.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.2 ERECTION

- A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".
- B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

- C. Field weld components and shear studs indicated on shop drawings.
- D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".
- E. Do not field cut or alter structural members without approval of Architect.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for non-shrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.3 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Structural drawings and specifications on plan sheets. The requirements shown on the structural drawings and specifications shall take precedence should conflict between the sections occur.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel framing and supports for counter doors.
 - 2. Steel framing and supports for countertops.
 - 3. Steel framing and supports for mechanical and electrical equipment.
 - 4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 5. Steel girders for supporting wood frame construction.
 - 6. Steel pipe columns for supporting wood frame construction.
 - 7. Prefabricated building columns.
 - 8. Shelf angles.
 - 9. Metal floor plate and supports.
 - 10. Miscellaneous steel trim including steel angle corner guards, steel edgings and service counter edge angles.
 - 11. Loose bearing and leveling plates for applications where they are not specified in other Sections.
- B. Products furnished, but not installed, under this Section:
 - 1. Loose steel lintels.
 - 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
 - 3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.
- C. Related Sections:
 - 1. Section 033000 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
 - 2. Section 04200 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
 - 3. Section 051200 "Structural Steel Framing."
 - 4. Section 053000 "Steel Decking".

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design ladders, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

- 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Nonslip aggregates and nonslip-aggregate surface finishes.
 - 2. Prefabricated building columns.
 - 3. Metal nosings and treads.
 - 4. Paint products.
 - 5. Grout.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
 - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
- C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified professional engineer.
- B. Mill Certificates: Signed by manufacturers of stainless-steel certifying that products furnished comply with requirements.
- C. Welding certificates.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.8 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts,

anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- D. Steel Tubing: ASTM A 1085, Grade 50.
- E. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless-steel fasteners for fastening aluminum.
 - 2. Provide stainless-steel fasteners for fastening stainless steel.
 - 3. Provide stainless-steel fasteners for fastening nickel silver.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 (ASTM A 325M, Type 3); with hex nuts, ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3); and, where indicated, flat washers.
- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1).
- E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Eyebolts: ASTM A 489.
- G. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
- H. Lag Screws: ASME B18.2.1 (ASME B18.2.3.8M).
- I. Wood Screws: Flat head, ASME B18.6.1.
- J. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).
- K. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).

- L. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- M. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- N. Post-Installed Anchors: Torque-controlled expansion anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Low-Emitting Materials: Paints and coatings 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."
- C. Shop Primers: Provide primers that comply with Section 099000 "Painting."
- D. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- G. Non-shrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- H. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 4500 psi (20 MPa).

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
1. Fabricate units from slotted channel framing where indicated.
 2. Furnish inserts for units installed after concrete is placed.
- C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as recommended by partition manufacturer. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
- D. Fabricate steel girders for wood frame construction from continuous steel shapes of sizes indicated.
1. Provide bearing plates welded to beams where indicated.
 2. Drill or punch girders and plates for field-bolted connections where indicated.
 3. Where wood nailers are attached to girders with bolts or lag screws, drill or punch holes at 24 inches (600 mm) o.c.
- E. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.
1. Unless otherwise indicated, fabricate from Schedule 40 steel pipe.
 2. Unless otherwise indicated, provide 1/2-inch (12.7-mm) baseplates with four 5/8-inch (16-mm) anchor bolts and 1/4-inch (6.4-mm) top plates.
- F. Galvanize miscellaneous framing and supports where indicated.

2.7 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.
 - 1. Provide mitered and welded units at corners.
 - 2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize shelf angles located in exterior walls.
- D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates.
- C. Prime plates with primer specified in Section 099000 "Paint."

2.10 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches (200 mm) unless otherwise indicated.
- C. Prime loose steel lintels located in exterior walls with primer specified in Section 099600 "Paint."

2.11 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.12 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.
- C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.13 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be fully embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer.
- C. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 3. Items Indicated to Receive Primers Specified in Section 099000 "Paint": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 4. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.14 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
- C. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.
- C. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as indicated on the Contract Documents. Grout baseplates of columns supporting structural beams after structural beams installed and leveled.

3.3 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use non-shrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use non-shrink, nonmetallic grout in exposed locations unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099000 "Painting."
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.5 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor, Architect and the Owner.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 055000

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Wood blocking, cants, and nailers.
 - 2. Wood sleepers.
 - 3. Plywood backing panels.
- B. Related Requirements:
 - 1. Section 061600 "Sheathing" For Plywood Sheathing.

1.3 DEFINITIONS

- A. Exposed Framing: Framing not concealed by other construction.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- C. Timber: Lumber of 5 inches nominal or greater in least dimension.
- D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. RIS: Redwood Inspection Service.
 - 4. SPIB: The Southern Pine Inspection Bureau.
 - 5. WCLIB: West Coast Lumber Inspection Bureau.
 - 6. WWPA: Western Wood Products Association.
- E. Fastener Patterns: Full-size templates for fasteners in exposed framing.

1.4 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. Fire-retardant-treated wood.
 - 3. Engineered wood products.
 - 4. Shear panels.
 - 5. Power-driven fasteners.
 - 6. Powder-actuated fasteners.
 - 7. Expansion anchors.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. 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. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
 - 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 4. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.
- C. 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. Do not use inorganic boron (SBX) for sill plates.
 - 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- 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.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, 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 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 beyond the centerline of the burners at any time during the test.
 1. Use treatment that does not promote corrosion of metal fasteners.
 2. 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.
 3. 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.
 4. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.
- 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.
 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- E. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat items indicated on Drawings:

2.4 DIMENSION LUMBER FRAMING

- A. Other Framing Not Listed Above: Use No. 1 grade, from species listed below.
 1. 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.

2.5 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. Cants.
 4. Furring.
 5. Grounds.
 6. Utility shelving.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber and any of the following species:
1. Hem-fir (north); NLGA.
 2. Mixed southern pine; SPIB.
 3. Spruce-pine-fir; NLGA.
 4. Hem-fir; WCLIB or WWPA.
 5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
 6. Western woods; WCLIB or WWPA.
 7. Northern species; NLGA.
 8. Eastern softwoods; NeLMA.
- C. For utility shelving, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
1. Hem-fir or hem-fir (north); Select Merchantable or No. 1 Common; NLGA, WCLIB, or WWPA.
 2. Spruce-pine-fir (south) or spruce-pine-fir; Select Merchantable or No. 1 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
- D. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine; No. 2 grade; SPIB.
 2. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
 3. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 4. Eastern softwoods; No. 2 Common grade; NeLMA.
 5. Northern species; No. 2 Common grade; NLGA.
 6. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.
- E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: DOC PS 1, fire-retardant treated, ¾ inches thick.

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."

2.7 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. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1.
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.8 METAL FRAMING ANCHORS

- A. Manufacturers: Subject to compliance with requirements, provide products by 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.
 6. Or approved equal.
- B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, which 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.

2.9 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

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. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- I. 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.
- J. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
- K. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
 - 1. Comply with approved fastener patterns where applicable.
 - 2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
 - 3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- D. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.4 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.

END OF SECTION 061000

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Combination wall sheathing, water resistive barrier and air barrier..
 - 2. Combination roof sheathing and roof underlayment.
 - 3. Self-adhering flexible flashing.
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry".
 - 2. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

1.3 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. For panels with integral water resistive barrier, include data on air/-moisture-infiltration protection based on testing according to referencing standards.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Capable of demonstrating that all wood procurement operations are conducted in accordance with procedures and policies of the Sustainable Forestry Initiative (SFI) Program.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Outdoor Storage: Comply with manufacturer's recommendations.
 - 1. Set panel bundles on supports to keep off ground.
 - 2. Cover panels loosely with waterproof protective material.
 - 3. Anchor covers on top of stack, but keep away from sides and bottom to assure adequate air circulation.
 - 4. When high moisture conditions exist, cut banding on panel stack to prevent edge damage.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sheathing system that fail due to manufacturing defects within specified warranty period.
 - 1. System Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. APA-The Engineered Wood Association: Product supply, installation and performance shall meet or exceed those standards as stated in the latest edition of Engineered Wood Construction Guide E-30.
 - 1. Building Code Compliance: Meet or exceed criteria contained in PS 1-09 and PS 2-10.
 - 2. Type: CDX
 - 3. Minimum Panel Span Rating: 32/16

2.2 COMBINATION ROOF SHEATHING AND ROOF UNDERLAYMENT

- A. Plywood Roof Sheathing: five (5) ply APA Performance rated roof sheathing. Doug Fir, Larch ply species.
 - 1. Span Rating and Performance Category: Not less than 32/16.
 - 2. Edge Profile: Square edge.
 - 3. Provide fastening guide to meet APA Structural 1 Grade on center and edge spacing for panels.

4. Minimum one (1) panel clips per span, top and bottom.

2.3 FASTENERS

- A. General: Provide fasteners of size and type that comply with requirements specified in this article by the authority having jurisdiction, International Building Code, International Residential Code, Wood Frame Construction manual, APA Design Manual and National Design Specification.
 1. Panel: Not less than 6" on center.
 2. Fastener Type: 10d, hot dipped, zinc coated..

2.4 MISCELLANEOUS MATERIALS

- A. Self-Adhering Roof Edge, Ridge and Valley Membrane Protection: Pressure-sensitive, self-adhering, cold-applied, proprietary sheet membrane.
 1. 36" wide x Continuous applied membrane flashing equal to that as manufactured as:
 - a. W.R. Grace – Ice and Water Shield
 - b. SRP Canada Inc. – AirOutshield ROOF.
 - c. Supremo -- RESISTO
 2. Thickness: 0.04 inch.
 3. Width: 36 inches

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.
- 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. Chapter 23 in ICC's "International Building Code."
 3. APA – Engineered Wood Construction Guide E30.
- D. Use common, zinc coated wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate 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.
- F. 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. Roof Sheathing:
 - a. Nail to wood framing.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch (3 mm) apart at edges and ends.
 - d. Install fasteners 3/8 inch (9.5 mm) to 1/2 inch (12.7 mm) from panel edges.

- e. Space fasteners in compliance with requirements of authority having jurisdiction.

3.3 FLEXIBLE FLASHING INSTALLATION

- A. Apply Eave, Ridge and Valley flashing on all roofing planes, inclusive of canopies and overhangs to comply with manufacturer's written instructions.
 - 1. After flashing has been applied, roll surfaces with a hard rubber roller to ensure that flashing is completely adhered to substrates.

END OF SECTION 061600

SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Wood roof trusses. Shaped and profile to match existing roof line.
 - 2. Wood truss bracing.
 - 3. Wood truss accessories.
- B. Related Requirements:
 - 1. Section 061600 "Sheathing" for roof sheathing.

1.3 DEFINITIONS

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.4 ACTION SUBMITTALS

- A. 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.
- B. 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.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For metal connector-plate manufacturer professional engineer and fabricator.
- B. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.
- C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss fabricating firm.
- D. Evaluation Reports: For the following, showing compliance with building code in effect for Project:
 - 1. Metal-plate connectors.
 - 2. Metal truss accessories.

1.6 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 the Owner.

1.7 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."
 - 1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
 - 2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
 - 3. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. 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.
 - 1. Design Loads: As indicated on structural Contract Documents.
 - 2. Maximum Deflection Under Design Loads: $L/360$.
- B. Comply with applicable requirements and recommendations of the following publications:
 - 1. TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
 - 2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
 - 3. TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
- C. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

- A. 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.
 - 3. Provide dry lumber with 19 percent maximum moisture content at time of dressing.

- B. Permanent Bracing: Provide wood bracing to meet code for this application. Continuous as required with size indicated on Contract Documents.
- C. Provide a 2x6 horizontal member at mid-span, 24 inches above the bottom chord of each truss to be used for attic access and inspection. Design connections and anticipated load of 45 PSF into truss chords.

2.3 METAL CONNECTOR PLATES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, 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. Simpson Strong Tie Co., Inc.
 - 9. Truswal Systems Corporation; an ITW company.
- B. Source Limitations: Obtain metal connector plates from single manufacturer.
- C. General: Fabricate connector plates to comply with TPI 1.
- D. Provide truss tie downs equal to that as manufactured as Simpson Strong-Tie; H1 for field installation on site. Two per truss minimum.

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 METAL FRAMING ANCHORS AND ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Simpson Strong-Tie Co., Inc.
- B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, which 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.

2.6 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. 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.
- D. 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. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.
- G. 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.
- H. Securely connect each truss ply required for forming built-up girder trusses.
 - 1. Anchor trusses to girder trusses as indicated on shop drawings and setting guides.
- I. 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.
- J. Install bracing to comply with Section 061000 "Rough Carpentry."
- K. Install wood trusses within installation tolerances in TPI 1.
- L. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- M. Replace wood trusses that are damaged or do not meet requirements.

END OF SECTION 061753

SECTION 06200 FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish carpentry items.
- B. Interior Wood casings and moldings.
- C. Exterior Wood mouldings, and trim.

1.2 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry blocking and grounds.
- B. Section 099300 - Paints and Coatings: Painting and finishing of finish carpentry items.

1.3 REFERENCES

- A. AWI P-200 - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute; 1997, Seventh Edition, Version 1.0.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, to a minimum scale of 1-1/2 inch to 1 ft.
- C. Samples: Submit two samples of wood trim 6 inch long.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Custom grade.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Protect work from moisture damage.

1.7 PROJECT CONDITIONS

- A. Do not deliver materials to the site until all masonry, drywall and quarry tile work has been completed and has had sufficient time to dry.
- B. Do not deliver materials to the site until the permanent heating system is installed and running so as to maintain a minimum temperature of 60 degrees.
- C. Materials shall be delivered to the site at least seven days in advance of installation and stored in the rooms they will be installed in and allowed to acclimate to the site

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

- A. Hardwood Lumber for trim and mouldings: Red Oak species, Plain sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish. AWI Grade I.
- B. Softwood Lumber for exterior moldings and trim: Western Red Cedar species, Plain sawn, maximum moisture content 6 percent, Western Wood Products Association B & Better.

2.2 SHEET MATERIALS

- A. Hardwood Plywood: Veneer core, type of glue recommended for application; Red Oak face species, Plain Sawn cut.
 - 1. Exposed edges of plywood shall be covered with a 3/8 inch thick solid wood edging of Red Oak, Plain Sliced.

2.3 BUTCHER BLOCK COUNTERTOP

- A. 2-1/4" Edge grain, Red Oak species, plain sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish. AWI Grade I.

2.4 FASTENERS

- A. Fasteners: Of size and type to suit application; finish in concealed locations and finish in exposed locations.
- B. Concealed Joint Fasteners: Threaded steel, or hardwood biscuits.

2.5 ACCESSORIES

- A. Wood Filler: Solvent base, tinted to match surface finish color.

2.6 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Fit exposed sheet material edges with 3/8 inch matching hardwood edging. Use one piece for full length only.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. See Section 06100 for installation of recessed wood blocking.

3.2 INSTALLATION

- A. Set and secure materials and components in place, plumb and level.
- B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- C. All finished work shall be scribed and coped as required for an accurate fit and erected plumb, true, square and in accordance with the drawings. Correlate location of nailers, blocking grounds and similar supports to allow proper attachment or other work. All work shall be secured in place with screws or nails as required. Countersink and fill all nail and screw heads exposed to view.
- D. This Contractor shall furnish and install all nails, spikes, screws, bolts and other similar items of rough hardware required in the progress of his work and shall install all items of finish hardware furnished by others.
- E. Install moldings to the following standards:
 - 1. Moldings to receive transparent finish shall be selected for compatibility of grain and color.
 - 2. No warped or twisted moulding shall be allowed.
 - 3. All moldings to be set plumb, level and true.

4. Moldings and trim shall be installed in maximum lengths possible to minimize joints.
5. All field joints to be tightly fitted and flush.
6. Field joints in running trim to be diagonal ("scarfed") joints.
7. Exposed ends of running trim shall have profiled or self-mitered returns.
8. All exposed fastenings (nails or trim head screws) shall be deep set.
9. Miters on large members (4" or larger) shall be doweled or splined and glued.
10. Blind nailing and concealed type fasteners to be used whenever possible.
11. Cope or miter inside corners where applicable, to produce tight fitting joints.
12. Miter outside joints to produce tight fitting joints.

3.3 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- B. Site Finishing: Refer to Section 09900.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

3.5 SCHEDULE

- A. Exterior: All exterior wood shall be Western Red Cedar.
 1. Window and Door Trim.
 2. Corner Boards.
- B. Interior: All interior mouldings and trim shall be Red Oak.
 1. Window Casings.
 2. Other wood fabrications as shown on drawings.

END OF SECTION

SECTION 071416 COLD FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Application of single-component, cold-applied, liquid waterproofing membrane.

1.02 RELATED SECTIONS

- A. Section 03 30 00 – Cast-in-Place Concrete.
- C. Section 07 21 00 – Thermal Insulation.
- D. Section 07 62 00 – Flashing and Sheet Metal.
- E. Section 07 92 00 – Joint Sealants.
- F. Section 33 2502 – Sub Surface Drain Tile.

1.03 REFERENCES

- A. ASTM D146-97 - Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Fabrics Used in Roofing and Waterproofing.
- B. ASTM D412-98a(2002)e1 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers -Tension.
- C. ASTM E96-00e1 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.
- D. ASTM D1228 - Methods of Testing Asphalt Insulating Siding Surfaced with Mineral Granules.
- E. ASTM C836 - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
- F. ASTM D1970-01 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

1.04 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean, dry area in accordance with manufacturer's instructions.
- C. Store adhesives and primers at temperatures of 40° F (5° C) and above to facilitate handling.
- D. Do not store at temperatures above 90° F (32° C) for extended periods.
- E. Protect materials during handling and application to prevent damage or contamination.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Product not intended for uses subject to abuse or permanent exposure to the elements.
- B. Do not apply membrane when air, material, or surface temperatures are expected to fall below 30° F (-1° C) within four hours of completed application.
- C. Do not apply membrane if rainfall is forecast or imminent within 12 hours.
- D. Do not apply to frozen concrete.
- E. Membrane can be applied to green concrete.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. W. R. MEADOWS®, INC., PO Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976. (847) 683-4500. Fax (847) 683-4544. Web Site www.wrmeadows.com: MEL-ROL-LM
- B. Tremco Commercial Sealants & Waterproofing, 3735 Green Road, Beachwood, OH 44122. (216)292.5000, (800)-321-7906. www.tremcosealants.com: TremProof 250GC
- C. Carlisle Coatings and Waterproofing, Inc., 900 Hensley Lane, Wylie, TX 78098. (800)527-7092. www.carlisle.com. CCW Miraseal

2.02 MATERIALS

- A. Waterproofing Membrane: single-component, polymer-modified, cold-applied, liquid waterproofing membrane.
 - 1. Performance Based Spec: Waterproofing membrane shall have the following properties as determined by laboratory testing:
 - a. Color: Black
 - b. Solids: 70%
 - c. Total Cure Time: 16-24 hours
 - d. Shore "00" Hardness, ASTM C836: Passes
 - e. Adhesion to Concrete, ASTM C836: Exceeds
 - f. Low Temperature Flex and Crack Bridging, ASTM C836: Passes
 - g. Stability, ASTM C836: Exceeds
 - h. Elongation, ASTM D412: 1500%
 - i. Water Absorption, ASTM D1970: 0.7%
 - j. Water Vapor Transmission, ASTM E96 (Method B): 0.03 perms

2.03 ACCESSORIES

- A. Concrete Repair Materials: Manufacturer's standard Concrete Repair Mortars.
- B. Waterproofing Protection Course: Manufacturer's standard, 10 mil.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive membrane. Notify architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.02 SURFACE PREPARATION

- A. Protect adjacent surfaces not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- C. Do not apply waterproofing to surfaces unacceptable to manufacturer.
- D. Concrete surfaces must be clean, relatively smooth, and free of standing water.
- E. Patch all holes and voids and smooth out any surface misalignments.
- F. Remove and patch all concrete form ties.
- G. Apply primer coat of membrane diluted 4:1 with water if necessary to reduce blistering on concrete surfaces at a coverage rate of 100-150 ft.²/U.S. gal (13.9 m²/3.78 L) by spraying or rolling.
- H. Allow primer coat to dry before proceeding to membrane application.

3.03 APPLICATION

- A. Apply waterproofing membrane system in accordance with manufacturer's instructions.
- B. Thoroughly mechanically mix membrane prior to application.
- C. Apply membrane by spray, roller, or brush at a minimum coverage rate of 20-25 ft.²/U.S. gal (1.9-2.3 m²/3.78L) providing a thickness of 60 wet mils.
- D. Frequently inspect surface area with a wet mil gauge to ensure consistent thickness.
- E. Work material into any fluted rib forming indentations.
- F. Cured thickness of membrane should be 45 mils dry.
- G. Avoid use of products that contain tars, solvents, pitches, polysulfide polymers, or PVC materials that may come into contact with waterproofing membrane system.

3.04 PROTECTION

- A. Protect membrane with application of waterproofing protection course or other approved material.
- B. Backfill immediately using care to avoid damaging waterproofing membrane system.

END OF SECTION 071416

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 1. Glass-fiber blanket insulation.
 2. Mineral-wool blanket insulation.
 3. Spray polyurethane foam insulation.
 4. Vapor retarders.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.5 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site before installation time.
 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. CertainTeed Corporation.
 2. Guardian Building Products, Inc.
 3. Johns Manville.
 4. Knauf Insulation.
 5. Owens Corning.
- B. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

- C. Un-faced, 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.
- D. 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.
- E. Provide glass-fiber blanket insulation as follows:
 - 1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.

2.2 MINERAL-WOOL BLANKET INSULATION

- A. Manufacturers: Subject to compliance with requirements and where indicated on the Contract Documents, provide products by one of the following:
 - 1. Fibrex Insulations Inc.
 - 2. Owens Corning.
 - 3. Roxul Inc.
 - 4. Thermafiber.
- B. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- C. Un-faced, Mineral-Wool Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; 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 MINERAL-WOOL BOARD INSULATION

- A. Manufacturers: Subject to compliance with requirements and where indicated on the Contract Documents, provide products by one of the following:
 - 1. Roxul Inc. (Roxul Comfortboard 80)
 - 2. Owens Corning.
 - 3. Johns Manville.
- B. Mineral-Wool Board Insulation: Consisting of rigid stone wool insulation board to improve thermal performance by R4 per inch, and a flame-spread and smoke-developed indexes of 5 and 10, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

2.4 SPRAY POLYURETHANE FOAM INSULATION

- A. Open-Cell Polyurethane Foam Insulation (miscellaneous gaps as needed): Spray-applied polyurethane foam using water as a blowing agent, 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. BaySystems NorthAmerica, LLC.
 - b. Demilec (USA) LLC.
 - c. Gaco Western Inc.
 - d. Icynene Inc.
 - e. SWD Urethane Company.
 - 2. Minimum density of 0.4 lb/cu. ft., thermal resistivity of 3.4 deg F x h x sq. ft./Btu x in. at 75 deg F.

2.5 VAPOR RETARDERS

- A. Reinforced-Polyethylene Vapor Retarders (under-slab): Two outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/1000 sq. ft., with maximum permeance rating of 0.04 perm. Comply with ASTM E-1745-11.
 - 1. Products: Subject to compliance with requirements, provide the following
 - a. Raven Industries Inc.; DURA-SKRIM 6WW.
 - b. Reef Industries, Inc.; Griffolyn T-65.
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.
- D. Single-Component Non-sag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.
- E. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

2.6 VAPOR BARRIER

- A. Polyethylene Vapor Barrier (where indicated): Class 1 Polyethylene Vapor Barrier not less than 6 mil thickness and not less than 0.1 Perms. Minimum 6" lap at all joints.

2.7 EXTRUDED POLYSTYRENE BOARD INSULATION

- A. Extruded-Polystyrene Board Insulation (foundation walls): ASTM C 578, of type and minimum compressive strength of 40 psi, 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.

2.8 POLYISOCYANURATE BOARD INSULATION

- A. Polyisocyanurate Board Insulation (low slope roofs): Rigid cellular foam, complying with ASTM C 1289, furnish both flat and tapered as shown on drawings. Insulation shall be Polyisocyanurate insulation to be compatible with this roofing system.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - a. John Manville
 - b. Carlisle SynTec Systems
 - c. GAF
 - d. Soprema

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

3.2 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.

3.3 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. 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. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 - 5. For wood-framed construction, install blankets according to ASTM C 1320:
- C. 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.
- D. Spray-Applied Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.
- 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..
 - 2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions. Use low expanding formula insulation where tolerances of movement and fitment are critical to daily function and operation..

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.
- 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.

3.5 PROTECTION

- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Weather barrier membrane
- B. Seam Tape
- C. Flashing
- D. Fasteners

1.2 REFERENCES

- A. ASTM International
 - 1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
 - 2. ASTM C1193; Standard Guide for Use of Joint Sealants
 - 3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting
 - 4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
 - 5. ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
 - 6. ASTM E96; Test Method for Water Vapor Transmission of Materials
 - 7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
 - 8. ASTM E2178; Test Method for Air Permeance of Building Materials
 - 9. ASTM E2357; Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- B. AATCC – American Association of Textile Chemists and Colorists
 - 1. Test Method 127 Water Resistance: Hydrostatic Pressure Test
- C. TAPPI
 - 1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
 - 2. Test Method T-460; Air Resistance (Gurley Hill Method)

1.3 SUBMITTALS

- A. Refer to Section 013300 Submittal Procedures
- B. Product Data: Submit manufacturer current technical literature for each component.
- D. Quality Assurance Submittals
 - 1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
 - 2. Manufacturer Instructions: Provide manufacturer's written installation instructions.
 - 3. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.
- E. Closeout Submittals
 - 1. Refer to Section 017800 Closeout Submittals
 - 2. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.4 QUALITY ASSURANCE

- A. Qualifications
 - 1. Installer shall have minimum 5 years of experience with installation of commercial weather barrier assemblies under similar conditions.

2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
 3. Source Limitations: Provide commercial weather barrier and accessory materials produced by single manufacturer.
- B. Mock-up
1. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
 - a. Mock-up size: 10 feet by 10 feet
 - b. Mock-up Substrate: Match wall assembly construction, including window opening.
 - c. Mock-up may remain as part of the work.
 2. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty.
- C. Pre-installation Meeting
1. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Installer, Owner's Representative, and Weather Barrier Manufacturer's Designated Representative.
 2. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store weather barrier materials as recommended by weather barrier manufacturer.

1.6 SCHEDULING

- A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.
- B. Schedule installation of weather barrier materials and exterior cladding within six months of weather barrier assembly installation.

1.7 WARRANTY

- B. Special Warranty
 1. Special weather-barrier manufacturer's warranty for weather barrier for a period of ten (10) years from date of purchase.
 2. Pre-installation meetings and jobsite observations by weather barrier manufacturer for warranty are required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. DuPont; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 1-800-44-TYVEK (8-9835); <http://www.construction.tyvek.com>

- B. PrimeSource Building Products, Inc.; 1321 Greenway Drive, Irving, TX 75038-2504; 972-999-8500
<http://www.grip-rite.com/us/en/products/weather-resistive-barriers/house-wrap/house-wrap>
- C. Fortifiber Building Systems Group; 300 Industrial Dr., Fernley NV 89408; 800-773-4777;
<https://www.fortifiber.com>

2.2 MATERIALS

- A. Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® CommercialWrap® and related assembly components.
- B. Performance Characteristics:
 - 1. Air Penetration: 0.001 cfm/ft² at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677. ≤0.04 cfm/ft² at 75 Pa, when tested in accordance with ASTM E2357
 - 2. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B.
 - 3. Water Penetration Resistance: 280 cm when tested in accordance with AATCC Test Method 127.
 - 4. Basis Weight: 2.7 oz/yd², when tested in accordance with TAPPI Test Method T-410.
 - 5. Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.
 - 6. Tensile Strength: 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.
 - 7. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.
 - 8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 10, Smoke Developed: 10.

2.3 ACCESSORIES

- A. Seam Tape: 3 inch wide, DuPont™ Tyvek® Tape for commercial applications.
- B. Fasteners:
 - 2. Tyvek® Wrap Caps, as distributed by DuPont: #4 nails with large 1-inch plastic cap fasteners, or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.
- C. Sealants
 - 2. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions.
 - 3. Products:
 - a. DuPont™ Commercial Sealant
 - b. Sealants recommended by the weather barrier manufacturer.
- D. Adhesives:
 - 1. Provide adhesive recommended by weather barrier manufacturer.
 - 2. Products:
 - a. Liquid Nails® LN-109
 - b. 3M High Strength 90
 - c. Adhesives recommend by the weather barrier manufacturer.
- E. Primers:

1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
 2. Products:
 - a. 3M High Strength 90
 - b. Denso Butyl Spray
 - c. Permagrip 105
 - d. ITW TACC Sta' Put SPH
 - e. Primers recommended by the flashing manufacturer
- F. Flashing
1. DuPont™ FlexWrap™ NF, as distributed by DuPont: flexible membrane flashing materials for window openings and penetrations.
 2. DuPont™ Thru-Wall Surface Adhered Membrane with Integrated Drip Edge: Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.
 3. Preformed Inside and Outside Corners and End Dams as distributed by DuPont: Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.2 INSTALLATION – WEATHER BARRIER

- A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
- B. Install weather barrier prior to installation of windows and doors.
- C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.
- E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
- F. Window and Door Openings: Extend weather barrier completely over openings.
- G. Overlap weather barrier
 1. Exterior corners: minimum 12 inches.
 2. Seams: minimum 6 inches.
- H. Weather Barrier Attachment:
 1. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

3.3 SEAMING

- A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.

- B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.4 OPENING PREPARATION (for use with non-flanged windows – all cladding types)

- A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.5 FLASHING (for use with non-flanged windows – all cladding types)

- A. Cut 9-inch wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening. Apply primer as required by manufacturer.
- B. Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanical fastening is not required for DuPont™ FlexWrap™ NF.
- D. Apply 9-inch wide strips of DuPont™ StraightFlash™ at jambs. Align flashing with interior edge of jamb framing. Start DuPont™ StraightFlash™ at head of opening and lap sill flashing down to the sill.
- E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.
- F. Install DuPont™ FlexWrap™ DuPont™ FlexWrap™ NF at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.
- G. Coordinate flashing with window installation.
- H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.
- I. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.
- J. Tape top of window in accordance with manufacturer recommendations.
- K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.6 OPENING PREPARATION (for use with flanged windows)

- A. Cut weather barrier in an "I-cut" pattern. A modified I-cut is also acceptable.
 - 1. Cut weather barrier horizontally along the bottom and top of the window opening.
 - 2. From the top center of the window opening, cut weather barrier vertically down to the sill..
 - 3. Fold side and bottom weather barrier flaps into window opening and fasten.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.7 FLASHING (for use with flanged windows)

- A. Cut 9-inch wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

- C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanical fastening is not required for DuPont™ FlexWrap™ NF.
- D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.
- E. Install window according to manufacturer's instructions.
- F. Apply 4-inch wide strips of DuPont™ StraightFlash™ at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.
- G. Apply 4-inch wide strip of DuPont™ StraightFlash™ as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.
- H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.
- I. Tape head flap in accordance with manufacturer recommendations.
- J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.8 THRU-WALL FLASHING INSTALLATION

- A. Apply primer per manufacturer's written instructions.
- B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.
- C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.
- D. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.
- E. Roll flashing into place. Ensure continuous and direct contact with substrate.
- F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.
- G. Trim exterior edge of membrane 1-inch and secure metal drip edge per manufacturer's written instructions.
- H. Terminate membrane on vertical wall. [Terminate into reglet, counterflashing or with termination bar.]
- I. Apply sealant bead at each termination.

3.12 FIELD QUALITY CONTROL

- A. Notify manufacturer's designated representative to obtain [required] periodic observations of weather barrier assembly installation.

3.14 PROTECTION

- A. Protect installed weather barrier from damage.

END OF SECTION

SECTION 073113 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Asphalt shingles.
 - 2. Underlayment.
- B. Related Sections:
 - 1. Section 061000 "Rough Carpentry" for wood framing.
 - 2. Section 061600 "Sheathing" for roof sheathing.
 - 3. Section 076200 "Sheet Metal Flashing and Trim" for metal roof penetration flashings counterflashings and flashings.

1.3 DEFINITION

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For the following products, of sizes indicated, to verify color selected:
 - 1. Asphalt Shingle: Full size.
 - 2. Ridge and Hip Cap Shingles: Full size.
 - 3. Ridge Vent: 12-inch long Sample.
 - 4. Must be a minimum of 300 lbs. per square.
 - 5. Extended Warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of asphalt shingle to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Asphalt Shingles: 100 sq. ft of each type, in unbroken bundles.

1.7 QUALITY ASSURANCE

- A. Source Limitations: Obtain ridge and hip cap shingles ridge vents and self-adhering sheet underlayment from single source from single manufacturer.
- B. Fire-Resistance Characteristics: Where indicated, provide asphalt shingles and related roofing materials identical to those of assemblies tested for fire resistance per test method below by UL or another testing

and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing materials in a dry, well-ventilated, weathertight location according to asphalt shingle manufacturer's written instructions. Store underlayment rolls on end on pallets or other raised surfaces. Do not double stack rolls.
 1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.
- B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install asphalt shingles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.10 WARRANTY

- A. Special Warranty: Standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Manufacturing defects.
 - b. Structural failures including failure of asphalt shingles to self-seal after a reasonable time.
 2. Material Warranty Period: See stated warranty under the product manufacturer's listed below.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: GAF Materials Corporation - Timberline; 1361 Alps Road, Wayne, NJ 07470. ASD. Tel: 1-888-532-5767. www.GAF.com.
- B. Certainteed - Independence.
- C. Verify which shingle is on the existing roof and match.
- D. Requests for substitutions will be considered in accordance with provisions of Section 012500 and 013300.

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. Strip Size: Manufacturer's standard.
 2. Color and Blends: As selected by Architect and Owner from manufacturer's full range.

3. Material Overage: Provide two (2) squares of shingles of the provided types and color for Owner's use for maintenance. Additional shingles shall come from same color and production run as those supplied for use on the project.
- B. Provide one of the shingles from the manufacturer's as listed below;
1. CertainTeed: XT 30 AR; shingles and roof system components. Provide manufacturer's Sure Start Plus Warranty and extended warranty coverage as stated under the Five Star Coverage.
 - a. Fifty (50) year material and labor costs for repair or replacement, tear off protection, disposal costs and workmanship defects.
 - b. Non-Prorated Warranty.
 2. Owens Corning: True Definition Weather Guard; shingles and roof system components. Provide manufacturer's Platinum Plus Protection Warranty and extended warranty coverage.
 - a. Fifty (50) year material and labor costs for repair or replacement, tear off protection, disposal costs and workmanship defects.
 - b. Non-Prorated Warranty.
 3. GAF: Timberline Ultra HD; shingles and roof system components. Provide manufacturer's Weatherstopper Golden Pledge Warranty and extended warranty coverage.
 - a. Fifty (50) year material and labor costs for repair or replacement, tear off protection, disposal costs and workmanship defects.
 - b. Non-Prorated Warranty.
- C. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, minimum of 40-mil thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing; cold applied.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle Coatings & Waterproofing, Inc.
 - b. Grace, W. R. & Co. - Conn.
 - c. Owens Corning.

2.4 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 external deflector baffles; for use under ridge shingles.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Air Vent, Inc.; a Gibraltar Industries company.
 - b. GAF Materials Corporation.
 - c. Owens Corning.
 2. Minimum Net Free Area: 18 square inches per lineal foot.

- B. Mid-Roof Vent: Manufacturer's standard, rigid section high-density polypropylene or other UV-stabilized vent with nonwoven geotextile filter strips and external deflector baffles; for use under shingles. Equal to that as manufactured by DCI Products; Smart Vent. Place as shown on documents.
- C. Off-Wall Shed Roof Vent: Manufacturer's standard, rigid section high-density polypropylene or other UV-stabilized vent with nonwoven geotextile filter strips and external deflector baffles; for use under shingles. Equal to that as manufactured by DCI Products; Smart Vent. Place as shown on documents.
- D. Roof Vent: Manufacturer's standard, rigid section high-density polypropylene or other UV-stabilized vent with nonwoven geotextile filter strips and external deflector baffles; for use under shingles. Equal to that as manufactured by DCI Products; Smart Vent. Place as shown on documents. Minimum Net Free Area: 18 square inches per lineal foot.
- E. 3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. [DCI Products, Inc.](#); Smart Vent.
 - 2. [GAF Materials Corporation](#).
 - 3. [Owens Corning](#).
 - 4. AF COBRA Ridge Vent or GAF COBRA Rigid Vent II.

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 diameter, barbed shank, sharp-pointed, with a minimum 3/8-inch diameter flat head and of sufficient length to penetrate 3/4 inch into solid wood decking or extend at least 1/8 inch through OSB or plywood sheathing.
 - 1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.
- C. Zinc Coil Stock: Provide product equal to that as manufactured as WSI Zinc Coil Stock; 139 Queen Anne Rd Unit 1, Harwich, MA 02645. Apply zinc to the first full course of shingles below the ridge vent from end to end and also below any obstruction. Butt the zinc up to the shingle above keeping most of it exposed. Secure in adhesive and use manufacturer supplied, galvanized roof nails that have a rubber washer around the nail head to prevent leaks. Face nail the zinc every 2ft and also apply a construction adhesive like "Liquid Nails" behind the zinc to help ensure a permanent bond.

2.6 METAL FLASHING AND TRIM

- A. General: Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
 - 1. Sheet Metal: Zinc-tin alloy-coated steel, pre-painted.
- 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 the item.
 - 1. Apron Flashings: Fabricate with lower flange a minimum of 4 inches over and 4 inches beyond each side of downslope asphalt shingles and 6 inches up the vertical surface.
 - 2. Step Flashings: Fabricate with a headlap of 2 inches and a minimum extension of 4 inches over the underlying asphalt shingle and up the vertical surface.
 - 3. Cricket Flashings: Fabricate with concealed flange extending a minimum of 18 inches beneath upslope asphalt shingles and 6 inches beyond each side of skylight and 6 inches above the roof plane.
 - 4. Open-Valley Flashings: Fabricate in lengths not exceeding 10 feet with 1-inch-high, inverted-V profile at center of valley and equal flange widths of 12 inches.

5. Drip Edges: Fabricate in lengths not exceeding 10 feet with 2-inch roof-deck flange and 1-1/2-inch fascia flange with 3/8-inch drip at lower edge.
- C. Vent Pipe Flashings: ASTM B 749, Type L51121, at least 1/16 inch thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof, and extending at least 4 inches from pipe onto roof.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through asphalt shingles.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated below, lapped in direction to shed water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days.
1. Eaves: Extend from edges of eaves 36 inches beyond interior face of exterior wall.
 2. Rakes: Extend from edges of rake 36 inches beyond interior face of exterior wall.
 3. Valleys: Extend from lowest to highest point 18 inches on each side.
 4. Hips: Extend 18 inches on each side.
 5. Ridges: Extend 36 inches on each side without obstructing continuous ridge vent slot.
 6. Sidewalls: Extend beyond sidewall 18 inches, and return vertically against sidewall not less than 4 inches.
 7. Dormers, Chimneys, Skylights, and Other Roof-Penetrating Elements: Extend beyond penetrating element 18 inches, and return vertically against penetrating element not less than 4 inches.
 8. Roof Slope Transitions: Extend 18 inches on each roof slope.

3.3 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Section 076200 "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."
- B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.
- C. Step Flashings: Install with a headlap of 2 inches and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.

- D. Cricket Flashings: Install against the roof-penetrating element extending concealed flange beneath upslope asphalt shingles and beyond each side.
- E. Open-Valley Flashings: Install centered in valleys, lapping ends at least 8 inches in direction to shed water. Fasten upper end of each length to roof deck beneath overlap.
 - 1. Adhere 9-inch wide strip of self-adhering sheet to metal flanges and to self-adhering sheet underlayment.
- F. Rake Drip Edges: Install rake drip edge flashings over underlayment and fasten to roof deck.
- G. Eave Drip Edges: Install eave drip edge flashings below underlayment and fasten to roof sheathing.
- H. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.4 ASPHALT SHINGLE INSTALLATION

- A. General: 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 wide with self-sealing strip face up at roof edge.
 - 1. Extend asphalt shingles 1/2 inch over fascia at eaves and rakes.
 - 2. Every sixth (6) course, provide for a double shingle run to provide a thickened edge shadow line. Contractor shall only use the 6 course spacing as a guide for pricing. Contractor shall equally space this double course within the roof plan, not to exceed every sixth course. Assure the spacing does not come up with a "short" course at ridge. Mastic set double shingle set.
- 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 four roofing nails located according to manufacturer's written instructions.
- E. Open Valleys: Cut and fit asphalt shingles at open valleys, trimming upper concealed corners of shingle strips. Maintain uniform width of exposed open valley from highest to lowest point.
 - 1. Set valley edge of asphalt shingles in a 3-inch wide bed of asphalt roofing cement.
 - 2. Do not nail asphalt shingles to metal open-valley flashings.
- 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.
 - 1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

END OF SECTION 073113

SECTION 075300 - ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Elastomeric roofing membrane, fully adhered application.
- B. Insulation, flat and tapered.
- C. Protection board.
- D. Vapor retarder.
- E. Flashings.
- F. Roofing cant strips, stack boots.

1.2 RELATED SECTIONS

- A. Section 061000 - Rough Carpentry: Wood nailers and curbs.
- B. Section 072100 – Thermal Insulation: Vapor Barriers
- C. Section 076200 - Sheet Metal Flashing and Trim: Counterflashings, reglets, and cap flashing.

1.3 SUBMITTALS

- A. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
- B. Shop Drawings: Indicate joint or termination detail conditions and conditions of interface with other materials.
- C. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.
- B. Applicator Qualifications: Company specializing in performing the work of this section approved by manufacturer. Roofing shall be installed in accordance with the approved shop drawings. There must be no deviations made from Manufacturer's specifications or the approved shop drawings without the prior written approval from Manufacturer.
- C. Upon completion of the installation, an inspection will be conducted by a technical representative of Manufacturer to ascertain that the roofing system has been installed according to Manufacturer's specifications and details.

1.5 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.
- B. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.
- C. Job site storage temperatures in excess of 90 degrees F may affect shelf life of curable materials
- D. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60 degrees F before use. Do not store containers with open lids due to loss of solvent which will occur from flash off.
- E. Membrane should be stored in its original plastic wrap or be covered to protect from moisture. Any moisture absorbed by the membrane must be removed by using a wet-vac system, prior to membrane adhesion.
- F. Insulation and underlayment must be stored so it is kept dry and is protected from the elements. Store insulation on a skid and completely cover with a breathable material as tarp or canvas.
- G. Protect foam insulation from direct exposure to sunlight.

1.7 PROJECT CONDITIONS

- A. Coordinate the work with installation of associated counterflashings installed by other sections as the work of this section proceeds.
- B. Do not apply Sure-Seal FAST 100 Adhesive when surface and/or ambient temperatures are below 40 degrees F. In colder temperatures, the addition of a catalyst to FAST Adhesive may be required.
- C. Coordination between various trades is essential to avoid unnecessary rooftop traffic over sections of the roof and to prevent damage to the membrane.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

1.9 WARRANTY

- A. See Section 017700 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.
- C. Provide twenty (20) year manufacturer's material and labor warranty to cover failure to prevent penetration of water into the facility.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. EPDM Membrane Materials:
 - 1. Carlisle SynTec, which is located at: P. O. Box 7000 ; Carlisle, PA 17013; Toll Free Tel: 800-4-SYNTEC; Tel: 717-245-7000; Fax: 717-245-7053; Web: www.carlisle-syntec.com
 - 2. Versico Roofing Systems; PO Box 1289, Carlisle, PA 17013. Toll Free: 800-992-7663 Fax: 717-960-4036. www.versico.com
 - 3. Holcim Elevate; 26 Century Blvd, Suite 205, Nashville, TN 37214 www.holcimelevate.com
 - 4. Substitutions: See Section 012500 – Substitution Procedures.
- B. The components of this roofing system specification are based on products as manufactured and supplied by Carlisle SynTec.
- C. Insulation: Section 072100 Thermal Insulation

2.2 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane: Furnish 60-mil thick EPDM (Ethylene, Propylene, Diene Terpolymer) in the largest sheet possible with 3" or 6" Factory-Applied Tape (FAT). (Splice tape shall be a butyl/EPDM based polymer with a minimum thickness of 25-mil.) The membrane shall conform to the minimum physical properties of ASTM D4637. When a 10 foot wide membrane is to be used, the membrane shall be manufactured in a single panel with no factory splices to reduce splice intersections.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Vapor Retarder: Section 072100 Thermal Insulation
- D. Flexible Flashing Material: Same material as membrane; conforming to the following:
 - 1. Sure-Seal (black) Pressure-Sensitive Pipe Seals with Factory-Applied TAPE on the deck flange are available for use with Sure-Seal/Sure-White Roofing systems.
 - 2. Sure-Seal Pressure-Sensitive Overlayment Strip: A nominal 40-mil black, semi-cured EPDM membrane laminated to a nominal 35-mil cured, Factory-Applied TAPE for flashing gravel stops, metal edgings and Seam Fastening Plates.
 - 3. Sure-Seal Fully Pressure Sensitive Curb Flashing: 60 mil Sure-Seal cured EPDM Membrane laminated to a 35 mil 6 inch (152mm) and 12 inch (305mm) SecurTape.
 - 4. Sure-Seal Pressure-Sensitive RUSS (Reinforced Universal Securement Strip):
 - a. 6 inch (152 mm) RUSS: A nominal 6 inch (152 mm) wide, 45-mil thick reinforced EPDM membrane with a nominal 3 inch (76mm) wide 30-mil thick cured synthetic rubber pressure-sensitive adhesive laminated to one edge. This product provides perimeter securement, and additional membrane securement at angle changes for Adhered, Ballasted, and Mechanically Fastened Roofing Systems.

2.3 VAPOR BARRIER

- A. See Section 072100 Thermal Insulation.

2.4 INSULATION

- A. See Section 072100 Thermal Insulation.

2.5 ACCESSORIES

- A. Expansion Joint (at junction from existing building to new addition) shall be manufacturer's compatible expansion joint.
- B. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- C. Membrane Adhesive: As recommended by membrane manufacturer.
- D. Insulation Adhesive: As recommended by insulation manufacturer. Carlisle - FAST Adhesive.
- E. Sealants: As recommended by membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and

suitable for installation of roof system.

- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.
- F. Defects in the roof deck must be reported and documented to the Architect, General Contractor and Owner for assessment. The Carlisle Authorized Roofing Applicator shall not proceed until the defects are corrected.

3.2 VAPOR RETARDER AND INSULATION - UNDER MEMBRANE

- A. Apply vapor retarder to deck surface in accordance with manufacturer's instructions.
 - 1. Extend vapor retarder under cant strips and blocking to deck edge.
 - 2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
- B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.
- C. Attachment of Insulation:
 - 1. Spray apply FAST Adhesive over the dry substrate at the coverage rate as recommended by the manufacturer.
 - 2. Allow the adhesive to rise up approximately 1/8 inch and set insulation boards into adhesive. Continue to install boards into the adhesive and after necessary set up time, walk the boards into the adhesive and roll using the 30 inch wide 100 - 150 pound weighted steel roller to insure full embedment.
 - 3. Install subsequent layer of insulation in a similar manner. Joints shall be staggered a minimum of 6 inches from joints in insulation below.
 - 4. All gaps and voids in insulations shall be filled with FAST Adhesive.
- D. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- E. Do not apply more insulation than can be covered with membrane in same day.

3.3 MEMBRANE APPLICATION

- A. Membrane shall be fully adhered to an approved, acceptable substrate. Adhesive is applied to the substrate only and the membrane is rolled onto the wet adhesive once it has foamed up approximately 1/8 inch. Roll the membrane with a weighted (100 - 150 lbs.), rubber coated steel roller to set the membrane into the adhesive.
- B. Adjoining sheets of Membrane are overlapped a minimum of 3 inches along the length of the membrane (at selvage edges) in preparation for membrane splicing. At end laps membrane shall be overlapped 2 inches to 1 inch which will be overlaid with 6 inch wide pressure sensitive Flashing or Cured EPDM Flashing.
- C. Membrane Splicing: Contractor's Option: Use either Slicing Cement or Secure Tape as is best suited to this application.
- D. Flashing:
 - 1. When feasible, flash all walls/curbs, etc., with continuous deck membrane. When the use of continuous deck membrane is not feasible, a separate piece of Cured EPDM Flashing or Membrane may be utilized.
 - 2. Uncured Elastoform and Pressure Sensitive Uncured Flashing shall be limited to overlaying vertical field seams, inside and outside corners, scuppers or other unusual shaped walls or penetrations; where the use of cured EPDM Flashing membrane, Pressure Sensitive Flashing or Prefabricated accessories is not practical.
 - 3. When using Pressure-Sensitive Flashing (semi-cure or cured) to overlay metal edging flanges, etc., Sure-Seal Primer must be used to clean the membrane and metal surfaces. Lap Sealant is optional on straight runs of Pressure Sensitive Flashing and around Pressure Sensitive Pipe Seals.

4. Terminate the flashing in accordance with the appropriate detail.
 5. Copings, counterflashing and metal work, not supplied by Carlisle shall be fastened to prevent metal from pulling free or buckling and sealed to prevent moisture from entering the roofing system or building.
- E. Coordinate installation of roof drains and sumps and related flashings.
 - F. Complete roof system, clean all overages and remove debris from site.
 - G. Coordinate and request system warranty inspection. Owner shall be present during Warranty Inspection.

END OF SECTION

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Formed roof-drainage sheet metal fabrications.
 - 2. Formed steep-slope roof sheet metal fabrications.
 - 3. Formed wall sheet metal fabrications.
- B. Related Requirements:
 - 1. Section 048100 "Unit Masonry".
 - 2. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 3. Section 062000 "Finish Carpentry".
 - 4. Section 072100 "Thermal Insulation".
 - 5. Section 092423 "Cement Stucco".

1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leak proof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.
 - 1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review requirements for insurance and certificates if applicable.
 - 3. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.9 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; pre-painted by coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Surface: Smooth, 24 gauge flat and with manufacturer's standard clear acrylic coating on both sides.
 - 2. Exposed Coil-Coated Finish:

- a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- 3. Color: As selected by Owner from manufacturer's full range.
- 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item 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 or manufactured item.
 - 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. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - 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 Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1/2 inch wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; 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.

2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, non-expansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.
- G. Do not use graphite pencils to mark metal surfaces.

2.5 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings and Fascia/Trim in the existing Open Frame Entrance Deck Construction: Fabricate radii fascia and trim and similar flashings to extend beyond structural steel and flush metal roofing system being installed. Form edge using rolled and hemmed edges, free of segmenting.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Verify that any air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line, levels, and slopes. 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 apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 - 5. Torch cutting of sheet metal flashing and trim is not permitted.
 - 6. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
 2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.3 WALL FLASHING INSTALLATION

- A. General: At existing building, install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

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.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturers written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 078400 FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Firestopping materials.
- B. Firestopping of all penetrations and interruptions to fire rated assemblies, whether indicated on drawings or not, and other openings indicated.

1.2 REFERENCES

- A. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2000.
- B. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- C. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.
- D. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.3 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs which provide the specified fire ratings when tested in accordance with methods indicated.
 - 1. Listing in the current classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
 - 2. Current evaluation reports published by CABO, ICBO, or BOCA will be considered as constituting an acceptable test report.
 - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section approved by manufacturer.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

PART 2 PRODUCTS

2.1 FIRESTOPPING ASSEMBLIES

- A. Firestopping: Any material meeting requirements.
 - 1. Fire Ratings: Use any system listed by UL or tested in accordance with ASTM E 814 that has F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and that meets all other specified requirements.
- B. Manufacturer's:
 - 1. Fire stopping and fire safing products shall be UL or Warnock Hersey Rated Systems as manufactured by one of the following or approved equal:
 - a. Rectorseal Corporation, Metacaulk
 - b. Isolatek International, Cafco
 - c. 3M
 - d. The General Electric Company
 - e. Nelson Firestop Products
 - f. Hilti Construction Chemicals

- g. Tremco Construction Division
- h. United States Gypsum Company

2.2 MATERIALS

- A. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant.
- B. Foam Firestopping: Single component foam compound.
- C. Fibered Compound Firestopping: Formulated compound mixed with incombustible non-asbestos fibers.
- D. Fiber Packing Material: Mineral fiber packing insulation.
- E. Firestop Devices: Mechanical device with incombustible filler and sheet stainless steel jacket;
- F. Intumescent Putty: Compound which expands on exposure to surface heat gain.
- G. Firestop Pillows: Formed mineral fiber pillows
- H. Primers, Sleeves, Forms, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- B. Remove incompatible materials which may affect bond.

3.3 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authority having jurisdiction.
- C. Install labelling required by code.

3.4 CLEANING AND PROTECTION

- A. Clean adjacent surfaces of firestopping materials.
- B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Caulking and sealants specified under this Section shall be installed at the intersection of all dissimilar materials not mechanically or adhesively attached to each other, at the expansion and contraction joints of similar or dissimilar materials and where it is necessary to provide a smooth transition between materials of differing shapes. The following list of areas to be caulked or sealed is intended as a general guide to the Contractor and does not relieve the Contractor of providing caulking to all areas shown on the drawings and that fit the above definition.
 - 2. Exterior joints in vertical surfaces and non-traffic horizontal surfaces as indicated below:
 - a. Joints between different materials.
 - b. Perimeter joints between materials and frames of doors and windows.
 - c. Elevated Entry Deck at Flush Metal Soffit Panels.
 - d. Other joints as indicated.
 - 3. Interior joints in vertical surfaces and horizontal non-traffic surfaces as indicated below:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of all plastic laminate counters and work surfaces.
 - c. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - d. Joints between plumbing fixtures and adjoining walls, floors and counters.
 - e. Other joints between dissimilar materials.

1.3 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Owner.
 - 2. Conduct field tests for each kind of sealant and joint substrate indicated.
 - 3. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. 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.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - 4. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch wide joints formed between two 6-inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and testing agency.
- B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
- C. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- C. Pre-installation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 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: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.

3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 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.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 ELASTOMERIC JOINT SEALANTS

- A. Joint-Sealant Type A: Exterior and interior joints in horizontal traffic surfaces.
 1. Joint Locations:
 - a. Control, isolation and contraction joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Joints between different materials listed above.
 - d. All fenestrations through floor slab and corridor walls.
 - e. Other joints as indicated.
 2. Provide single-component or multi-component polyurethane or silicone sealant having a Shore A hardness of not less than 15 or more than 50 and plus-or-minus 25 percent joint movement capability; comply with ASTM C920, Type S or M, Grade P or NS, Class 25.
 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Sonolastic SL 1.
 - b. Sika Corporation. Construction Products Division; Sikaflex - 1CSL.
 - c. Tremco Incorporated; Vulkem 45.
 - d. Dow Corning Corporation; 790.
 - e. May National Associates, Inc.; Bondaflex Sil 728 NS.
 - f. Pecora Corporation; 301 NS.
 - g. Tremco Incorporated; Spectrem 800.
 4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Type B: Exterior joints in vertical surfaces and horizontal non-traffic surfaces.
 1. Joint Locations:
 - a. Joints in exterior insulation and finish systems.
 - b. Perimeter joints between materials listed above and frames of doors, windows and louvers.
 - c. Other joints as indicated..
 2. Provide a single-component or multi-component, low-modulus, non-sag sealant; comply with ASTM C920, Type S or M, Grade NS, Class 25, comply with EIMA 300.01.

3. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Sonolastic NP1.
 - b. Sika Corporation, Construction Products Division; Sikaflex - 1a.
 - c. Tremco Incorporated; Dymonic.
 - d. Dow Corning Corporation; 790.
 - e. Sika Corporation, Construction Products Division; SikaSil-C990.
 - f. Tremco Incorporated; Spectrem 1.
 4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Type C: Interior joints in vertical surfaces and horizontal non-traffic surfaces.
1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Tile control and expansion joints.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - e. Trim or finish joints subject to movement.
 - f. Other joints as indicated.
 2. Single-Component, Non-sag, Urethane Joint Sealant or Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Sonolastic NP1.
 - b. Sika Corporation, Construction Products Division; Sikaflex - 1a.
 - c. Tremco Incorporated; Dymonic.
 - d. Dow Corning Corporation; 799.
 - e. Polymeric Systems, Inc.; PSI-631.
 - f. Tremco Incorporated; Tremsil 600.
 4. Fire Proofing Sealant: Any and All fenestrations through the floor slabs and corridor wall.
 - a. TREMCO; Dymeric 240 FC
 - b. VULKEM; 44SSSL
 5. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Type D: Mildew-resistant interior joints in vertical surfaces and horizontal non-traffic surfaces. (ex; kitchen, food service & tub rooms)
1. Joint Sealant Location:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated.
 2. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Omniplus.
 - b. Dow Corning Corporation; 786 Mildew Resistant.
 - c. GE Advanced Materials - Silicones; Sanitary SCS1700.
 - d. May National Associates, Inc.; Bondaflex Sil 100 WF.
 - e. Tremco Incorporated; Tremsil 200 Sanitary.
 4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

2.3 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type O (open-cell material), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.4 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, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.
 4. 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. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- 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.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. 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.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. 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.
- F. Tooling of Non-sag 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.
 4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.

5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
 1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch. Hold edge of sealant bead 1/4 inch inside masking tape.
 3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
 4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.
- H. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.4 CLEANING

- A. 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.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 081213 - HOLLOW METAL FRAMES & DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes hollow-metal frames and doors.
- B. Related Requirements:
 - 1. Section 082110 "Flush Wood Doors" for wood doors installed in hollow-metal frames.
 - 2. Section 087100 "Door Hardware"
 - 3. Section 088000 "Glazing"
 - 4. Section 099300 "Painting"

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 2. Locations of reinforcement and preparations for hardware.
 - 3. Locations of Fire Label required.
 - 4. Details of each different wall opening condition.
 - 5. Details of anchorages, joints, field splices, and connections.
 - 6. Details of moldings, removable stops, and glazing.
 - 7. Details of conduit and preparations for power, signal, and control systems.
- C. Samples for Verification: Prepare Samples to demonstrate compliance with requirements for quality of materials and construction. Show profile, corner joint, floor and wall anchors, and silencers.
- D. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of frame assembly, for tests performed by a qualified testing agency.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
 - 1. Provide additional protection to prevent damage to factory-primed units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each unit to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ceco Door Products; an Assa Abloy Group company.
 - 2. Curries Company; an Assa Abloy Group company..
 - 3. Steelcraft; an Ingersoll-Rand company.
 - 4. Steward Steel; Door Division.
 - 5. Midwest Manufacturing; MasterCraft, *Kathryn* Series – Doors: 134F, 136G, 138F, 140F and 142G.
 - 6. Chase Manufacturing: SC3000 Traffic Door, Kitchen Service Doors and Frames; 107A, 107B.
- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

2.3 INTERIOR FRAMES

- A. Construct interior frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Hollow-Metal Frames: NAAMM-HMMA 860. At locations indicated in the Door and Frame Schedule.
 - 1. Physical Performance: Level A according to SDI A250.4.
 - 2. Materials: Uncoated] steel sheet, minimum thickness of 0.053 inch.
 - 3. Construction: Full profile welded.
 - 4. Exposed Finish: Prime. Finish coating by Section 09900.

2.4 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick or Steel stud channel anchor.
 - 2. Masonry Wall Anchors: Labeled masonry strap anchor. Fill jambs with grout.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.5 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Heavy-Duty Doors and Frames: SDI A250.8, Level 2. At locations indicated in the Door and Frame Schedule.
 - 1. Physical Performance: Level B according to SDI A250.4.
 - 2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch, with minimum A40 coating.
 - d. Edge Construction: Model 1, Full Flush.
 - e. Core: Polyisocyanurate.
 - 3. Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
 - 4. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
 - b. Construction: Full profile welded.
 - 5. Exposed Finish: Prime plus two finish coats.

2.6 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

2.7 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated. Weld seams, grind flush and re-coat primer free of marks of any type.

2. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 3. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Stud-Wall Type: Space anchors not more than 32 inches o.c. and as follows:
 - 1) Four anchors per jamb from 60 to 90 inches high.
 - b. Masonry Type: Space anchors not more than 32 inches o.c. and as follows:
 - 1) Four anchors per jamb from 60 to 90 inches high.
 - 2) Fill jambs with grout.
 4. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
 5. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
 6. Terminated Stops: Terminate stops 6 inches above finish floor with a 45 degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
- C. Hardware Preparation: Factory prepare hollow-metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
- B. Factory Finish: Clean, pretreat, and apply manufacturer's standard prime coat.
 1. Color and Gloss: As selected by Architect from manufacturer's full range

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap frames to receive non-template, mortised, and surface-mounted hardware.

3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Install any frames with removable stops located on secure side of opening.
 - c. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - d. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.
- D. Paint:

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.

END OF SECTION 081213

SECTION 082110 FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flush wood doors; flush and flush glazed configuration; fire rated and non-rated.

1.2 RELATED SECTIONS

- A. Section 081213 - Steel Door Frames.
- B. Section 087100 - Door Hardware.
- C. Section 088000 - Glazing.

1.3 REFERENCES

- A. AWI P-200 - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute; 1997, Seventh Edition, Version 1.0.
- B. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- C. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 1999.
- D. UBC Std 7-2, Part II - Test Standard for Smoke- and Draft-control Assemblies; International Conference of Building Officials; 1997.
- E. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- F. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; 1998.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria.
- C. Samples: Submit two samples of door veneer, illustrating wood grain, stain color, and sheen.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Section 1300, Custom Grade.
- B. Finish doors in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Section 1500, grades identified in schedule.

1.6 REGULATORY REQUIREMENTS

- A. Fire Door Construction: Conform to NFPA 252.
- B. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated.
- C. Smoke and Draft Control Doors: In addition to required fire rating, comply with air leakage requirements of UBC Std 7-2, Part II; with "S" label; if necessary, provide additional gasketing or edge sealing.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.8 PROJECT CONDITIONS

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.9 WARRANTY

- A. See Section 01730 - Closeout Submittals for additional warranty requirements.
- B. Provide warranty for the following term:
 - 1. Interior Doors: Life of installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Veneer Doors, 5 Ply:
 - 1. Eggers Industries: www.eggersindustries.com.
 - 2. Marshfield Door Systems, Inc..
 - 3. Algoma Hardwoods, Inc..
 - 4. VT Industries
 - 5. Substitutions: See Section 013300 – Submittal Procedures.

2.2 DOORS

- A. All Doors: See drawings for locations and additional requirements.
 - 1. Quality Standard: AWI Architectural Woodwork Quality Standards Illustrated, Section 1300, Premium Grade with A grade veneer.
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at all locations.
 - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C or UBC Standard 7-2-97 ("positive pressure"); UL or WH (ITS) labeled without any visible seals when door is open.
 - 3. Smoke and Draft Control Doors: Tested to ratings indicated on drawings in accordance with International Building Code; UL labeled if required by applicable code; provide gasketing as specified by listing.
 - 4. Wood veneer facing with factory transparent finish where indicated on drawings.
- C. Flush Glazed Doors: 1-3/4 inches thick, solid core construction, with glazing openings as shown on drawings. Furnish matching veneer and finish glazing stops.

2.3 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type PC, particleboard core, plies and faces as indicated above.
- B. Fire Rated Doors: Mineral core, Type FD, plies and faces as indicated above.

2.4 DOOR FACINGS

- A. Wood Veneer Facing for Transparent Finish: Veneer grade as specified by quality standard, rotary sliced, book veneer match, running assembly match; unless otherwise indicated.
- B. Pre-Finished doors shall receive a stained and clear coat finish system similar and equal to that as Algoma "Univar Factory Finishes". Owner/Architect to select from manufacturer's standard color range. The intent is to match the finish color of the existing facility doors. Field Verify.

2.5 ACCESSORIES

- A. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style screws.

2.6 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.

- B. Fabricate fire rated doors in accordance with UL requirements. Attach fire rating label to door.
- C. Provide solid blocks at lock edge for hardware reinforcement.
 - 1. Provide solid blocking for other through bolted hardware.
- D. Vertical Exposed Edge of Stiles - Veneer Faces: Of same species as veneer facing.
- E. Fit door edge trim to edge of stiles after applying veneer facing.
- F. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- G. Factory fit doors for frame opening dimensions identified on shop drawings.
- H. Provide edge clearances in accordance with AWI Quality Standards Illustrated Section 1700.

2.7 FACTORY FINISHING

- A. Factory finish doors in accordance with AWI P-200, Section 1500. Pre-Finished doors shall receive a stained and clear coat finish system similar and equal to that as Algoma "Univar Factory Finishes". Owner/Architect to select from manufacturer's standard color range. The intent is to match the finish color of the existing facility doors. Approximate color range is similar to Univar-RA4368. Verify.
- B. Seal door top edge with color sealer to match door facing.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Trim door height by cutting bottom edges to a maximum of 3/4 inch (19 mm).
 - 1. Trim fire door height at bottom edge only, in accordance with fire rating requirements.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

3.3 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

3.4 SCHEDULE - See Drawings

END OF SECTION

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Access doors and frames for truss access, walls and ceilings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Detail fabrication and installation of access doors and frames for each type of substrate.
- C. Samples: For each door face material, at least 3 by 5 inches in size, in specified finish.
- D. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Access Panel Solutions.
 - 2. Acudor Products, Inc.
 - 3. Alfab, Inc.
 - 4. Babcock-Davis.
 - 5. Cendrex Inc.
 - 6. Elmdor/Stoneman Manufacturing Co.; Div. of Acorn Engineering Co.
 - 7. Or equal.
- B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.
- C. Fire-Rated, Flush Access Doors with Concealed Flanges FAD:
 - 1. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release. Provide frame with gypsum board beads for concealed flange installation.

2. Attic Locations: Four (4) Required in wood truss heel. Field verify exact locations with Owner and Architect.
 - a. Size: 24" wide x 36" high. Assembly shall be sized to fit between the truss spacing. Verify.
 - b. Fire-Resistance Rating: Not less than that of adjacent construction.
 - c. Temperature-Rise Rating: 450 deg F (250 deg C) at the end of 30 minutes.
 - d. Uncoated Steel Sheet for Door: Nominal 0.036 inch.
 - e. Finish: Factory prime.
 - f. Frame Material: Same material, thickness, and finish as door.
 - g. Hinges: Manufacturer's standard.
 - h. Hardware: Lock.
 3. Wall Locations: Ten (10) Required in lavatory walls for plumbing access. Field verify exact locations with Owner and Architect.
 - a. Size: 16" wide x 16 high. Assembly shall be sized to fit between the stud spacing. Verify.
 - b. Fire-Resistance Rating: Not less than that of adjacent construction.
 - c. Temperature-Rise Rating: 450 deg F (250 deg C) at the end of 30 minutes.
 - d. Uncoated Steel Sheet for Door: Nominal 0.036 inch.
 - e. Finish: Factory prime. Field finish painted to match wall.
 - f. Frame Material: Same material, thickness, and finish as door.
 - g. Hinges: Manufacturer's standard.
 - h. Hardware: Lock.
- D. Hardware:
1. Latch: Self-latching bolt operated by flush key.
 2. Lock: Cylinder.

2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Frame Anchors: Same type as door face.
- D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.4 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
 1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
 2. Provide mounting holes in frames for attachment of units to metal or wood framing.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.
- E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
 1. For cylinder locks, furnish two keys per lock and key all locks alike.

2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:
 1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
 2. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil (0.025 mm) for topcoat.

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.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 084113 - ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames and door hardware.
- C. Power Operators for aluminum doors.
- D. Perimeter sealant.

1.2 RELATED SECTIONS

- A. Section 079000 - Joint Sealers: Perimeter sealant and back-up materials.
- B. Section 08710 0- Door Hardware: Hardware items other than specified in this section.
- C. Section 08800 - Glazing: Glass and glazing accessories.

1.3 REFERENCES

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; American Architectural Manufacturers Association; 1997.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 1998.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 1998.
- D. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2000.
- E. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2000.
- F. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 1991 (Reapproved 1999).
- G. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1997.
- H. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000.

1.4 PERFORMANCE REQUIREMENTS

- A. Design and size components to withstand the following load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - 1. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
- B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
- C. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E 283.

- D. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 2.86 lbf/sq ft.
- E. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- F. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

1.5 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- D. Color Samples: Provide physical color samples of manufacturer's standard selection no less than 1"x1".

1.6 QUALITY ASSURANCE

- A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years of documented experience.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond to aluminum when exposed to sunlight or weather.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.9 WARRANTY

- A. See Section 01730 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Kawneer Trifab™ VG 451UT Framing System – 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension; Thermal; Front, Center, Back, Multi-Plane, Structural Silicone or Weatherseal Glazed (Type B); Screw Spline, Shear Block, Stick, or Punched Opening Fabrication.
- B. Other Acceptable Manufacturers:
 1. United States Aluminum Corp
 2. Oldcastle BuildingEnvelope INC.
 3. EFCO
 4. Tubelite
 5. Substitutions: Permitted.

2.2 COMPONENTS

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Finish: Class I natural anodized.
- B. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 - 1. Framing members for interior applications need not be thermally broken.
 - 2. Glazing stops: Flush.
 - 3. Cross-Section: 2x4-1/2 inch nominal dimension.
 - 4. Aluminum framing for interior Vestibule Doors need not be thermally broken.
- C. Doors: Glazed aluminum.
 - 1. Thickness: 1-3/4 inches.
 - 2. Top Rail: 4 inches wide.
 - 3. Vertical Stiles: 4-1/2 inches wide.
 - 4. Bottom Rail: 6 inches wide.
 - 5. Glazing Stops: Square.
 - 6. Finish: Same as storefront.

2.3 MATERIALS

- A. Extruded Aluminum: ASTM B 221 (ASTM B 221M).
- B. Fasteners: Stainless steel.
- C. Perimeter Sealant: Type as specified in Section 079000.
- D. Glass: As specified in Section 088000.
- E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.4 FINISHES

- A. High Performance Organic Finish: AAMA 2604; multiple coats, thermally cured fluoropolymer system; color to match existing building and as selected by architect from manufacturer's standard selection.

2.5 HARDWARE

- A. See Door Hardware Schedule.

2.6 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- E. Arrange fasteners and attachments to conceal from view.
- F. Reinforce components internally for door hardware and door operators.
- G. Reinforce framing members for imposed loads.
- H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

2.7 FENESTRATION ENERGY EFFICIENCY

- A. The U-Factor of the entirety of the Fixed Fenestration assembly shall be U-Value equal to or less than 0.29. See Section 088000 Glazing for COG (Center of Glass) U-Value.
- B. The U-Factor of the entirety of the Entrance Door Fenestration assembly shall be U-Value equal to or less than 0.77. See Section 088000 Glazing for COG (Center of Glass) U-Value.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- G. Set thresholds in caulking bead each edge and secure. Caulking as specified in Section 07900.
- H. Install hardware using templates provided.
- I. Install glass in accordance with Section 088000, using glazing method required to achieve performance criteria.
- J. Install perimeter sealant in accordance with Section 079000.

3.2 ADJUSTING

- A. Adjust operating hardware for smooth operation.

3.3 CLEANING AND PROTECTION

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by method acceptable to sealant manufacturer.
- D. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.
- E. Protect finished work from damage.

END OF SECTION

1 **SECTION 085202**
2 **WOOD CLAD DOUBLE HUNG WINDOWS**

3
4
5 **PART 1 – GENERAL**

6
7
8 **SCOPE**

9 The work under this section shall consist of providing all work, materials, labor, equipment, and supervision
10 necessary to provide for the wood clad windows work and such features as required in these specifications and on
11 the drawings. Included are the following topics:

12 **PART 1 - GENERAL**

- 13 Scope
- 14 Summary
- 15 Related Sections
- 16 References
- 17 Submittals
- 18 Quality Assurance
- 19 Delivery
- 20 Storage and Handling
- 21 Warranty

22 **PART 2 - PRODUCTS**

- 23 Manufactured Units
- 24 Frame Description
- 25 Sash Description
- 26 Glazing
- 27 Finish
- 28 Hardware
- 29 Weather Strip
- 30 Jamb Extension
- 31 Insect Screen
- 32 Combination Storm Sash and Screen
- 33 Accessories and Trim

34 **PART 3 - EXECUTION**

- 35 Examination
- 36 Installation
- 37 Field Quality Control
- 38 Cleaning
- 39 Protecting Installed Construction

40
41 **Summary**

42 Section Includes:

43 Wood Clad Double Hung window complete with hardware, glazing, certified mulls, weather strip, insect screen,
44 jamb extension, combination storm/screen, and standard or specified anchors, trim, attachments, factory-applied
45 historic casing(s) and accessories.

46

1 **Related Sections**

- 2 Applicable provisions of Division 1 govern work performed under this section.
3 Section 01 33 00 – Electronic Submittal Procedures
4 Section 01 74 19 – Construction Waste Management
5 Section 06 10 00 – Rough Carpentry
6 Section 06 20 00 – Finish Carpentry
7 Section 07 62 00 – Sheet Metal Flashing & Trim
8 Section 07 92 00 – Joint Sealants
9 Section 08 08 00 – Commissioning of Exterior Envelope
10 Section 09 93 00 – Painting and Transparent Finishing

11
12 **References**

13 American Society for Testing Materials (ASTM):

14 E283: Standard Test method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors

15
16 E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Door by
17 Uniform Static Air Pressure Difference

18
19 E547: Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by
20 Cyclic Static Air Pressure Differential

21
22 E2190: Specification for Sealed Insulated Glass Units

23
24 C1036: Standard Specification for Flat Glass

25
26 E2068: Standard Test Method for Determination of Operating Force of Sliding Windows and Doors

27
28 E 1996: Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Storm
29 Shutters Impacted by Windborne Debris in Hurricanes

30
31 E 1886: Standard Test method for Performance of Exterior Windows, curtain Walls, and Storm Shutters
32 Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials

33
34 F 2090-17: Standard Specifications for Windows Fall Prevention Devices with Emergency Escape (egress)
35 Release Mechanisms

36 American Architectural Manufacturer’s Association/Window and Door Manufacturer’s Association
37 (AAMA/WDMA/CSA):

38 AAMA/WDMA/CSA 101/I.S.2/A440-08, Standard/Specification for windows, doors and skylights

39
40 AAMA/WDMA/CSA 101/I.S.2/A440-11, Standard/Specification for windows, doors and skylights

41
42 AAMA 450-10, Voluntary Performance Rating Method for Mullled Fenestration Assemblies

43
44 WDMA I.S.4: Industry Standard for Water Repellant Preservative Treatment for Millwork

45

- 1 Window and Door Manufacturer's Association (WDMA): 101/I.S.2 WDMA Hallmark Certification Program
- 2
- 3 Sealed Insulating Glass Manufacturer's Association/Insulating Glass Certification Council (SIGMA/IGCC)
- 4
- 5 American Architectural Manufacturer's Association (AAMA): 2605: Voluntary Specification for High Performance
- 6 Organic Coatings on Architectural Extrusions and Panels
- 7
- 8 National Fenestration Rating Council (NFRC):
- 9 101: Procedure for Determining Fenestration Product thermal Properties
- 10 200: Procedure for Determining Solar Heat Gain Coefficients at Normal Incidence
- 11
- 12 Window Covering Manufacturer's Association
- 13 A100.1: American National Standard for Safety of Corded Window Coverings Products
- 14

15 **Submittals**

- 16 Shop Drawings: Submit shop drawings under provision of Section 01 33 00.
- 17
- 18 Product Data: Submit production data for certified options under provision of Section 01 33 00. Product
- 19 performance rating information may be provided via quote, performance rating summary (NFRC Data), or certified
- 20 performance grade summary (WDMA Hallmark data).
- 21
- 22 Samples:
- 23 Submit corner section under provision of section 01 33 00.
- 24 Specified performance and design requirements under provisions of Section 01 33 00.
- 25

26 **Delivery**

- 27 Deliver in original packaging and protect from weather
- 28

29 **Storage and Handling**

- 30 Prime and seal wood surfaces, including to be concealed by wall construction, if more than thirty (30) days will
- 31 expire between delivery and installation.
- 32
- 33 Store window units in an upright position in a clean and dry storage area above ground to protect from weather.
- 34

35 **Warranty**

- 36 Complete and current warranty information is available at manufacturers' websites. The following summary is
- 37 subject to the terms, condition, limitations and exclusions set forth in the manufacturer's Windows Warranty:
- 38 Clear insulating glass with stainless steel spacers is warranted against seal failure caused by manufacturing defects
- 39 and resulting in visible obstruction through the glass for twenty (20) years from the original date of purchase. Glass
- 40 is warranted against stress cracks caused by manufacturing defects from ten (10) years from the original date of
- 41 purchase.
- 42
- 43 Standard exterior aluminum cladding finish is warranted against manufacturing defects resulting in chalk, fade and
- 44 loss of adhesion (peel) per the American Architectural Manufacturer's Association (AAMA) Specification 2605-11
- 45 Section 8.4 and 8.9 for twenty (20) years from the original date of purchase.

1
2 Factory-applied interior finish is warranted to be free from finish defects for a period of five (5) years from the
3 original date of purchase.

4
5 Hardware and other non-glass components are warranted to be free from manufacturing defects for ten (10) years
6 from the original date of purchase.

7 **PART 2 – PRODUCTS**

8
9 **Manufactured Units**

10 Description: Wood Clad Double Hung window.

11 Acceptable Manufacturers:

12 Marvin Windows, 104 State Ave., Warroad, MN 56763

13 Kolbe Windows & Doors, 1323 S 11th Ave, Wausau, WI 54401

14 Other products that meet specified requirements are also acceptable.

15
16 **Frame Description**

17 Interior: Non Finger-Jointed Pine or finger-jointed core with non finger-jointed Pine veneer

18 Kiln-dried to moisture content no greater than 12 percent at the time of fabrication

19 Water repellant, preservative treated in accordance with ANSI/WDMA I.S.4.

20
21 Frame exterior aluminum clad with 0.050" thick extruded aluminum

22
23 Frame thickness: 1 1/16" head and jambs.

24
25 Frame depth: Frame depth had an overall 5 21/32" jamb.

26
27 Sill assembly including the sill liner: 2 7/32"

28
29 Factory-applied profile extrusion

30
31 **Sash Description**

32 Interior: Non Finger-Jointed Pine or finger-jointed core with non finger-jointed Pine veneer

33 Kiln-dried to moisture content no greater than 12 percent at the time of fabrication

34 Water repellant preservative treated with accordance with WDMA I.S.4.

35
36 Sash exterior aluminum clad with 0.050" (1.3mm) thick extruded aluminum

37
38 Sash thickness: 1 3/4". Corner slot and tenoned.

39
40 Operable sash tilt to interior for cleaning or removal

41
42 Sash: Standard: Equal Sash

43
44 Exterior Cope Profile: Putty

45
46 Interior Sash Sticking

1 Standard: Ogee
2 **Glazing**
3 Select quality complying with ASTM C1036. Insulating glass SIGMA/IGCC certified to performance level CBA when
4 tested in accordance with ASTM E2190.
5
6 Glazing method: Insulating glass
7
8 Glazing seal: Silicone bedding on interior and exterior
9
10 Glass fill: Air with capillary tubes, Argon
11
12 Glass Type: Clear, Low E with Argon
13
14 SHGC: SOUTH/EAST/WEST: 0.45
15 NORTH: NR
16
17 U-factor: 0.37
18
19 **Finish**
20 Exterior: Aluminum clad. Fluoropolymer modified acrylic topcoat over a primer. Meets AAMA 2605 requirements.
21 Aluminum clad color: As selected by Architect from full line of manufacturer's colors.
22
23 Interior Finish options:
24 Factory-applied water-borne urethane stain. Stain applied over a wood (stain) conditioner. A water-
25 borne acrylic enamel clear coat applied in two separate coats, with light sanding between coats, applied
26 over the stain. Confirm with manufacturer availability for wood species. Color: As selected by Architect
27 from full line of manufacturer's colors. Meets WDMA TM-14 requirements.
28
29 **Hardware**
30 Locking system that provides locking, unlocking, balancing, and tilting of the sash members
31
32 Lock Actuator Assembly
33 Material:
34 Zinc die-cast
35
36 Finish: As selected by Architect from full line of manufacturer's colors.
37
38 Design Feature and Components
39 To unlock unit, turn the handle 135°
40
41 Lock automatically locks when both sash are closed.
42
43 To tilt the bottom sash for wash mode, the bottom sash must be unlocked and raised a few
44 inches; push the button on top of the lock handle and rotate the handle 180°

1
2 To tilt the top sash for wash mode, the bottom sash must be tilted and/or removed from the
3 frame; lower the top sash to a good working height, retract the tilt latches on the top rail and tilt
4 sash inward out of the frame

5
6 Custodial hardware color: As selected by Architect from full line of manufacturer's colors.

7
8 Bottom Rail Lock Actuator Assembly - Lift Lock

9 Material:

10 Zinc die-cast

11 Finish: As selected by Architect from full line of manufacturer's colors

12
13 Design Feature and Components:

14 Does not contain Check Rail Lock Actuator Assembly or Strike Assembly

15
16 Traditional design

17
18 To unlock unit, lift the lock

19
20 Lock automatically locks when bottom sash is closed.

21
22 To tilt the bottom sash for wash mode, raise the bottom sash and manually retract the latches.

23
24 Custodial hardware color: As selected by Architect from full line of manufacturer's colors.

25
26 Latches:

27 Bottom sash latch

28 Material

29 Bolt: Glass-filled nylon

30 Latch housing: Acetal

31 Sash latch reinforcement: Stainless steel

32 Top sash tilt latch

33 Material

34 Bolt: Glass-filled nylon

35 Latch housing: Glass-filled nylon

36 Latches accommodate travel of sash in frame, and tilting into wash-mode

37 Color: As selected by Architect from full line of manufacturer's colors.

38
39 Strike Assembly:

40 Material

41 Zinc die-cast strike plate and injection-molded Acetal housing and button

42 Finish: As selected by Architect from full line of manufacturer's colors.

43 Strike assembly accommodates locking/unlocking

44
45 Balance System (balance system determined by sash weight)

1 Block & tackle balances
2 Hybrid spiral balances
3
4 Sash Limiter
5 Bottom Sash Limiter (Acetal)
6 Selectable bottom sash locations, 4", 6" or 8" Net Clear Opening (NCO)
7
8 Non-tilt hardware is default, and a sash removal tool is required in order to by-pass the Sash
9 limiter for sash removal (tilt wash mode)
10
11 Standard application of factory applied.

12
13 Color: Will align with the Exterior Weather Strip Package selection
14

15 Top Sash Limiter (Extruded PVC)
16 Standard application of factory applied.
17
18 Color: Will align with the Interior Weather Strip Package selection
19

20 **Weather Strip**

21 Operating units:
22 Jamb: Foam-filled bulb
23
24 Header: Continuous dual leaf
25
26 Bottom rail and check rail: Hollow bulb
27
28 Color: As selected by Architect from full line of manufacturer's options.
29

30 **Jamb Extension**

31 Jamb extensions are available for various wall thickness factory-applied up to a 14" (356mm) wide
32 Finish: Match interior frame finish
33

34 **Insect Screen**

35 Factory-installed full screen.
36 Aluminum Screen Mesh: As selected by Architect from full line of manufacturer's options.
37

38 **Screen Frame**

39 Window frame height less than or equal to 54 ½" Aluminum Screen Frame.
40 Window frame height greater than 54 ½" Extruded Screen Frame.
41

42 **Aluminum frame finish:**

43 Color: Matches exterior aluminum clad color
44

45 **Combination Storm Sash and Screen**

1 Frame: Exterior extruded aluminum 0.050" (1.3mm) thick
2
3 Finish: Fluoropolymer modified acrylic topcoat applied over Fluoropolymer primer. Meets AAMA 2605
4 requirements
5 Finish: As selected by Architect from full line of manufacturer's colors.
6
7 Hardware: Spring loaded locking pins to hold movable storm panel in position. Heavy metal clips to lock upper and
8 lower storm panels together
9
10 Weather strip: Dual durometer weather strip on center cross rail seals against operating panel in closed position
11 Storm panel: Select quality glass in aluminum frame
12 Frame finish: As selected by Architect from full line of manufacturer's colors.
13
14 Insect screen panel:
15 Extruded aluminum surround
16
17 Aluminum Screen mesh: As selected by Architect from full line of manufacturer's colors.
18
19 Aluminum frame finish: As selected by Architect from full line of manufacturer's colors.
20
21 **Accessories and Trim**
22 Installation Accessories:
23 Installation brackets: 6 3/8" (162mm), 9 3/8" (283mm), 15 3/8" (390mm)
24
25 Masonry brackets: 6" (152mm), 10" (254mm)
26
27 Aluminum Extrusions:
28 Casing Profile: As selected by Architect from full line of manufacturer's options.
29
30 Aluminum clad Extrusion: As selected by Architect from full line of manufacturer's options.
31
32 Finish: Fluoropolymer modified acrylic topcoat applied over primer. Meets AAMA 2605 requirements
33
34 Historic casing, factory-applied profiles: As selected by Architect from full line of manufacturer's options.
35 Subsills factory-applied

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33

PART 3 – EXECUTION

Examination

Verification of Condition: Before installation, verify openings are plumb, square and of proper dimensions. Report frame defects or unsuitable conditions to the General contractor before proceeding.

Acceptance of Condition: Beginning on installation confirms acceptance of existing conditions.

Installation

Assemble and install window/door unit(s) according to manufacturer’s instruction and reviewed shop drawing.

Install sealant and related backing materials at perimeter of unit or assembly in accordance with Section 07 92 00 Joint Sealants.

Install accessory items as required.

Use finish nails to apply wood trim and mouldings.

Field Quality Control

Remove visible labels and adhesive residue according to manufacturer’s instruction.

Cleaning

Remove visible labels and adhesive residue according to manufacturer’s instruction.

Leave windows and glass in a clean condition. Final cleaning as required in Division 01- General Requirements for Simplified Projects.

Protecting Installed Construction

Protect windows from damage by chemicals, solvents, paint or other construction operations that may cause damage.

End of Section

SECTION 087100 DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hardware for wood and hollow metal doors.

1.2 RELATED SECTIONS

- A. Section 081213 – Hollow Metal Door & Frames.
- B. Section 082110 - Flush Wood Doors.

1.3 REFERENCES

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.
- B. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 1990.
- C. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Wood Flush Doors; Door and Hardware Institute; 1993.
- D. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 1999.
- E. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association; 2000.
- F. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.4 SUBMITTALS

- A. See Section 013300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate locations and mounting heights of each type of hardware, schedules and catalog cuts.
- C. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- D. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.
- E. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 DELIVERY, STORAGE, AND PROTECTION

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.6 COORDINATION

- A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.

1.7 WARRANTY

- A. See Section 01730 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for door closers.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS

- A. Provide products that comply with the following:
 - 1. Applicable provisions of Federal, State, and local codes.
 - 2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
 - 3. Applicable provisions of NFPA 101, Life Safety Code.
 - 4. Fire-Rated Doors: NFPA 80.
 - 5. All Hardware on Fire-Rated Doors: Listed and classified by UL as suitable for the purpose specified and indicated.

- B. Finishes: Identified in schedule as follows:
 1. Hinges, exterior : US 32D
 2. Hinges, interior: US 26D
 3. Locksets: US 26D
 4. Exit Device: US 32D
 5. Door Closers: Aluminum
 6. Door Stops: US 26D
 7. Thresholds: Aluminum
 8. Weatherstripping: Aluminum
 9. Miscellaneous: US 26D

2.2 KEYING

- A. Door Locks: Grand master keyed.
 1. Key to existing keying system.
- B. Supply keys in the following quantities:
 1. 2 master keys.
 2. 2 grand master keys.
 3. 2 change keys for each lock.

2.3 KEY CABINET

- A. Cabinet Construction: Sheet steel construction, piano hinged door with lock master keyed to building system.
- B. Cabinet Size: Size for project keys plus 10 percent growth.
- C. Horizontal metal strips for key hook labelling with clear plastic strip cover over labels.
- D. Finish: Baked enamel, color as selected.

2.4 HINGES

- A. The following is a table of hinge types in manufacturers' catalog number, which are considered equal:
- B. Ives
- C. Type 1 5BB1
- D. Type 2 5PB1
- G. Hinge types shall be furnished as follows:
 1. All exterior doors - Type 1 x Non rising pins
 2. All interior openings over 40" wide and all vestibule doors - Type 2
 3. All interior doors 36" through 40" wide without closer and interior doors up to 40" wide with a closer - Type 3.
 4. All interior doors through 36" wide without a closer - Type 4.
- H. Hinge quantities and sizes shall be as follows:
 1. Two hinges for doors 60" in height and under.
 2. Three hinges for doors 61" through 89" in height.
 3. Four hinges for doors 90" through 120" in height.
 4. Provide one additional hinge for every additional 30" in height over 120".
 5. Dutch doors - 4 hinges.
- I. Hinges shall be 4-1/2" x 4-1/2", provide proper hinge width to clear trim and allow full 180 degree swing. All Hinges shall have flat button tips, unless otherwise noted in hardware group. All Hinges shall be modern Slim Line type.
- J. Hinges for all lockable doors opening outward shall have non-removable pin (NRP). All other hinges shall have non-rising pins.

2.5 LOCKSETS - CYLINDRICAL

- A. Approved locks shall be of quality and design as follows:
 1. Schlage - ND Series, Rhodes RHO.
 2. 2 3/4" backset.
- B. Provide wrought boxes and strikes with proper lip length to protect trim, frame, or inactive leaf.

Where required, provide open back and protected back strikes to allow practical and secure operations.

- C. Furnish abrasive coating on outside levers that lead to loading platforms, stages, mechanical and electrical rooms, stairs other than exit stairs, and other hazardous locations.

2.6 EXIT DEVICES

- A. All Exit Devices shall be the product of one manufacturer. Functions shall be as noted on the schedule. Furnish exit device types and functions as specified in the hardware schedule. Lever handles supplied with exit devices shall match the design specified for locks and latches.
 - 1. Von Duprin - 99 Series or as indicated.

2.7 CLOSERS

- A. Closers shall be of rack and pinion construction with rack and pinion of heat treated steel and with cast hydraulic iron case. Closing the doors shall be controlled by two independent valves. Closers shall have fully adjustable back check by means of third valve. All closers shall be complete with spring power adjustment.
- B. All closers to be surface applied complete with a rectangular cover.
- C. Closers shall be as manufactured by:
 - 1. LCN - P4041-H-CUSH Exterior; 4040XP Interior, or as listed.

2.8 GASKETING

- A. Smoke seals for labeled doors shall be Polypropylene compound, self-adhering type; as manufactured by:
 - 1. Reese - 797
- B. Sound gasketing for Therapy Rooms, as manufactured by:
 - 1. Reese - 797
- C. Automatic Door Bottom shall be as manufactured by the following:
 - 1. Reese - 370A.
- D. Finish on aluminum keepers for gasketing shall be as selected by the Architect.

2.9 DOOR STOPS

- A. Wall door stops shall be as manufactured by one of the following or approved equal:
 - 1. Hager 236W.
- B. Furnish wall stops in all locations requiring stops as noted in the hardware schedule unless there is casework or other obstructions that will prevent the use of wall stops, floor stops shall be used in these locations.

2.10 PUSH/PULL

- A. Push plates shall be 16 gauge stainless Steel, US 32D finish, 4" x 16", with square corners, as manufactured by one of the following or approved equal:
 - 1. Hager 30S, 4x16.
- B. Pulls shall be 1" diameter solid bar pull, cast stainless steel, US 32D finish, 10" long with concealed fastening. Pulls shall be as manufactured by one of the following or approved equal:
 - 1. Hager 3G, 4x16

2.11 FLUSHBOLTS

- A. Manual flush bolt for non-rated doors shall be as manufactured by one of the following or approved equal:
 - 1. Ives - 358
- B. Flush bolts shall be constant latching type with one automatic bolt at the bottom of the door and one

constant latching type at the top. Top bolt shall remain engaged when active door is opened, while bottom bolt will automatically retract. Top bolt shall retract only when plunger on face of bolt is depressed. Flush bolt shall be non-handed with an effective throw of 3/4" and a 3/4" vertical adjustment. Flush bolt shall be as manufactured by one of the following or approved equal:

1. Ives - 556 x 356

2.12 KICKPLATES

- A. Kick Plates shall be .050" stainless steel with a US 32D. Kick plates shall be 10" high and sized 2" less than the width of the door, 1" less than the width of pairs. Kick plates shall be as manufactured by one of the following or approved equal:
 1. Stainless Steel Kick Plates

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.

3.2 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- D. Mounting heights for hardware from finished floor to center line of hardware item:
 1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
 2. For steel doors and frames: See Section 08110.
 3. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 4. Wood doors: See Section 081416.

3.3 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01400.

3.4 ADJUSTING

- A. Adjust work under provisions of Section 01700.
- B. Adjust hardware for smooth operation.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01700.
- B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION 087100

SECTION 088000 GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glass.
- B. Glazing compounds and accessories.

1.2 RELATED SECTIONS

- A. Section 081213 – Hollow Metal Doors & Frames: Glazed borrowed lites.
- B. Section 081416 - Flush Wood Doors: Glazed doors.
- C. Section 083313 Coiling Fire Doors
- D. Section 064116 – Plastic Laminated Faced Architectural Cabinets – Divider and Art Glass Products.

1.3 REFERENCES

- A. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 1984 (R1994).
- B. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 1999.
- C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 1998.
- D. ASTM C 1036 - Standard Specification for Flat Glass; 1991 (Reapproved 1997).
- E. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 1997b.
- F. ASTM E 773 - Standard Test Method for Accelerated Weathering of Sealed Insulating Glass Units; 1997.
- G. ASTM E 774 - Standard Specification for the Classification of the Durability of Sealed Insulating Glass Units; 1997.
- H. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 1997.
- I. GANA (SM) - FGMA Sealant Manual; Glass Association of North America; 1990.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.

PART 2 PRODUCTS

2.1 FLAT GLASS MATERIALS

- A. Manufacturers:
 - 1. AFG Industries, Inc: www.afglass.com.
 - 2. Guardian Industries Corp: www.guardian.com.
 - 3. Pilkington Building Products North America: <http://buildingproducts.us.pilkington.com>.
 - 4. PPG Industries, Inc: www.ppg.com.
 - 5. Visteon Glass Systems: www.visteon.com.
 - 6. Viracon.
 - 7. Clear Float Glass: Clear, annealed.

8. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality q3 glazing select.
9. Comply with ASTM C 1048, Condition A uncoated, Type I, transparent flat, Class 1, Quality q3 glazing select.
10. 1/4 inch thick.

- B. Safety Glass: Clear; fully tempered with horizontal tempering.
1. Comply with ASTM C 1048, Condition A uncoated, Type I, transparent flat, Class 1, Quality q3 glazing select.
 2. Comply with ANSI Z97.1.
 3. 1/4 inch thick, interior glazing.
 4. 1/2 inch thick, Roof Top Plaza railing glazing.

2.2 SEALED INSULATING GLASS MATERIALS

- A. Manufacturers:
1. Any of the manufacturers listed under Flat Glass Materials.
 2. Substitutions: Refer to Section 01600 - Product Requirements.
- B. Tempered Insulated Glass Units: Double pane with glass to elastomer edge seal.
1. Outer Pane 1/4" Clear SB60 #2
 2. 1/2" Argon (90% Argon), TGI Thermal Box Spacer
 3. Inner pane 1/4" Clear SB60 #2
 4. Place reflective coating on No. 2 & 4 surfaces within the unit.
 5. Comply with ASTM E 774 and E 773, Class CBA.
 6. Total unit thickness of 1 inch.
 7. C.O.G. U-Value as determined by NFRC.

2.3 GLAZING COMPOUNDS

- A. Manufacturers:
1. Dow Corning Corp: www.dowcorning.com.
 2. GE Plastics: www.geplastics.com.
 3. Pecora Corporation: www.pecora.com.
 4. Substitutions: Refer to Section 01600 - Product Requirements.
- B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; cured Shore A hardness of 15 to 25; color as selected.

2.4 GLAZING ACCESSORIES

- A. Manufacturers:
1. Norton Performance Plastics Corp.
 2. Pecora Corporation: www.pecora.com.
 3. Tremco, Inc: www.tremcosealants.com.
 4. Substitutions: Refer to Section 01600 - Product Requirements.
- B. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- C. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- D. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A

durometer hardness; coiled on release paper; black color.

- E. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I.
- F. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealant in accordance with manufacturer's instructions.
- E. At existing windows to receive new spandrel glass, remove existing glass and clean frame of all previous glazing compounds and sealants.

3.3 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)

- A. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- D. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.
- E. Fill gaps between pane and applied stop with silicone type sealant to depth equal to bite on glazing, to uniform and level line.
- F. Trim protruding tape edge.

3.4 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

END OF SECTION

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
- B. Related Requirements:
 - 1. Section 054000 "Cold Formed Metal Framing".
 - 2. Section 061000 "Rough Carpentry."
 - 3. Section 062000 "Finish Carpentry".
 - 4. Section 092116 "Gypsum Board Shaft Wall Assembly".
 - 5. Section 092216 "Non Structural Metal Framing".
 - 6. Section 102600 "Wall and Corner Guards".

1.3 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

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.

2.2 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Gypsum.
 - 2. CertainTeed Corp.
 - 3. Georgia-Pacific Gypsum LLC.
 - 4. National Gypsum Company.
 - 5. USG Corporation.

- B. Gypsum Wallboard: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch and 3/8 inch (at overlay locations, verify on Interior Elevations)
 - 2. Long Edges: Tapered
- C. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch
 - 2. Long Edges: Tapered
- D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch, Type X
 - 2. Long Edges: Tapered.

2.3 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
- 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.
 - 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Resilient Sound Channels: Equal to Phillips RC-1 Tru-25 gauge. Spaced 24 inches on center. See Interior Elevations/Finish Schedules for locations.
- C. Z-Furring Channel: Equal to Phillips Z-Furring Channel, 22 gauge, 1.5" spaced 24 inches on center.
- D. Hat Channels: Equal to Phillips DWC Hat furring channel, 22 gauge, 1.5 inch and 7/8 inch. Verify locations used on Contract Document.
- E. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Laminating adhesive 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."
- F. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

- G. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- H. Acoustical Joint Sealant: Manufacturer's standard non-sag, paintable, non-staining 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. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - d. USG Corporation; SHEETROCK Acoustical Sealant.
 - e. Or approved equal
 - 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).

2.5 CEILING AND SOFFIT SUPPORT MATERIALS

- A. Hanger Anchorage Devices: Screws, clips, bolts or other devices compatible with indicated structural anchorage for ceiling hangers and whose suitability has been proven through standard construction practices or by certified test data.
- B. Powder-Actuated Fasteners in Concrete: Fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers [and with capability to sustain, without failure, a load equal to 10x calculated loads].
- C. [Post-tensioned Concrete Slabs:
 - 1. For inserts placed in post-tensioned concrete work, maintain 3 inch clearance between inserts and prestressing strands.
 - 2. If insert is in conflict with strand, insert must be moved to avoid strand. Do not move strands to avoid inserts.]
- D. Hangers:
 - 1. Steel wire or rods, sizes to comply with requirements of ASTM C754 for ceiling or soffit area and loads to be supported.
 - 2. Wire: ASTM A 641, soft, Class 1 galvanized.
 - 3. Rods and flats:
 - 1. Mild steel components.
 - 2. Finish: Galvanized or painted with rust-inhibitive paint for interior work; galvanized for exterior work.
- E. Framing System:
 - 1. Main runners:
 - 1. Cold-rolled, "C" shaped steel channels, 16 gauge minimum.
 - 2. Finish: Galvanized with G40 hot-dip galvanized coating per ASTM A525 [for exterior work]; galvanized or painted with rust-inhibitive paint for other interior work.
 - 3. Form to required radius at curved ceilings.
 - 2. Cross furring: Hat-shaped steel furring channels, ASTM C645, 7/8 inch high, 25 gauge, galvanized.
 - 3. Furring anchorages: 16 gauge galvanized wire ties, manufacturer's standard wire-type clips, bolts, nails or screws recommended by furring manufacturer and complying with ASTM C754.
 - 4. [Provide compression posts and other accessories as required to comply with seismic requirements.]
- F. Proprietary Framing System:
 - 1. Framing system for gypsum board panels consisting of cold-rolled steel members conforming to ASTM C635, with exposed surfaces finished in manufacturer's standard enamel paint finish.

2. Fire rating: 1 [1-1/2] [2] [3] hour rating in accordance with UL assembly indicated.
 3. Components: Main tees, furring cross channels, furring cross tees, and cross tees.
 4. Accessories:
 - a. U-shaped channel molding.
 - b. Galvanized carbon steel (12 ga.) hanger wire.
 5. Acceptable product: Equivalent to Drywall Suspension System by USG.
- G. Provide USG Compäso™ Elite extruded aluminum edge moldings and trim: where indicated. The aluminum trim will feature smooth visible face with reveal edges on return sides. The non-visible face shall include extruded bosses to accommodate Compäso™ Elite attachment clips that attach trim to adjacent ceiling grid. At vertical butt joints between adjacent trim pieces, utilize Compäso™ splice clips. Prefabricated corner pieces accommodate inwards and outwards 90 degree corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer and Owner present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- 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.
- H. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Wallboard Type: As indicated on Drawings
 - 2. Type X: As indicated on Drawings
 - 3. Ceiling Type: As indicated on Drawings
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 - 3. On Z-furring, Hat Channels or Resilient Channel members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 - 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Where indicated on Drawings
 - 3. Level 3: Where indicated on Drawings
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated
 - a. Primer and its application to surfaces are specified in other Section 099123 "Interior Painting." Level 5 is suitable for surfaces receiving gloss and semi-gloss enamels and other surfaces subject to severe lighting. It is considered a high-quality gypsum board finish.
 - 5. Level 5: Where indicated on Drawings
 - a. Primer and its application to surfaces are specified in other Section 099123 "Interior Painting."

3.5 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093000 – TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Ceramic tile.
 - 2. Waterproof membrane.
 - 3. Crack isolation membrane.
 - 4. Tile backing panels.
 - 5. Metal edge strips.
- B. Related Sections:
 - 1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 - 2. Section 092400 "Portland Cement Plastering" for portland cement scratch coat over metal lath on wall surfaces.

1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
 - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 8 inches square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
 - 3. Full-size units of each type of trim and accessory for each color and finish required.
 - 4. Metal edge strips in 6-inch lengths.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.

- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product, signed by product manufacturer.
- D. Material Test Reports: For each tile-setting and -grouting product and special purpose tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
 - 1. Waterproof membrane.
 - 2. Crack isolation membrane.
 - 3. Joint sealants.
 - 4. Cementitious backer units.
 - 5. Metal edge strips.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.
- C. FloorScore Compliance: Tile for floors shall comply with requirements of FloorScore Standard.
- D. Low-Emitting Materials: Tile flooring systems 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."
- E. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- F. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
 - 1. Where tile is indicated for installation in swimming pools or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.
- G. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

- A. Tile Type: Refer to drawings for tile locations.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Daltile; Division of Dal-Tile International Inc.
 - b. Or approved equal.
 - 2. Composition: Porcelain Tiles and Quarry Tiles.
 - 3. Module Size: Varies, see product list. Per scheduled tile, see finish material key on drawings.
 - 4. Thickness: 3/8" unless otherwise noted per scheduled tile, see finish material key on drawings.
 - 5. Face: Per scheduled tile, see finish material key on drawings.
 - 6. Surface: Slip-resistant at all locations. Provide options for approval during submittals.
 - 7. Finish: Per scheduled tile, see finish material key on drawings.
 - 8. Tile Color and Pattern: Per scheduled tile, see finish material key on drawings.
 - 9. Grout Color: Per scheduled tile, see finish material key on drawings. Submit samples.
 - 10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cove: Size per scheduled tile, see finish material key on drawings.
 - b. Base Cap for Thin-Set Mortar Installations: Surface bullnose, size per scheduled tile, see finish material key on drawings.

- c. Wainscot Cap for Thin-Set Mortar Installations: Size per scheduled tile, see finish material key on drawings.
- d. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
- e. External Corners for Thin-Set Mortar Installations: Surface bullnose, size per scheduled tile, see finish material key on drawings.
- f. Internal Corners: Cove, module size Size per scheduled tile, see finish material key on drawings. Field-buttet square corners.
- g. Mosaic Accents: Provide accents and trims as per elevations and/or where listed on schedules.

B. Product Type: Refer to drawings.

2.3 WATERPROOFING AND CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product, selected from the following, which complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fluid-Applied Membrane:

- 1. Products: Subject to compliance with requirements, provide the following:
 - a. TEC; a subsidiary of H. B. Fuller Company; HydraFlex - Waterproofing Crack Isolation Membrane.
 - b. Or approved equal.

2.4 SETTING MATERIALS

A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. MAPEI Corporation.
 - b. TEC; a subsidiary of H. B. Fuller Company.
 - c. Or approved equal.
- 2. Provide prepackaged, dry-mortar mix containing dry, re-dispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
- 3. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
- 4. For wall applications, provide mortar that complies with requirements for non-sagging mortar in addition to the other requirements in ANSI A118.4.

2.5 GROUT MATERIALS

A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.

B. Standard Cement Grout: ANSI A118.6.

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:
 - a. MAPEI Corporation, Ultracolor Plus.
 - b. Or approved equal.

2.6 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Section 079200 "Joint Sealants."

- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; Dow Corning 786.
 - b. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
 - c. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
 - d. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
 - e. Tremco Incorporated; Tremsil 600 White.
 - f. Or approved equal.
- D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bostik, Inc.; Chem-Calk 550.
 - b. Degussa Building Systems; Sonneborn Sonolastic SL 2.
 - c. Pecora Corporation; [Dynatrol II-SG] [NR-200 Urexpan].
 - d. Sika Corporation; Sikaflex-2c SL.
 - e. Tremco Incorporated.; [THC-900] [THC-901] [Vulkem 245].
 - f. Or approved equal.
- E. Chemical-Resistant Sealants: (Food Service and Kitchen) For chemical-resistant floors, provide chemical-resistant elastomeric sealant of type recommended and produced by chemical-resistant mortar and grout manufacturer for type of application indicated, with proven service record and compatibility with tile and other setting materials, and with chemical resistance equivalent to mortar/grout.
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following:
 - a. Atlas Minerals & Chemicals, Inc.
 - b. Or approved equal

2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayment and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
- C. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
 - 1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
 - 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

- E. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bonsal American; an Oldcastle company; Grout Sealer.
 - b. C-Cure; Penetrating Sealer 978.
 - c. Custom Building Products; Grout and Tile Sealer.
 - d. Jamo Inc.; Matte Finish Penetrating Sealer.
 - e. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout.
 - f. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
 - g. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
 - h. TEC; a subsidiary of H. B. Fuller Company; TA-256 Penetrating Silicone Grout Sealer.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and

match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

- D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile swimming pool decks.
 - c. Tile floors in laundries.
 - d. Tile floors composed of tiles 8 by 8 inches or larger.
 - e. Tile floors composed of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Ceramic Mosaic Tile: 1/16 inch.
 - 2. Paver Tile: 1/4 inch, unless noted otherwise under specific tile requirements.
 - 3. Glazed Wall Tile: 1/16 inch.
- G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 - 2. Where CMU wall meets concrete slab.

- I. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.6 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove latex-portland cement grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 - 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION 093000

SECTION 095123 - ACOUSTICAL TILE CEILINGS & GRID

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Acoustical tiles for ceilings.
 - 2. Concealed suspension systems.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6-inches- in size.
- C. Samples for Initial Selection: For components with factory-applied color finishes.
- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - 1. Acoustical Tile: Set of full-size Samples of each type, color, pattern, and texture.
 - 2. Concealed Suspension-System Members: 6-inch- long Sample of each type.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Ceiling suspension-system members.
 - 2. Method of attaching hangers to building structure.
 - 3. Size and location of initial access modules for acoustical tile.
 - 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 5. Minimum Drawing Scale: 1/8 inch = 1 foot.
- B. Qualification Data: For testing agency.
- C. Product Test Reports: For each acoustical tile ceiling, for tests performed by a qualified testing agency.
- D. Evaluation Reports: For each acoustical tile ceiling suspension system and anchor and fastener type, from ICC-ES.
- E. Field quality-control reports.
- F. CLOSEOUT SUBMITTALS: Maintenance Data, for finishes to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size tiles equal to 2 percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 2 percent of quantity installed.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to the National Voluntary Laboratory Accreditation Program (NVLAP) for testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical tiles, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
 - 2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL TILES, GENERAL

- A. Low-Emitting Materials: Acoustical tile ceilings 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."
- B. Source Limitations: Obtain each type of acoustical ceiling tile and supporting suspension system from single source from single manufacturer.

- C. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- D. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.
 - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface according to ASTM E 795.
- E. Acoustical Tile Colors and Patterns: Match appearance characteristics indicated for each product type.
 - 1. Where appearance characteristics of acoustical tiles are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.3 ACOUSTICAL TILES (ACT)

- A. **Manufacturers: See Reflected Ceiling plan(s) for location of ACT locations. Subject to compliance with requirements, provide products by one of the following:**
 - 1. USG Interiors, Inc.; Subsidiary of USG Corporation.
 - 2. Armstrong World Industries, Inc.
 - 3. CertainTeed Corp.
- B. *USG; Mars Healthcare Acoustical Panels Climaplus Performance - New High-NRC - 24x24x7/8, SLT, Class A, 86470, lay-in. Provide tiles complying with HIPAA and FGI guidelines for use in Healthcare Facilities.*
 - 1. Grid: *USG; H DXLA.*
 - 2. Pattern: lightly textured.

2.4 METAL SUSPENSION SYSTEMS, GENERAL

- A. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- B. Metal Suspension-System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.135 diameter wire.
- E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- F. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch- thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.

2.5 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - 1. Armstrong World Industries, Inc.
 - 2. USG Interiors, Inc.; Subsidiary of USG Corporation.
 - a. Donn DX/DXL/DXLA
- B. Direct-Hung, Double-Web Suspension System: Main and cross runners roll formed from and capped with cold-rolled steel sheet, pre-painted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G30 coating designation.
 - 1. Structural Classification: Intermediate-duty system.
 - 2. Access: Upward and end pivoted or side pivoted, with initial access openings of size indicated below and located throughout ceiling within each module formed by main and cross runners, with additional access available by progressively removing remaining acoustical tiles.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corp.
 - 3. Chicago Metallic Corporation.
 - 4. Fry Reglet Corporation.
 - 5. Gordon, Inc.
 - 6. USG Interiors, Inc.; Subsidiary of USG Corporation.
 - a. Donn Shadowline
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Provide manufacturer's standard edge moldings that fit acoustical tile edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
 - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.7 EXTRUDED ALUMINUM PERIMETER TRIM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corp.
 - 3. Chicago Metallic Corporation.
 - 4. Fry Reglet Corporation.
 - 5. Gordon, Inc.
 - 6. USG Interiors, Inc.; Subsidiary of USG Corporation.
 - a. Compasso Elite
- B. Provide USG Compäso™ Elite extruded aluminum edge moldings and trim: where indicated. The aluminum trim will feature smooth visible face with reveal edges on return sides. The non-visible face shall include extruded bosses to accommodate Compäso™ Elite attachment clips that attach trim to adjacent ceiling grid. At vertical butt joints between adjacent trim pieces, utilize Compäso™ splice clips. Prefabricated corner pieces accommodate inwards and outwards 90 degree corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates with the **Owner** Project Manager(s), areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and approved by the **Owner** Project Manager(s).

3.2 PREPARATION

- A. Testing Substrates: Before installing adhesively applied tiles on wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.
- B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 - 6. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 - 7. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical tiles.

1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Arrange directionally patterned acoustical tiles as follows:
1. As indicated on reflected ceiling plans.
- F. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material.
1. Fit adjoining tile to form flush, tight joints. Scribe and cut tile for accurate fit at borders and around penetrations through tile.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes modular, fusion-bonded carpet tile.
- B. Related Requirements:
 - 1. Section 096513 "Resilient Base and Accessories"

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include installation recommendations for each type of substrate.
- B. Shop Drawings: Show 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.
- C. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with The Carpet and Rug Institute's Standard for Installation of Commercial Carpet CRI 104.

1.9 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.10 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 does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, loss of tuft bind strength, loss of face fiber, and delamination.
 - 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: Subject to compliance with requirements, provide product indicated on Drawings or an approved equal in accordance with section 012500 and 013300 meeting the following:
 - 1. Performance: *Static*; AATCC-134, Under 3.5 KV; *Flammability*; ASTM E 648 Class 1, Glue Down; *Smoke Density*; ASTM E662, Less than 450.
- B. **CPT 1:** Subject to compliance with requirements, provide product as manufactured *Mohawk Group* or an approved equal:
 - 1. Shape Theory – Cartesian Plane (BT600)
 - 2. Construction: Tufted
 - 3. Dye Method: 100% Solution Dyed
 - 4. Soil/ Stain Protection Technology: EcoSentry Soil Protection
 - 5. Tufted Pile Weight: 16.0 oz/yd²
 - 6. Gauge: 1/12", 47.2 per 10cm
 - 7. Total Thickness: 0.200", 6035mm
 - 8. Stitches: 11.5 /in
 - 9. Size/Width: 24" x 24"
 - 10. Color: 977 *Iron Index*
 - 11. Flooring Radiant Panel: (ASTM E-648) Class 1
 - 12. Smoke Density: (ASTM E662) ≤ 450
 - 13. Total Recycled Content: 44% (post industrial 44% | post consumer 0%)
 - 14. Indoor Air Quality: Green Label Plus # GLP1171

2.2 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, non-staining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
 - 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Adhesives 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."
- C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width required, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints. Floor Transition A & B as manufactured by Schluter, DECO & RENO-TK.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates on site with Fond Du Lac Band of Lake Superior Chippewa Project Manager(s), areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
 - 2. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with The Carpet and Rug Institute's Standard for Installation of Commercial Carpet CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- 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 wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. 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 carpet tile manufacturer.
- D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.

- C. Maintain dye lot integrity. Do not mix dye lots in same area.
- D. 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.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, non-staining marking device.
- G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."
- C. 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 099300 – PAINTING & TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems and transparent finishes on the following interior/exterior substrates as related to ***Bid Package #1 & 2:***
 - 1. Concrete masonry units (CMU).
 - 2. Clay facing brick.
 - 3. Precast concrete.
 - 4. Steel.
 - 5. Gypsum board.
 - 6. Galvanized metal.
 - 7. Ferrous Metals
 - 8. Wood Doors & Trim

1.3 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches 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.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
 - 3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURER - PAINT

- A. Basis of Design: Sherwin Williams
 1. Line: See paint schedule on room finish drawing sheet.
 2. Reference product and color on schedule on room finish drawing sheet.
- B. Or approved equal.

2.2 MANUFACTURER – PRIMERS

- A. **PR-1:** Conc/Masonry, Sherwin Williams; Loxon Block Surfacers A24W200 – Concrete & Masonry Primer, Interior/Exterior Latex or approved equal.
- B. **PR-2:** Drywall, Sherwin Williams; ProMar 200 Zero VOC B28W2600, Interior Latex Primer or approved equal.
- C. **PR-3:** Ferrous Metal, Sherwin Williams; Pro-Cryl Universal Primer, B66-310 Series or approved equal.
- D. **PR-4:** Exterior Wood, Prep Rite Pro Block Latex Primer Sealer B51 Series.
- E. **PR-5:** Painted Wood Doors, Frame, Trim; Prep Rite Pro Block Sealer B51 Series.
- F. **PR-6:** Wood Stained Trim, Doors, Frame; Minwax 250 Stain

2.3 MANUFACTURER - SEALERS

- A. Basis of Design: BASF
 1. Clay faced brick, BASF; MasterProtect H 177 - water based, VOC-compliant, clear or transparent silane/siloxane sealer for interior vertical masonry surfaces.
 2. Or approved equal.

2.4 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. 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.
- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a

tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24), shall be equal to or less than the figure stated:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Dry-Fog Coatings: 400 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Floor Coatings: 100 g/L.
9. Shellacs, Clear: 730 g/L.
10. Shellacs, Pigmented: 550 g/L.

2.5 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 2. Testing agency will perform tests for compliance with product requirements.
 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator and **Owner** Project Manager(s) present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
 2. Masonry (Clay and CMU): 12 percent.
 3. Wood: 15 percent.
 4. Gypsum Board: 12 percent.
 5. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and 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.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, 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. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. 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.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
 1. Scrape and clean knots, and apply coat of 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.
 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 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 labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

- D. 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.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panel boards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 - 2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. 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.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 PAINTING SCHEDULE

- A. PRIMER: All surfaces, faces, trim, shall receive a primary coating of a product as defined below. Finish coats require a minimum of two additional coats as defined below, per finish classification.
 - 1. **PR-1:** Conc/Masonry, Sherwin Williams; Loxon Block Surfacer A24W200 – Concrete & Masonry Primer, Interior/Exterior Latex or approved equal.
 - 2. **PR-2:** Drywall, Sherwin Williams; ProMar 200 Zero VOC B28W2600, Interior Latex Primer or approved equal.
 - 3. **PR-3:** Ferrous Metal, Sherwin Williams; Pro-Cryl Universal Primer, B66-310 Series or approved equal.
 - 4. **PR-4:** Exterior Wood, Prep Rite Pro Block Latex Primer Sealer B51 Series.
 - 5. **PR-5:** Painted Wood Doors, Frame, Trim; Prep Rite Pro Block Sealer B51 Series.
 - 6. **PR-6:** Wood Stained Trim, Doors, Frame; Minwax 250 Stain

NOTE! See Room Finish Drawing Sheet for finish coats.

END OF SECTION 099123

SECTION 102800 – TOILET/BATH ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Washroom accessories as scheduled in this Section and as indicated on the Drawings.

1.2 RELATED REQUIREMENTS

- A. Section 061000 - Rough Carpentry, coordination with blocking.
- B. Section 092000 - Plaster and Gypsum Board, coordination with blocking.
- C. Section 093000 - Tiling, coordination with layout and installation.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's data sheets for each product specified, including the following:
 - 1. Installation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Cleaning and maintenance instructions.
 - 4. Replacement parts information.
- B. Schedule: Submit a toilet accessory schedule, indicating the type and quantity to be installed in each washroom. Use room numbers as indicated on the Drawings.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Provide products manufactured by a company with a minimum of 10 years successful experience manufacturing similar products.
- B. Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.
- C. Accessibility Requirements: Comply with requirements applicable in the jurisdiction of the project, including but not limited to ADA and ICC/ANSI A117.1 requirements as applicable.
- D. Hazardous Materials: Comply with EU Directive "Restrictions of Hazardous Substances (RoHS) requirements."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations. Protect from damage.

1.6 WARRANTY

- A. Manufacturer's Warranty for Washroom Accessories: Manufacturer's standard 1 year warranty for materials and workmanship.
- B. Manufacturer's Warranty for Electric Hand Dryers: Manufacturer's standard 10 year warranty on parts, except 3 year warranty on motor brushes from date of purchase. Does not include Bobrick Compac Model B-710.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturers:

1. Bobrick Washroom Equipment, Inc.: 200 Commerce Drive, Clifton Park, New York 12065-1350; Tel: 518-877-7444; Website: <http://www.bobrick.com/Pages/default.aspx>
2. Bradley Corporation: W142N9101 Fountain Boulevard, Menomonee, WI 53051; Tel: 1-800-272-3539; Website: www.bradleycorp.com
3. American Specialties Inc.: 441 Saw Mill River Road, Yonkers, NY 10701-4913; Tel: 914-476-9000; Website: www.americanspecialties.com

2.2 TOILET ACCESSORY SCHEDULE (QTY is per each Restroom)

A. Restrooms

1. B-6806 Series Concealed Mounting Grab Bar – 1-1/2 inch diameter. (QTY 1)
2. No.1 Quality, 1/4" (6 mm) bright polished mirror. Meet Federal specification DD-M-00411B against silver spoilage. Use manufacturer's recommended adhesive. See drawings for dimensions. (QTY 1)
3. B-2888 Classic Series Surface-Mounted Multi-Roll Toilet Tissue Dispenser. (QTY 1)
4. KB200-01SS Koala Kare Products Horizontal Surface-Mounted Baby Changing Station. (QTY 1)
5. B-7188 QuietDry Series, TerraDry ADA Surface-Mounted Hand Dryer. (QTY 1)

PART 3 - EXECUTION

3.1 INSTALLATION

- #### **A. Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:**
1. Verify blocking has been installed properly where necessary to support accessories.
 2. Verify location does not interfere with door swings or use of fixtures.
 3. Comply with manufacturer's recommendations for backing and proper support.
 4. Use fasteners and anchors suitable for substrate and project conditions.
 5. Install all units rigid, straight, plumb, and level, in accordance with manufacturer's installation instructions and approved shop drawings.
 6. Conceal evidence of drilling, cutting, and fitting to room finish.
 7. Test for proper operation.
- #### **B. Confirm operation and completion with Owner.**

3.2 CLEANING AND PROTECTION

- #### **A. Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.**
- #### **B. Touch-up, repair or replace damaged products until Substantial Completion.**

END OF SECTION 102800

SECTION 220000 - DESIGN-BUILD PERFORMANCE REQUIREMENTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION REQUIREMENTS

- A. This document outlines the minimum product performance required and is not intended to preclude any other products by the contract or good practice. All Construction Documents and other design work shall incorporate these minimum design-build performance requirements and all products and services provided shall be in compliance with all governing, local, municipal, state and federal codes and regulations.

1.3 DESCRIPTION OF WORK

- A. The work to be done under this specification includes the furnishing of all design, labor, materials, equipment and services necessary for the proper completion of all Plumbing work. The omission of express reference to any parts necessary for or reasonably incidental to the complete installation shall not be construed as releasing the Contractor from furnishing such parts.
- B. Provide plumbing assemblies with the appropriate characteristics necessary for the occupancy, use, and sanitation in the interior spaces enclosed by the shell and any area, exterior or interior, as determined necessary by these contract documents and relevant codes, regulations and standards.
- C. The Plumbing system consists of the following elements:
 - 1. Floor Drains and Piping: Provides drainage from interior spaces to the exterior of the building.
 - 2. Water Piping: Provides rough-in piping for future lavatory; lavatory N.I.C..

1.4 CODES, REGULATIONS & STANDARDS

- A. All work under this Division shall be in strict conformance with the applicable parts of the following codes, laws, rules, regulations and applicable standards of technical societies where referenced hereinafter. References to standards, codes, regulations, etc., shall mean the latest edition of such publications adopted and published at date of the invitation to submit proposals.

National Electric Code (NEC)
National Fire Protection Association (NFPA)
Local Utilities Regulations
Local Codes, Rules and Regulations
Standards of the American Society of Testing Materials (ASTM)
American Gas Association (AGA)
Occupational Safety and Health Act (OSHA)
Michigan State Building Code
Michigan Plumbing Code

1.5 INSPECTION OF SITE

- A. The Contractor is urged to examine the site and familiarize himself with existing conditions on

the premises and surrounding area. No extras will be authorized because of the Contractor's misunderstanding as to work required in order to comply with these plans and specifications, or his lack of knowledge of conditions in connection with the work. Information received by the Contractor from telephone conversations shall not be construed as relieving the Contractor from actually visiting the site and making his own analysis of conditions.

1.6 DRAWINGS AND SPECIFICATIONS

- A. Plumbing drawings shall be by the contractor. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be of like effect as if shown on or mentioned in both. In case of any discrepancy in Drawings or Specifications, the matter shall immediately be submitted to the Architect, without whose decision said discrepancy shall not be adjusted by the Contractor except at his own risk.
- B. The Contractor shall consult the architectural Drawings for all dimensions, furred spaces, suspended ceilings, etc. The Contractor shall also check the architectural Drawings verifying the heights of cabinets and counters to place wall outlets over this equipment at the proper heights; location of closets, doors, and window frames which may interfere. Particular attention shall also be given to the height and location of convectors and radiators. The Contractor shall check with other trades for interference and shall cooperate to avoid such interferences.

1.7 AS-BUILT DRAWINGS

- A. The Contractor will be provided a clean set of Drawings for the purpose of recording conduit routings (underground and concealed) and locations of equipment that deviate from the Contract Drawings. Additional detail of difficult routing shall be sketched on the as-built Drawings to more clearly show routing around where interference was encountered during construction. Sufficient measurements shall also be recorded on the Drawings to locate routings that have been made inaccessible by walls, floors, or ceilings. Upon completion of the Project, the as-built set of Drawings will be reviewed with the Engineer before delivering to the Owner.

1.8 WORKMANSHIP

- A. All work shall be installed and completed by a contractor with a minimum of (5) years of experience in their trade and shall be installed in a practical and efficient workman like manner and in strict accordance with the best practice of the trade.

1.9 PROJECT CLOSEOUT

- A. Refer to the Section: PROJECT CLOSEOUT for procedures and requirements for project closeout.

1.10 EXISTING CONDITIONS & SERVICES

- A. When encountered in work, protect, brace, support existing active services included but not restricted to sewers, gas, electric and other systems where required for proper execution of work. If existing active services are encountered that require relocation, make request in writing for determination. Do not proceed with work until written directions are received. Do not prevent or disturb operation of active services that are to remain.
- B. When encountered in work, remove, cap or plug inactive services. Notify utility companies or municipal agencies having jurisdiction; protect or remove these services as directed.
- C. Where work makes temporary shutdown of services unavoidable, shut down at night, or at such times as approved by Engineer, which will cause least interference with established operating

routine. Arrange to work continuously, including overtime, if required, to make necessary connections to existing work.

1.11 PERMITS, LICENSES & FEES

- A. The Contractor shall obtain and pay for all permits, notices, inspection fees, licenses, etc., necessary for the performance to the work included in this contract, including plan review costs; and he shall observe any requirements stipulated thereon.

1.12 FIRE & SAFETY PRECAUTIONS

- A. Take all necessary precautions for safety of employees and public. Comply with applicable provisions of Federal, State and Local laws, ordinances and requirements. Erect and properly maintain necessary safeguards for said protection as required by conditions and progress of job and post danger signs warning against hazards of construction. All employees shall be notified of potentially hazardous materials according to "Right to Know" statutes.

1.13 GUARANTEES

- A. The Contractor shall assume responsibility for any defects which may develop in any part of the system caused by faulty workmanship, material, or equipment and agrees to replace any such workmanship, material, or equipment during a period of one year from the date of final acceptance of the work without cost to the Owner. Acceptance of the work shall not waive this guarantee.

1.14 MANUFACTURER'S DIRECTIONS

- A. Materials and equipment shall be installed in strict accordance with the manufacturer's directions for installation, connection, and startup of factory-assembled units and/or composite parts assembled into a system

1.15 REFERENCES

AFI	Air Filter Institute
AGA	American Gas Association
AIEE	American Institute of Electrical Engineers
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
AWWA	American Water Works Association
CMA	Convactor Manufacturers Association
CSD	Commodity Standards Division, US Dept. of Commerce
HPACCNA	Heating, Piping and Air Conditioning Contractors National Association
IBR	Institute of Boiler and Radiator Manufacturers
IUHA	Industrial Unit Heater Association
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
NAFM	National Association of Fan Underwriters
NBFU	National Board of Fire Underwriters
NEC	National Electric Code (NFPA Pamphlet #70)
NEMA	National Electric Manufacturers Association
SBI	Steel Boiler Institute

PART 2 - PRODUCTS/PERFORMANCE BASED WORK ITEMS

2.1 GENERAL

- A. Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service. Where type, grade or class is not indicated, provide proper selection as determined by Installer for installation requirements, and comply with governing regulations and industry standards.
- B. Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.
- C. VERTICAL-PIPING CLAMPS: Except as otherwise indicated, provide factory-fabricated vertical-piping clamps complying with MSS SP-58, selected by Installer to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.
- D. BUILDING ATTACHMENTS: Except as otherwise indicated, provide factory-fabricated building attachments complying with MSS SP- 58, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.
- E. Piping Insulation Materials:
 - 1. Fiberglass Piping Insulation: ASTM C547, Class 1, unless otherwise indicated.
 - 2. Jackets for Piping Insulation: ASTM C921, Type I, for piping with temperatures below ambient; Type II, for piping with temperatures above ambient. Type I may be used for all piping at Installer's option.
 - 3. Encase pipe and pipe fittings insulation in mechanical room and as indicated with one-piece premolded PVC jacket, fitting covers, fastened as per manufacturer's recommendations.
 - 4. Encase exterior piping insulation with aluminum jacket with weatherproof construction.
 - 5. Staples, Bands, Wires and Cement: As recommended by insulation manufacturer for applications indicated.
 - 6. Adhesives, Sealers and Protective Finishes: As recommended by insulation manufacturer for applications indicated.

2.2 FLOOR DRAINS AND PIPING

- A. Provide design, labor, material, equipment, and supervision required for the installation of floor drains and piping as indicated in the drawings. All material and equipment shall be new and undamaged.

2.3 WATER PIPING

- A. Provide design, labor, material, equipment, and supervision required for the installation hot and

cold water piping for a future lavatory, lavatory N.I.C., as indicated in the drawings. All material and equipment shall be new and undamaged.

PART 3 - EXECUTION

3.1 DESIGN

- A. Plumbing shall be designed in accordance with the International Plumbing Code.
 - 1. Adherence to design parameters defined herein is required to the extent that such parameters exceed or are more stringent than applicable codes and standards.
 - 2. Perform pipe sizing calculations and other project requirements wherever applicable. Preserve all calculations as part of the record of design.
 - 3. Coordinate all Plumbing equipment locations with all architectural and engineering disciplines and the work of all trades.
 - 4. Identify the quantity and/or location of the floor drains to satisfy code, equipment drainage, and maintenance and good housekeeping. Notify the Architect immediately upon discovery of discrepancy between the contract documents and the Plumbing contractor's design.
 - 5. Design criteria for all spaces shall be in compliance with the Michigan Plumbing Code.

3.2 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected. Refer to equipment specifications for rough-in requirements.

3.3 PLUMBING INSTALLATIONS

- A. Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently-leakproof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings, but with adequate and accessible unions for disassembly and maintenance/replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Align piping accurately at connections, within 1/16" misalignment tolerance. Comply with ANSI B31 Code for Pressure Piping.
- B. Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, columns and other structural and permanent-enclosure elements of building; limit clearance to 1/2" where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1" clearance outside insulation. Wherever possible in finished and occupied spaces, conceal piping from view, by locating in column enclosures, in hollow wall construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.
- C. Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical or electronic equipment spaces and enclosures unless unavoidable. Install drip pan under piping that must be run through electrical spaces.
- D. Provide joints as recommended by the manufacturer in each piping system.

1. Hubless Cast-Iron Joints: Comply with coupling manufacturer's installation instructions.
2. Plastic Pipe/Tube Joints: Comply with manufacturer's instructions and recommendations and with applicable industry standards:
 - a. Making Solvent-Cemented Joints: ASTM D2235 and ASTM F402.

3.4 CLEANING, FLUSHING, INSPECTING

- A. Clean exterior surfaces of installed piping systems of superfluous materials and prepare for application of specified coatings (if any). Flush out piping systems with clean water before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items.
- B. Inspect pressure piping in accordance with procedures of ASME B31.

3.5 PIPING TESTS

- A. Test pressure piping in accordance with ASME B31.
- B. Provide temporary equipment for testing, including pump and gages. Test piping system before insulation is installed wherever feasible, and remove control devices before testing. Test each natural section of each piping system independently but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water and pressurize for indicated pressure and time.
 1. Required test periods is 2 hours.
 2. Test long runs of Schedule 40 pipe at 150 psi, except where fittings are lower Class or pressure rating.
 3. Test each piping system at 150% of operating pressure indicated, but not less than 25 psi test pressure.
 4. Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 5% of test pressure.
- C. Repair piping system sections which fail required piping test by disassembly and reinstallation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics or other temporary repair methods.
- D. Drain test water from piping systems after testing and repair work has been completed.

END OF SECTION 230000

SECTION 230000 - DESIGN-BUILD PERFORMANCE REQUIREMENTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION REQUIREMENTS

- A. This document outlines the minimum product performance required and is not intended to preclude any other products by the contract or good practice. All Construction Documents and other design work shall incorporate these minimum design-build performance requirements and all products and services provided shall be in compliance with all governing, local, municipal, state and federal codes and regulations.

1.3 DESCRIPTION OF WORK

- A. The work to be done under this specification includes the furnishing of all design, labor, materials, equipment and services necessary for the proper completion of all HVAC work. The omission of express reference to any parts necessary for or reasonably incidental to the complete installation shall not be construed as releasing the Contractor from furnishing such parts.
- B. Provide artificial means of controlling temperature, relative humidity, velocity, and direction of air motion in the interior spaces enclosed by the shell, and reduction of airborne odors, particulates, and contaminant gases.
- C. The HVAC system consists of the following elements:
 - 1. Facility Fuel System: which provides energy used to maintain building comfort.
 - 2. Heating System: required to heat the building to maintain space comfort.
 - 3. HVAC Air Distribution System: required to distribute air to maintain building comfort.
 - 4. Integrated Automation Control of HVAC Systems: Elements required to control equipment which maintains building comfort.
 - 5. HVAC Design Parameters: Elements required to design systems to maintain building comfort.

1.4 CODES, REGULATIONS & STANDARDS

- A. All work under this Division shall be in strict conformance with the applicable parts of the following codes, laws, rules, regulations and applicable standards of technical societies where referenced hereinafter. References to standards, codes, regulations, etc., shall mean the latest edition of such publications adopted and published at date of the invitation to submit proposals.

National Electric Code (NEC)
NEMA EPAct – Energy Efficient Motors.
National Institute of Health Design Policy and Guidelines (NIH)
National Fire Protection Association (NFPA) Local Utilities Regulations
Local Codes, Rules and Regulations
Standards of the American Society of Testing Materials (ASTM)
American Gas Association (AGA)
Occupational Safety and Health Act (OSHA)
Michigan State Building Code

(SMACNA/ANSI), HVAC Duct Construction Standards.
American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE)
AABC National Standards for Total System Balance; Associated Air Balance Council.
NEBB (TAB) Procedural Standards for Testing Adjusting Balancing of Environmental Systems
American National Standards Institute (ANSI)
Underwriters' Laboratories (UL)

1.5 INSPECTION OF SITE

- A. The Contractor is urged to examine the site and familiarize himself with existing conditions on the premises and surrounding area. No extras will be authorized because of the Contractor's misunderstanding as to work required in order to comply with these plans and specifications, or his lack of knowledge of conditions in connection with the work. Information received by the Contractor from telephone conversations shall not be construed as relieving the Contractor from actually visiting the site and making his own analysis of conditions.

1.6 RECORD DOCUMENTS

- A. Refer to the Section: PROJECT CLOSEOUT or PROJECT RECORD DOCUMENTS for requirements. The following paragraphs supplement the requirements of Division 01.
- B. Mark drawings to indicate revisions to piping and ductwork, size and location both exterior and interior; including locations of coils, dampers and other control devices, filters, boxes, and similar units requiring periodic maintenance or repair; actual equipment locations, dimensioned for column lines; actual inverts and locations of underground piping; concealed equipment, dimensioned to column lines; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.); Change Orders; concealed control system devices.
- C. Mark specifications to indicate approved substitutions; Change Orders; actual equipment and materials used.

1.7 WORKMANSHIP

- A. All work shall be installed and completed by a contractor with a minimum of (5) years of experience in their trade and shall be installed in a practical and efficient workman like manner and in strict accordance with the best practice of the trade.

1.8 PROJECT CLOSEOUT

- A. Refer to the Section: PROJECT CLOSEOUT for procedures and requirements for project closeout.

1.9 EXISTING CONDITIONS & SERVICES

- A. When encountered in work, protect, brace, support existing active services included but not restricted to sewers, gas, electric and other systems where required for proper execution of work. If existing active services are encountered that require relocation, make request in writing for determination. Do not proceed with work until written directions are received. Do not prevent or disturb operation of active services that are to remain.
- B. When encountered in work, remove, cap or plug inactive services. Notify utility companies

or municipal agencies having jurisdiction; protect or remove these services as directed.

- C. Where work makes temporary shutdown of services unavoidable, shut down at night, or at such times as approved by Engineer, which will cause least interference with established operating routine. Arrange to work continuously, including overtime, if required, to make necessary connections to existing work.

1.10 PERMITS, LICENSES & FEES

- A. The Contractor shall obtain and pay for all permits, notices, inspection fees, licenses, etc., necessary for the performance to the work included in this contract, including plan review costs; and he shall observe any requirements stipulated thereon.

1.11 FIRE & SAFETY PRECAUTIONS

- A. Take all necessary precautions for safety of employees and public. Comply with applicable provisions of Federal, State and Local laws, ordinances and requirements. Erect and properly maintain necessary safeguards for said protection as required by conditions and progress of job and post danger signs warning against hazards of construction. All employees shall be notified of potentially hazardous materials according to "Right to Know" statutes.

1.12 GUARANTEES

- A. The Contractor shall assume responsibility for any defects which may develop in any part of the system caused by faulty workmanship, material, or equipment and agrees to replace any such workmanship, material, or equipment during a period of one year from the date of final acceptance of the work without cost to the Owner. Acceptance of the work shall not waive this guarantee.

1.13 MANUFACTURER'S DIRECTIONS

- A. Materials and equipment shall be installed in strict accordance with the manufacturer's directions for installation, connection, and startup of factory-assembled units and/or composite parts assembled into a system

1.14 REFERENCES

AFI	Air Filter Institute
AGA	American Gas Association
AIEE	American Institute of Electrical Engineers
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
AWWA	American Water Works Association
CMA	Convactor Manufacturers Association
CSD	Commodity Standards Division, US Dept. of Commerce
HPACCNA	Heating, Piping and Air Conditioning Contractors National Association
IBR	Institute of Boiler and Radiator Manufacturers
IUHA	Industrial Unit Heater Association
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
NAFM	National Association of Fan Underwriters

NBFU	National Board of Fire Underwriters
NEC	National Electric Code (NFPA Pamphlet #70)
NEMA	National Electric Manufacturers Association
SBI	Steel Boiler Institute
SMACNA	Sheetmetal and Air Conditioning Contractors National Association
UL	Underwriters' Laboratories, Inc.

PART 2 - PRODUCTS/PERFORMANCE BASED WORK ITEMS

2.1 FACILITY FUEL SYSTEMS - ABOVE GROUND PROPANE TANK

- A. Above Ground Propane Tank System shall be furnished and installed by utility provider. Contractor to integrate system with Heating System - Gas Fired Duct Heater: Upflow LP Gas Furnace. All material and equipment shall be new and undamaged.

2.2 HEATING SYSTEM - GAS FIRED DUCT HEATER: UPFLOW LP GAS FURNACE

- A. Provide design, labor, material, equipment, controls, control interface and supervision required for the installation of an Upflow LP Gas Furnace. Integrate system with Facility Fuel Systems - Above Ground Propane Tank and HVAC Air Distribution System - Metal Ductwork. All material and equipment shall be new and undamaged.

1. All floor-mounted or supported equipment shall be on concrete housekeeping pads that are minimum 4" longer and wider than the equipment base and a minimum height of 4". Each pad shall be lagged to the floor with a minimum of 4 steel anchoring devices. Steel rods shall form a 12 inch grid to provide reinforcement of concrete. Provide spring vibration isolation for motorized equipment. All edges and corners shall be chamfered 1". All tripping hazards shall be eliminated. Heights and reinforcement requirements may vary depending on the weight and dynamic forces produced by the equipment. Adequate space shall be provided around pads to allow for servicing of equipment and manufacturers recommended clearances. Clearances shall be maintained around boilers, generators, tanks and related equipment and appliances so as to permit inspection, servicing, repair, replacement and visibility of all gauges.

2.3 HVAC AIR DISTRIBUTION SYSTEM - METAL DUCTWORK

- A. Provide design, labor, material, equipment, controls, control interface and supervision required for the installation of Metal Ductwork. Integrate system with Heating System - Gas Fired Duct Heater: Upflow LP Gas Furnace. Basic function shall be to maintain the required space conditions. All material and equipment shall be new and undamaged.

PART 3 - EXECUTION

3.1 DESIGN

- A. Heating, Ventilating, and Air Conditioning Systems shall be designed in accordance with the International Mechanical Code, heating load calculations and ASHRAE Standard 62.1 Ventilation for Acceptable Indoor Air Quality using the following criteria:
 1. Adherence to design parameters defined herein is required to the extent that such parameters exceed or are more stringent than applicable codes and standards.
 2. Perform HVAC calculations for system designs according to ASHRAE recommendations and other project requirements wherever applicable. Preserve all calculations as part of the record of design.

3. Coordinate all HVAC equipment locations with all architectural and engineering disciplines and the work of all trades.
4. Coordinate with the plumbing contractor to identify the quantity and/or location of the floor drains to satisfy code, equipment drainage, and maintenance and good housekeeping.
5. Design criteria for all spaces shall be in compliance with code and 72 deg F winter, 55 deg F unoccupied winter. Zamboni Garage shall be considered continually unoccupied for the purposes of temperature design criteria.
6. Ventilation criteria shall be to comply with outdoor air requirements per occupant for all spaces compliant with ventilation standards and by code.

3.2 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected. Refer to equipment specifications for rough-in requirements.

3.3 MECHANICAL INSTALLATIONS

- A. Coordinate mechanical equipment and materials installation with other building components.
- B. Verify all dimensions by field measurements.
- C. Arrange for chases, slots and openings in other building components to allow for mechanical installations.
- D. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components as they are constructed.
- E. Sequence, coordinate and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing- in the building.
- F. Coordinate the cutting and patching of building components to accommodate the installation of mechanical equipment and materials.
- G. Where mounting heights are not detailed or dimensioned, install mechanical services and overhead equipment to provide the maximum headroom possible.
- H. Install mechanical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

3.4 ROOF CURBS AND FLASHINGS

- A. The general Contractor will provide roof curbs and do all flashing for pipes, ducts, and conduits at the time the roofing material is installed providing conduit is in place at time of roofing; otherwise flashing will be responsibility of the Contractor.

3.5 TESTING, ADJUSTING, AND BALANCING

- A. Provide testing, adjusting, and balancing of all air systems, hydronic systems, equipment, hoods and their distribution components.
- B. Complete and submit the air systems testing and balancing report to the Owner and Architect. Provide in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified which affect control system setup and operation.

3.6 CLEANING

- A. Refer to the Section: PROJECT CLOSEOUT or FINAL CLEANING for general requirements for final cleaning.

3.7 FINAL INSPECTION

- A. When the Project is complete and prior to acceptance by the Owner, a final inspection will be held.
- B. Before final inspection is made, the Work shall be complete in accordance with plans and Specifications.
- C. When the Owner is notified in writing that the Work is complete, including the items noted on final inspection, a follow-up inspection will be made. The Contractor shall recognize the need for proper procedure and diligence for completing Work on time, including prompt attention to finishing and follow-up work.

END OF SECTION 230000

SECTION 260000 - DESIGN-BUILD PERFORMANCE REQUIREMENTS FOR ELECTRICAL

PART 1 -GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION REQUIREMENTS

- A. This document outlines the minimum product performance required and is not intended to preclude any other products by the contract or good practice. All Construction Documents and other design work shall incorporate these minimum design-build performance requirements and all products and services provided shall be in compliance with all governing, local, municipal, state and federal codes and regulations.

1.3 DESCRIPTION OF WORK

- A. The Work to be done under this Specification includes the furnishing of all design, labor, materials, equipment, and services necessary for the proper completion of all Electrical Work. The omission of express reference to any parts necessary for or reasonably incidental to the complete installation shall not be construed as releasing the Contractor from furnishing such parts.
- B. Provide electrical power with the appropriate characteristics to operate all electrically operated devices, including those in other services.
- C. The electrical system comprises the following elements:
 - 1. Service and distribution: Service entrance equipment, distribution equipment, transformers, motor control equipment, service and feeder wiring (conductors and raceways), transient voltage surge suppressors, control equipment, and other elements required for a complete functional system.
 - 2. Branch circuits: Branch circuit wiring.
 - 3. Electrical Design Parameters: Elements required to design systems to operate all electrically operated devices, including those in other services.

1.4 PERMITS, LICENSES, AND FEES

- A. The Contractor shall obtain and pay for all permits, notices, inspection fees, licenses, etc., necessary for the performance to the Work included in this Contract, including plan review costs; and he shall observe any requirements stipulated thereon.

1.5 CODES, REGULATIONS, AND STANDARDS

- A. All Work under this division shall be in strict conformance with the applicable parts of the following codes, laws, rules, regulations, and applicable standards of technical societies where referenced

hereinafter. References to standards, codes, regulations, etc., shall mean the latest edition of such publications adopted and published at date of the invitation to submit proposals.

National Electric Code (NEC)

Regulations of the State Department of Health Regulations of the State Industrial Commission Rules of the National Board of Fire Underwriters Local Codes, Rules, and Regulations Occupational Safety and Health Act (OSHA) State Building Code Division

Local Electric Utility Life Safety Code 101

1.6 REFERENCES

- A. References to standards, codes, Specifications, recommendations shall mean the latest edition of such publications adopted and published at date of invitation to submit proposals. Reference to technical societies, trade organizations, and governmental agencies is made in mechanical and electrical work sections in accordance with the following abbreviations:

AGA	American Gas Association
AIEE	American Institute of Electrical Engineers
ANSI	American National Standards Institute
ASHARE	American Society of Heating and Air Conditioning Refrigerating Engineers
ASTM	American Society for Testing Materials
CSD	Commodity Standards Division, US Department of Commerce
NAFM	National Association of Fan Manufacturers
NBFU	National Board of Fire Underwriters
NEC	National Electric Code
NEMA	National Electrical Manufacturers' Association
UL	Underwriters' Laboratories, Inc.

1.7 CONTRACTOR'S QUALIFICATIONS

- A. This Contractor shall be a licensed Master Electrical Contractor in the State. All Work shall be installed and completed by electricians skilled in their trade and shall be installed in a practical and workmanlike manner.

1.8 INSPECTION OF THE SITE

- A. The Contractor is urged to examine the site and familiarize himself with existing conditions on the premises and surrounding area. No extras will be authorized because of the Contractor's misunderstanding as to extra work required in order to comply with these plans and Specifications, or his lack of knowledge of conditions in connection with the Work. Information received by the Contractor from verbal conversations shall not be construed as relieving the Contractor from actually visiting the site and making his own analysis of conditions.

1.9 DRAWINGS AND SPECIFICATIONS

- A. Electrical drawings shall be by the contractor. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be

of like effect as if shown on or mentioned in both. In case of any discrepancy in Drawings or Specifications, the matter shall immediately be submitted to the Architect, without whose decision said discrepancy shall not be adjusted by the Contractor except at his own risk.

- B. The Contractor shall consult the architectural Drawings for all dimensions, furred spaces, suspended ceilings, etc. The Contractor shall also check the architectural Drawings verifying the heights of cabinets and counters to place wall outlets over this equipment at the proper heights; location of closets, doors, and window frames which may interfere. Particular attention shall also be given to the height and location of convectors and radiators. The Contractor shall check with other trades for interference and shall cooperate to avoid such interferences.

1.10 AS-BUILT DRAWINGS

- A. The Contractor will be provided a clean set of Drawings for the purpose of recording conduit routings (underground and concealed) and locations of equipment that deviate from the Contract Drawings. Additional detail of difficult routing shall be sketched on the as-built Drawings to more clearly show routing around where interference was encountered during construction. Sufficient measurements shall also be recorded on the Drawings to locate routings that have been made inaccessible by walls, floors, or ceilings. Upon completion of the Project, the as-built set of Drawings will be reviewed with the Engineer before delivering to the Owner.

1.11 FIRE AND SAFETY PRECAUTIONS

- A. Each Contractor shall: Take all necessary precautions for safety of employees, employees of Owner, and public; comply with applicable provisions of federal, state and local laws, ordinances and requirements; erect and properly maintain necessary safeguards for said protection as required by conditions and progress of job and shall post danger signs warning against hazards of construction.
- B. Each Contractor shall exercise extreme care to maintain and exercise adequate fire safety precautions throughout construction. Provide barriers around all excavations and openings where uncontrolled descent could cause injuries.

1.12 GUARANTEES

- A. The Contractor shall assume responsibility for any defects which may develop in any part of the system caused by faulty workmanship, material, or equipment and agrees to replace any such workmanship, material, or equipment during a period of one year from the date of final acceptance of the work without cost to the Owner. Acceptance of the work shall not waive this guarantee.

1.13 MANUFACTURER'S DIRECTIONS

- A. Materials and equipment shall be installed in strict accordance with the manufacturer's directions for installation, connection, and startup of factory-assembled units and/or composite parts assembled into a system

PART 2 - PRODUCTS/PERFORMANCE BASED WORK ITEMS

2.1 WIRING

- A. Provide code compliant wiring and disconnect box for all devices. All wire and cable shall be new, of the best quality, and of the size, type, and number indicated.
- B. Conductors shall be of soft annealed copper conforming to the requirements of ASTM specifications, latest edition. Unless otherwise noted, wire shall be rated 600V. All conduits are sized based on copper conductors unless noted on the Drawings.
- C. Neutral wire in all cases shall be provided with an outer identification of white or gray distinguishing color and shall be the same size as the phase wires unless otherwise noted. All branch wiring shall be color coded. #12 AWG wire shall be minimum size used throughout unless otherwise indicated on the Drawings. All power and control wire, except for lighting and receptacles, and all wire #10 AWG or larger shall be stranded.
- D. Electrical wire, cable, and connectors shall be for power distribution, lighting circuits, equipment circuits, appliance circuits, and motor circuits. All wiring and connectors shall be UL listed and labeled.
- E. Cross lines on the conduit runs indicate the number of wires to be installed. Where 2 or more neutrals are in one conduit, each shall be individually coded or rung out for identification of the proper circuit. Aluminum conductors shall be used only where shown on the Drawings.

2.2 IDENTIFICATION

- A. Wire coding shall be insulation colors, painting, taping or precolored manufactured permanent plastic colors.
- B. Branch, feeder, and service colors 250 Volts and below shall be: Color/Phase
 - 1. BlackA or 1
 - 2. RedB or 2
 - 3. BlueC or 3 (where applicable) WhiteNeutral GreenEquipment Ground
 - 4. Yellow, orange, brownSwitch Legs
- C. Underground plastic tape shall be a minimum of 6-inches wide and shall be yellow in color with Danger: Electrical Cables Buried Beneath or a standard manufacturer's logo.
- D. Plastic Tags. Manufactured, preprinted, accident prevention, and operational tags. Approximately 3 by 5. Fasten with tye wraps or other nonconductive ties.
- E. Branch Circuit Color Coding ColorPhase
 - 1. BlackA or 1
 - 2. RedB or 2
 - 3. BlueC or 3 (where applicable) White Neutral GreenEquipment Ground

2.3 MEDIUM VOLTAGE CABLES/WIRING

- A. Wiring for branch circuits shall be THHN/THWN.
- B. Wiring pulled through wiring channels of continuous rows of fluorescent fixtures shall be THHN/THWN or silicone rubber with glass braid SFF-1.
- C. Feeders and service wires shall be THHN/THWN.

2.4 CONNECTORS

- A. Joints for wiring sizes #10 and smaller shall be made with insulated, compression, spring-type connectors that exert pressure on the conductors as they are turned into the connector.
- B. #8 and larger connectors shall be solderless type lugs where the tightening screw does not bear directly on the conductor. Mechanical compression type connectors may be used if installed with a tool designed for the purpose by the manufacturer of the connector.
- C. Some of the known manufacturers are, but not limited to, as follows: Anixter, Brand-Rex, Essex, American, Carol, Southwire and Triangle, Appleton, Burndy, Gould, Ideal, 3M, OZ Gedney, T&B.

2.5 RIGID CONDUIT

- A. Rigid conduit shall be ferrous galvanized inside and out. Fittings shall be ferrous galvanized threaded NEC standard elbows. Crouse Hinds, OZ/Gedney or Appleton condulets. Allied, Triangle, Wheatland, or approved equal. Rigid conduit may be used throughout and shall be used as follows:
 - 1. In all structural stub ups or stub downs or out of slabs, where damage is possible.
 - 2. In structural slabs
 - 3. In slabs on grade.
 - 4. In walls next to earth.
 - 5. Underground runs when PVC coated.
 - 6. Exterior runs.
 - 7. Where voltage exceeds 600V.
 - 8. Where hazardous conditions require.

2.6 INTERMEDIATE METAL CONDUIT

- A. Intermediate metal conduit and fittings as outlined in NEC Article 345 shall be ferrous and galvanized inside and out. The conduit shall use only approved ferrous threaded fitting couplings and connectors. Intermediate metal conduit may be used throughout except in the following locations:
 - 1. In wet or damp areas unless fittings are threaded and approved

2. In masonry load bearing walls unless fittings are threaded and approved
3. In structure slabs and slabs on grade unless fittings are threaded and approved
4. Where voltage exceeds 600V
5. Hazardous areas

2.7 EMT (ELECTRICAL METALLIC TUBING)

A. EMT may be used throughout except in the following locations:

1. Wet or damp areas
2. Where subject to mechanical hazards
3. In poured concrete load bearing walls
4. In structural slabs
5. In slabs on grade
6. In walls next to earth
7. Underground runs
8. Exterior runs
9. Over four inches in size

B. EMT shall be Bay State, Allied, Triangle, or approved equal. Fittings shall be UL approved, galvanized, set screw type, all steel devices. No indenter type fittings shall be used. Fittings shall be Appleton, T&B, Gedney, Raco, or approved equal.

2.8 FLEXIBLE METAL CONDUIT

A. Flexible conduit may be used as follows:

1. Fixture connections.
2. In stud walls.
3. In bar joist construction.

B. Flexible conduit shall not be used where nonflexible conduit is to be installed. See Section (Rigid Conduit). Flexible conduit shall be Electroflex, Bay State, AFC, or equal. Fittings shall be malleable compression type, all steel devices, as manufactured by Appleton, T&B, Raco, Gedney, or approved equal. Fittings shall be as approved by the National Electric Code and of such type as to provide an adequate ground connection.

2.9 LIQUIDTIGHT METAL CONDUIT

- A. Liquidtight metal conduit may be used where flexible metal conduit can be used and shall be used where flexible watertight connections are required to:
 - 1. Motors.
 - 2. Light fixtures.
 - 3. Weatherproof electrical equipment.
 - 4. When shown on the Drawings.
- B. Liquidtight conduit by Appleton, Anamet or Electroflex, or approved equal.

2.10 FASTENERS, SUPPORTS, AND HANGERS

- A. Utilize industry standards and adhere to NFPA 70: NEC.

2.11 ALUMINUM CONDUITS AND FITTINGS

- A. Aluminum conduits and fittings shall not be used. PVC rigid conduit shall be used only where shown on the drawings.

2.12 PVC CONDUITS AND FITTINGS

- A. Schedule 80 PVC conduit shall be used for underground applications only as noted on construction drawings.
- B. PVC conduit shall be Carlon or approved Equal.

2.13 RACEWAYS AND BOXES

- A. Outlet boxes, device boxes, floor boxes, and rain-tight outlet boxes shall be a manufactured item complete with accessories required to complete the installation.
- B. Junction and pull boxes may be either from a national or local manufacture of code-gage sheet steel with screw-on covers and welded seams.
- C. Some of the known manufacturers are, but not limited to, as follows: Adalet, Appleton Electric, Bel Electric, Midland Ross Corp., OZ Gedney, Pass and Seymore, Raco, Thomas and Betts, Midwest, Hoffman, Malton, GTE, Keystone, Lew, Steel City, Walker, Hubbell, Arrow Hart, Sq. D. Company.

2.14 LIGHTING

- A. See drawings for specified interior and exterior lighting fixtures.

2.14 SALVAGE MATERIALS

- A. All materials removed by this contractor shall be reviewed by the Owner. Materials not wanted by the Owner shall become the property of this Contractor and shall be removed by him from the premises. Material the Owner wants to keep shall be stored by him.

2.15 EXISTING WIRING AND EQUIPMENT

- A. The Contractor shall disconnect all electrical power and controls of existing equipment in the existing building to be relocated. The Contractor shall connect electrical power to all new and relocated Owner's equipment. Existing conduits may be used wherever possible. Wiring to be abandoned shall be disconnected from the power source. Electrical Contractor shall disconnect and remove all existing electrical devices and wiring in existing walls being removed.

PART 3 - EXECUTION

3.1 DESIGN

- A. Electrical shall be designed in accordance with the National Electrical Code for electrical safety in commercial occupancies using the following criteria:
 - 1. Adherence to design parameters defined herein is required to the extent that such parameters exceed or are more stringent than applicable codes and standards.
 - 2. Perform Electrical calculations for system designs according to NFPA 70: NEC requirements and other project requirements wherever applicable. Preserve all calculations as part of the record of design.
 - 3. Coordinate all Electrical equipment locations with all architectural and engineering disciplines and the work of all trades.

3.2 TRENCHING AND BACKFILLING

- A. Each Contractor shall perform his own excavation as necessary and required in compliance with the standards and the additional applicable requirements listed below.
- B. Excavation may be either by hand or by machine. Remove all stones, unsound material, and other foreign material from the trench bottom. Provide sheeting and bracing as required to hold walls of excavation. In the event bottoms are carried below grade, backfill to proper grade with sand at no expense to the Owner.
- C. Trenches for electrical conduits and cables shall have a minimum excavation depth to comply with the NEC or as shown on the Drawings or called out in the Specifications, the deepest depth shall govern, and shall be backfilled with sand or gravel 1/4-inch maximum dimension surrounding the conduit or cable 3 inches on all sides and thoroughly tamped in place.
- D. Place balance of excavated material, if sound, in 6-inch layers. Add berm for settlement.
- E. This backfill material shall be free of stones larger than 4 inches. Compact to 95 percent density of original soil. Use special care in excavating and backfilling under buildings where compaction shall be 98 percent of original soil. Add moisture if required to secure maximum consolidation.
- F. In the event unsound materials are excavated and cannot be reused for backfilling, the Contractor shall provide and install suitable backfilling materials. Excess material not used in backfilling shall be removed from the site by the Contractor.

3.3 CORE DRILLING WALLS/FLOORS

- A. Contractor shall provide all holes through walls, floors, and ceilings of existing construction necessary for the installation of new conduits. All holes shall be core drilled and of sufficient size to allow the conduit to pass through the opening.
- B. All conduit passing through these openings shall be sized for a snug fit around the conduit, or the openings are to be reduced by using grout or other cement type closing materials approved by the engineer. The grout shall be troweled smooth on both sides of the wall and primed for painting.

3.4 CUTTING AND PATCHING

- A. Each Contractor shall perform all cutting necessary to perform his Work and shall patch damaged Work. However, special permission shall be obtained from the Architect before cutting structural members or finished materials. All patching shall be performed in such a manner as to leave no visible trace and to return the part affected to the condition of undisturbed work. All conduit holes shall be core drilled in existing construction.

3.5 EQUIPMENT ACCESSIBILITY

- A. The Contractor shall locate all apparatus requiring adjustments, cleaning, or similar attention so that they will be readily accessible. This shall include access doors and panel of proper size for proper maintenance of various parts. Front top and side clearances to electrical equipment shall be in line with Article 110 NEC.

3.6 EQUIPMENT

- A. Unless otherwise specified, each Contractor shall make all connections of his trade to all installed equipment whether provided by himself or by other Contractors. Each Contractor shall leave proper connections for equipment furnished by them including flanges, etc. Connections size shall be as indicated but not smaller than equipment.
- B. Plumbing. All domestic water, waste, vent, and soil connections, including traps and fixture shutoffs, shall be made by the Plumbing Contractor.
- C. Steam, Condensate, and Heating Water. All steam, condensate and hot water connections, including equipment, unions, traps, and shutoffs shall be made by the Heating Contractor.
- D. Electrical. Unless otherwise specified, the Electrical Contractor shall:
 - 1. Perform all electric power wiring and make all electric power connections to all electrical equipment shown on the Electrical Drawings.
 - 2. Provide and install all starters, disconnects, and overload protection. See motor and equipment schedule.
 - 3. Provide and install all control wiring shown only on the Electrical Drawings. Other control wiring shall be by the Contractor requiring the same.
 - 4. Provide and install all interior and exterior lighting.

E. All Trades

1. Furnish and set all motors required for their equipment.
2. Submit a complete list and wiring diagrams to the Electrical Contractor and the Architect of all equipment showing the electrical characteristics.

F. Equipment Removal.

1. This Contractor shall disconnect and remove existing light fixtures, electrical equipment, wiring, as indicated on the Drawings or required to complete the Work and blank off all boxes that are not to be reused. Concealed Work not to be reused may be abandoned if disconnected from the electrical system.

3.7 COORDINATION OF WORK

- A. This Contractor shall coordinate the installation of all electrical equipment and appurtenances required for this Project with other Contractors to eliminate interferences. Installation shall be as shown on the plans unless the coordination between Contractors require minor deviations. These adjustments shall be made at no cost to the Owner. The Engineer shall be kept informed of all such deviations.
- B. Work or Supplies by Others. Others includes other Contractors or persons outside the specified scope of Electrical Contractor or electrical subcontractors; such as General Contractor, Mechanical Contractor, or Owner.

3.8 EXISTING CONDITIONS AND SERVICE INTERRUPTIONS

- A. When encountered in work, protect, brace, support, existing active services including, but not restricted to sewers, gas, electric, and other systems where required for proper execution of Work. If existing active services are encountered that required relocation, make request in writing for determination. Do not proceed with Work until written directions are received. Do not prevent or disturb operation of active services that are to remain.
- B. When encountered in Work, remove, cap, or plug inactive services. Notify utility companies or municipal agencies having jurisdiction; protect, or remove these services which will be shut down only during the time actually required to make necessary connections to existing Work.
- C. Where Work makes temporary shutdown of services unavoidable, shut down at night, or at such times as approved by Owner, which will cause least interference with established operating routine. Arrange to work continuously, including overtime, if required, to assure that services will be shut down only during the time actually required to make connections to existing Work.

3.9 TESTS, INSPECTIONS, AND ADJUSTMENTS

- A. Furnish all items and labor necessary for tests required in this division. The Contractor shall notify the Architect a reasonable period ahead of time before the tests are to be made. Concealed Work shall remain uncovered until required tests have been completed; but, if necessary, tests on portions of the Work may be made and these portions covered up after proving satisfactory. Tests shall be repeated after defects have been eliminated.

- B. Tests will be as prescribed by local, state, or national codes insofar as they apply. Where inspections are made by an enforcing agency, a copy of the Certificate of Compliance of Acceptance shall be forwarded to the Engineer before the final inspection will be made. Tests shall be made at the Contractor's expense. Each portion of work shall be subject to inspection of the Engineer at times he deems necessary for inspection of materials and construction and shall give instructions as he may consider requisite.
- C. Workmanship, materials, or equipment, either at the site or intended for it, are subject to inspection and approval of Engineer at any time. Contractor must render such facilities as engineer requires for inspection whatever they may be. Engineer may reject and require removal from premises any materials or work which he may decide to be contrary to the contract. The Engineer shall have the right to make minor changes as may be considered necessary by job conditions, where no change in cost is involved.
- D. At the time of final inspection of the work under the Contract, the Work covered by this division shall be complete in every respect and in perfect operating condition. All surplus materials of every kind shall have been removed.
- E. After final inspection is made, the Contractor shall receive a list of items requiring adjustment, correction, replacement, or completion. The Contractor shall comply completely with all the listed requirements.
- F. Test for opens, ground, and shorts of feeders and branch circuits at time of construction. All equipment shall be left in first-class operating condition. All outlets, switches, light fixtures, and devices shall be in first-class working order. Motors shall be tested for rotation at time of connections. Test all alarm systems. Test all intercom, call, and PA systems.
- G. All factory-assembled equipment shall be checked when being installed for loose, missing, or broken parts. Any items found loose shall be tightened and items found broken or missing shall be replaced all at no expense to the Owner. Contractor shall obtain and pay for Certification by State Electrical Inspector.

3.10 ROOF CURBS AND FLASHINGS

- A. The general Contractor will provide roof curbs and do all flashing for pipes, ducts, and conduits at the time the roofing material is installed providing conduit is in place at time of roofing; otherwise flashing will be responsibility of the Contractor.

3.11 STREET, SIDEWALK, AND CURB REPAIR

- A. Each Contractor will be responsible for the replacement of existing street pavement, curbs, sidewalks, etc., removed by him or damaged by him in the course of the Work. Pavement repairs shall be done as required by the Owner, state, or city; and the Contractor shall make the necessary arrangements to perform such repairs and shall pay all costs in connection with same unless such work is to be reconstructed under the General Contract.

3.12 PAINTING

- A. Unless otherwise specified, all finished painting will be done by the general Contractor. The Contractor shall provide preservation and prime coats. This Contractor shall paint all hangers, straps, braces, supports, and equipment requiring same installed by him immediately after installation with Rustoleum paint or equal. If equipment furnished by the Contractor has started to rust or is painted, equipment shall be repainted to the satisfaction of the Architect.

3.13 CLEANING

- A. Upon completion of work, all rubbish must be cleared away; all fixtures, panels, hangers, and trim, etc., shall be thoroughly cleaned and ready for use. All fingermarks around access doors and outlet openings shall be cleaned or repainted if the marks cannot be removed by cleaning.

3.14 FINAL INSPECTION

- A. When the Project is complete and prior to acceptance by the Owner, a final inspection will be held.
- B. Before final inspection is made, the Work shall be complete in accordance with plans and Specifications.
- C. When the Owner is notified in writing that the Work is complete, including the items noted on final inspection, a follow-up inspection will be made. The Contractor shall recognize the need for proper procedure and diligence for completing Work on time, including prompt attention to finishing and follow-up work.

END OF SECTION 260000

August 2024

Electrical

Power System

The power for the addition will be fed from a new 60A breaker in existing Panel located in the Library. The breaker will power a new 60A, 16ckt, 120/240V load center located in the addition. All feeders and branch circuits to be copper conductors in 3/4" or larger EMT.

Receptacles will be provided in the interior and on the exterior of the addition. Receptacle circuits will be fed by a 20A breaker with no more than 5 receptacles per circuit. Mechanical equipment will be powered, as required, by the equipment manufacturer. Disconnects and circuit protection will be provided as required by the 2023 NEC. Breaker size for mechanical equipment will be determined by the equipment manufacturer.

Lighting

Exterior building mounted LED light fixtures, one centered on each side of the addition, will be provided to illuminate the exterior of the grounds for security purposes. The exterior fixtures will be controlled by individual photocells.

Interior fixtures in the children's room will be pendant mount, globe style with integral LED boards and drivers. Fixtures in the breezeway will be 6" LED recessed cans. The restroom will have a fan/light combination fixture with additional wall sconces for adequate light. All light fixtures will be controlled per ASHRAE 90.1 Table 9.6.1.

Emergency lighting will be provided, where needed per code, by individual battery packs integral to the light fixture.

Low Voltage System – Telecom, Security, CCTV

The interior of the addition will be monitored by a security camera system. The cameras will provide 100% coverage of the interior of the addition. Cameras need to be compatible with the existing security camera system.

Data will be distributed throughout the addition from a centralized IT room. WIFI access will be provided throughout the addition.

Plumbing

Provide fixtures for the toilet room including a floor mounted tank type toilet, wall mounted lavatory, single handle faucet and a floor drain. All fixtures to be ADA compliant and include a tempered water thermostatic mixing valve at the lavatory. The domestic water supply lines shall be routed back to the existing building through the breezeway ceiling space, and down a furred-out wall in the existing building. Pipes to be 3/4" copper type L, soldered (95/5) joints or PEX ASTM F876 compliant, with Mineral-Fiber, Preformed Pipe, Type I, Grade A with factory applied ASJ: 1-1/2" thick insulation. Connect hot and cold water to existing lines in the basement that are at least 3/4". The contractor shall be responsible for locating and verifying existing domestic water line sizes to work with additional restroom. The floor drain, toilet, and lavatory sanitary waste lines shall be routed based on nearest location of existing waste lines and tied into existing pipe of at least 3". A floor drain shall be furnished in the mechanical closet. This waste should be furnished with schedule 40 PVC ASTM-D185 and D2665, 3" in size with a 1/8" per foot slope. A 3" vent through the roof shall vent the new plumbing fixtures. The contractor is responsible for locating existing waste lines and routing to the new restroom and mechanical closet locations in accordance to the 2018 Michigan Plumbing Code and manufacturer installation instructions. Contractor shall allow for owner approval on all plumbing fixtures.

Mechanical

The addition will be heated from a high efficiency natural gas furnace located in the mechanical closet. Furnace to be 1200 CFM, 70,000 BTU, heating only with minimum efficiency of 96%. Include a filter with rating of MERV-6 or higher. Provide an 8" outside air scuttle with manual damper connected to the return air duct in the mechanical closet. Maintain code compliant clearances between any vents. The combustion air and vent shall be routed through the exterior wall, terminated and sized per manufacturer recommendation, with PVC schedule 40, ASTM D1785 compliant. Place furnace on 2-1/2" masonry soaps on slab floor. Route condensate to floor drain.

The supply duct will be routed in a soffit running north/south down the center of the addition. Provide (4) steel 12x12 diffusers, two on the east and two on the west side with the first one a minimum of 1/2 way into the room. Provide volume dampers at each diffuser. The unit return air will be ducted, with two steel return grilles on the sidewall of the drop ceiling area, one on each side of the library room.

A 7-day programmable thermostat to be installed on the south restroom wall of the addition to operate the furnace, confirm location with owner. All ductwork within 25 feet of motors shall be lined with 1" Manville lino-coustic duct liner or equal, excluding outside air duct. Concealed supply ductwork to be insulated with 1-1/2" mineral-fiber blanket insulation with factory applied FSK jacket, and concealed outside air ductwork to be insulated with 2" mineral-fiber blanket insulation with factory applied FSK jacket.

Provide air balancing of systems upon completion and provide balance report to owner. Provide owner with O&M manuals and warranties for all equipment and fixtures. Install all mechanical equipment in accordance with the 2018 Michigan Mechanical Code and manufacturer installation instructions.

Contractor to furnish 3/4" gas line from existing meter, underground, popping up outside addition, and into to mechanical closet location. Contractor is responsible for any coordination with local utilities. The gas pipe material above ground shall be Schedule 40 black steel pipe, Type E or S, Grade B with malleable-iron threaded (ASME B16.3, Class 150, standard pattern) or wrought-steel welding (ASTM A 234/A 234M for butt welding and socket welding) fittings. Underground piping to be polyethylene compliant with ASTM D2513, SDR 11. Gas shutoff valve shall comply with ASME B16.33. A flexible appliance connector shall comply with ANSI Z21.24. Follow the 2021 International Fuel Gas Code for gas pipe routing and connections. Coordinate with owner for gas shutoff scheduling and implications.

Provide an exhaust fan/light combination for the toilet room with a minimum of 75 cfm that terminates through the roof or west sidewall with a wall cap and backdraft damper, maintaining code compliant clearances to any operable windows and/or outside air intakes.

The breezeway shall have a 3000-watt electric wall heater at 240V, 175 cfm or similar with integral thermostat. Locate unit in west wall of breezeway.

Mechanical Alternate

The addition will be heated from the existing hot water boiler in the basement of the existing library building. The new hot water supply and return will tie into the existing hydronic system in the library basement. A new hydronic loop and pump shall be furnished with 1" hydronic pipes routed from the basement, up the furred-out wall and through the breezeway ceiling space. The hydronic piping shall be Type L copper with 1-1/2" thick Mineral-Fiber, Preformed Pipe, Type I, Grade A insulation with factory applied ASJ. Circulator to be approximately 5 gallons per minute with 20 feet of head, using a 20 deg delta T.

A hydronic unit ventilator located in the drop ceiling near the entry of the addition, facing southward, will provide the required ventilation and heat. The unit ventilator shall be sized for 1200 cfm with 150 cfm of outside air. The outside air will be ducted from the unit towards the northwest corner of the addition, on the plan north wall. Install unit ventilator in accordance with manufacturer recommended access panels and clearances for service.

The supply duct will be routed in a soffit running north/south down the center of the addition. Provide (4) steel 12x12 diffusers, two on the east and two on the west side with the first one a minimum of ½ way into the room. Provide volume dampers at each diffuser. The unit return air will be ducted, with two steel return grilles on the sidewall of the drop ceiling area, one on each side of the library room.

A 7-day programmable thermostat to be installed on the south restroom wall of the addition to operate the unit ventilator, confirm location with owner. All ductwork within 25 feet of motors shall be lined with 1" Manville lino-coustic duct liner or equal, excluding outside air duct. Concealed supply ductwork to be insulated with 1-1/2" mineral-fiber blanket insulation with factory applied FSK jacket, and concealed outside air ductwork to be insulated with 2" mineral-fiber blanket insulation with factory applied FSK jacket.

Provide air and water balancing of systems upon completion and provide balance report to owner. Provide owner with O&M manuals and warranties for all equipment and fixtures. Install all mechanical equipment in accordance with the 2018 Michigan Mechanical Code and manufacturer installation instructions.

SECTION 312200 SITE PREPARATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Work shall be completed as described in this section and shall include the furnishing of all labor, material, equipment, and appurtenances to remove all tree stumps, trees, limbs, sod, topsoil, and rubbish from the construction area and dispose of said material in an approved manner and location. Stockpile topsoil on site, in an approved area, for later use during final grading and restoration. The Contractor shall furnish all labor materials, supplies, and equipment necessary to provide erosion and sediment control during construction of the facilities.
- B. Related Sections: Additional Sections of the Documents which are referenced in this Section include:
- 1) Section 015000 – Temporary Facilities and Controls
 - 2) Section 015713 Temporary Erosion and Sediment Control
 - 3) Section 329119 Topsoil
 - 5) Section 329113 Soil Preparation
 - 6) Section 329100 Landscape Site Preparation

1.2 REFERENCES

- A. General: The work shall comply with recent standards as published at the date of the contract and as listed in this specification. MIDOT requirements governing this section of the work shall apply. MIDOT in part pertaining to work included within the Contract Documents.

1.3 DEFINITIONS

- A. Clearing: Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.
- B. Grubbing: Grubbing shall consist of the removal and disposal of brush, stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas.
- C. Usable Topsoil: Topsoil to be stockpiled for restoration shall consist of friable clay loam, free from roots, stones, and other undesirable material and shall be capable of supporting a good growth of grass.
- D. Large Trees: Trees, limbs, and other timber having a diameter of 3 inches and greater shall be disposed of as saw logs, firewood, and other usable material.
- E. Brush: Brush and tree tops may be chipped, stockpiled, and used for mulch on the project.

1.4 QUALITY ASSURANCE

- A. Coordination: Coordinate clearing operations with Owner to limit clearing of all work areas.

1.5 PROJECT CONDITIONS

- A. Site Protection:
- 1) CONTRACTOR shall provide protection as necessary to prevent damage to existing site improvements or vegetation to remain in place as indicated on the plans.
 - 2) CONTRACTOR shall protect improvements on adjoining properties and on Owner's property.
 - 3) CONTRACTOR shall restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.

PART 2 - PRODUCTS

2.1 EROSION AND SEDIMENT CONTROL

1. General: All perimeter erosion control measures shall be installed prior to site disturbance.

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING

- A. Clearing: All trees, stumps, roots, brush, and other vegetation in the area shall be removed to a depth of 12 inches below finished grades, foundations or slabs unless otherwise indicated on the plans. All brush, small trees, limbs, sod or rubbish shall be removed from the site. See Section 312101 for additional requirements.
- B. Grubbing: Material to be grubbed, together with logs and other organic debris not suitable for foundation purposes, shall be removed to a depth of not less than 12 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this Contract, such as areas buildings, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground. See Section 312101 for additional requirements.
- C. Staking: Areas to be cleared shall be staked on the ground by the Contractor and approved by the Owner before clearing operations are begun. Contractor shall obtain services of a certified Engineer or Land Surveyor for purposes of facilities layout. Locations to be field staked by the Contractor and approved by Owner's Representative prior to any construction.

3.2 DISPOSAL OF MATERIALS

- A. Disposal: Carry out disposal of debris and unsuitable or surplus material in accordance with these specifications or as directed by the Architect. In all cases, the Contractor shall be responsible for obtaining a suitable and legal disposal site.
- B. Burning or Removing from Site: Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for any salable timber, shall be removed from the site by the Contractor and shall be disposed of legally off-site. No on-site burning shall be permitted.

3.3 DRAINAGE

- A. General: The Contractor shall be responsible for proper drainage of the site during construction of the project. Water shall not be allowed to accumulate in any of the excavated areas. Storm or ground water collecting on the site during construction shall be removed by pumping, ditching or other suitable means. See Section 015713 Temporary Erosion and Sediment Control for further requirements. Coordinate all activities to be in compliance. See Section 322573 for additional requirements.

3.4 STOCKPILING

- A. Topsoil: Topsoil shall be stripped from all excavation and fill areas and stockpiled in an approved area until needed for finish grading. Stockpiles shall be seeded within 10 days of construction. Perimeter silt fence shall be installed and also maintained around any on site stockpiles until mature vegetation is established on the stockpile.
- B. Spreading of Topsoil: The spreading of topsoil shall be done in accordance with Specification Section 029100 and as indicated on the Contract Documents. A minimum of four (4) inches of clean, deleterious free topsoil shall be brought to finish grades indicated. Supplant any approved stockpile materials as necessary to provide minimum coverages specified.
- C. Protecting Finish Grades: Contractor shall protect finish grades from heavy equipment and vehicle traffic once grading and topsoil application is completed. Repair as required to assure smooth contours, free of ruts.

END OF SECTION

SECTION 312219 FINISH GRADING

PART 1 - GENERAL

- 1.1 INCLUDED:** Work of this Spec Section generally includes finish grading for seeded, sodded or otherwise planted areas.
- 1.2 RELATED:** General and Supplemental Conditions and all of Division One Sections govern and are hereby made a part of all work of this Section.
- A. LANDSCAPE SITE PREPARATION: Spec SECTION 329100.
C. TOPSOIL: Spec SECTION 329119
- 1.3. JOB CONDITIONS:**
- A. Examine the site, determine the nature of conditions to be encountered and accept the site as found upon the examination.
- B. PROTECTION:
1. Carefully maintain and protect all bench marks, corner monuments and other points; if disturbed or destroyed, replace as directed and at the Contractor's expense.
 2. Report to the Owner's Representative any underground utilities which may be encountered.
 3. Provide for surface drainage during construction.
 4. Appropriate protective measures shall be taken to reduce dust, noise and damage.
 5. Have all utility lines and appurtenances located by the utility companies prior to beginning work.
 6. Coordinate with the Owner's Representative on earthwork sequencing and operations. Give advance notification to other contractors, utility companies and the Owner's Representative when doing work that affects their operations.
 7. All existing pavements, utilities, vegetation and structures to remain shall be protected at all times. Any damage caused by the Contractor shall be reported to the Owner's Representative. The damaged item or items shall be repaired or removed at the expense of the Contractor and shall be approved by the Owner's Representative.
 8. Maintain clean pavement for all adjacent parking lots, sidewalks and roads during entire project.

PART 2 - PRODUCTS

- 2.1 NOT APPLICABLE: Products do not apply to this Section of the work.

PART 3 - EXECUTION

3.1 GRADING:

- A. The Contractor shall do all finish grading on site in all planting areas as indicated on Drawings. Where no elevations are provided on the Drawings, the Contractor shall match the existing grade.
- B. Excavated and filled sections and adjacent transition areas shall be reasonably smooth, compacted and free from irregular surface changes.
- C. Obtain Owner's Representative's approval of the subgrade before commencing further improvements. Tolerances shall not exceed 3/4" above or below desired subgrade elevations in all areas to be graded.

END OF SECTION

SECTION 312300 EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

1. Work Included: Excavate and grade in the areas designated in the Contract Documents as shown on the grading plan and specified herein, which shall include but not be limited to, the following:
 - A) Excavation and site preparation.
 - B) Grading to establish subgrades for slabs, walks, pavements, gravel surfaces, planting, landscaped and grassed areas.
 - C) Excavation, filling and backfilling and compaction.
 - D) Dewatering or addition of water as required.
 - E) Placing of topsoil and finish grading.
2. Related Sections: Additional Sections of the Documents which are referenced in this Section include:
 - A) Section 312200 – Site Preparation

1.2 REFERENCES

1. General: The work shall comply with the most recent standards as published at the date of the contract and as listed in this specification using the abbreviations shown.
2. American Society for Testing and Materials (ASTM):
 - A) D 698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft)
 - B) D 1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
 - C) D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³)(2,700 kN-m/m³)
 - D) D 2167 Standard Test Method for Density and Unit Weight of Soil In Place by the Rubber Balloon Method
 - E) D 2216 Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
 - F) D 2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
 - G) D 2922 Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
 - H) D 2937 Standard Test Methods for Density of Soil in Place by the Drive-Cylinder Method
 - I) D 3017 Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
 - J) D 4318 Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.3 DEFINITIONS

- A. Controlled Fill: Controlled fill is fill required in all areas on which final grade is not placed on original excavated soil.
- B. Unclassified Excavation: For the purposes of bidding and payment, material shall not be classified except for those items specifically listed in the work required in Contract Documents.

- C. Rock: For the purposes of the Contract Document excavation, rock shall be defined as material that cannot be dislodged by a Caterpillar Model No. D-8N, heavy duty track-type tractor, rated at not less than 285 hp flywheel power and equipped with a single shank hydraulic ripper, capable of exerting not less than 45,000 lbs breakout force. Rock excavation includes up to 6 inches over-excavation below the required excavation depth. Excavated rock shall be quantified by measuring the volume of removed rock and reducing this amount by 35%. This definition of rock does not include materials such as hardpan, loose rock, concrete or other materials that can be removed by means other than drilling and blasting, but which for reasons of economy in excavating the Contractor chooses to remove by drilling and blasting.
- D. Trench Rock: For the purposes of the Contract Document excavation, trench rock shall be defined as material encountered in trench excavation that cannot be dislodged by a Caterpillar Model No. 215D-LC track-type hydraulic excavator, equipped with a 42-inch wide short-tip radius rock bucket, rated at not less than 120 hp flywheel power with bucket-curling force of not less than 25,000 lbs and stick-crowd force of not less than 18,000 lbs. Trench rock excavation includes up to 6 inches over-excavation below the required excavation depth. Rock shall be quantified by measuring the extent of rock in the trench, not by measuring the volume of removed rock. This definition of trench rock does not include materials such as hardpan, loose rock, concrete or other materials that can be removed by means other than drilling and blasting, but which for reasons of economy in excavating the Contractor chooses to remove by drilling and blasting.
- E. Unsuitable Material: For the purposes of Contract Document excavation, unsuitable material shall be defined as material below subgrade elevation that exhibits excessive pumping or that does not meet density requirements due to unsatisfactory material as determined by the Structural Engineer and the Geotechnical Engineer.
- F. Satisfactory Materials: Materials classified by ASTM D 2487 as GW, GP, GM, GC, SW, SP, SM, SC, ML, and CL are satisfactory as fill for overlot grading and are satisfactory in situations requiring construction design loads. Materials shall have a minimum compacted density of 95 pounds per cubic foot and a plasticity index in excess of 15.
- G. Unsatisfactory Materials: Materials classified by ASTM D 2487 as OL, OH, MH, CH, and PT are unsatisfactory as fill. Unsatisfactory materials also include those materials containing roots and other organic matter, trash, debris, frozen materials, and stones larger than 6 inches. Fill materials containing stones larger than 3 inches shall not be used in the uppermost 2 feet.
- H. Cohesionless and Cohesive Materials: Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the minus #40 fraction has a plasticity index of zero as classified by ASTM D 4318.
- I. Degree of Compaction: Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D 698 or ASTM D 1557 as specified, abbreviated below as a percent of laboratory maximum density.
- J. Topsoil: Material obtained from excavations, suitable for topsoils shall consist of friable clay loam, free from roots, stones, other undesirable material and shall be capable of supporting a good growth of grass.
- K. Geotechnical Engineer: A representative of a licensed, commercial geotechnical testing laboratory which will be used by the Owner Representatives to provide the required quality assurance testing.

1.4 SYSTEM DESCRIPTION

- A. Soil Bearing Capacity: Section 004330 Contains the Soil Investigation Report and provides soil bearing capacity as it pertains to test cylinder removed from field tests. Soil underneath all footings and structures shall have a minimum bearing capacity of 2000 pounds per square foot. Contractor shall familiarize themselves with this report and notify Civil/Structural Engineer of any irregularities and discovered anomalies in the report versus actual observation.

1.5 SUBMITTALS

- A. General: Submittals shall be in accordance with Division I requirements. Copies of all test results and field and office worksheets shall be furnished to the Owner Representative within 72 hours after the tests are complete.
- B. Test Reports: The testing agency shall submit the following reports, in duplicate, directly to Owner Representative from the testing services, with a copy to the Contractor.
 - 1) Test report on borrow material for soil classification.
 - 2) Field density reports and map of test location.
 - 3) One optimum moisture-maximum density curve for each type of soil used for controlled fill.
 - 4) Other reports of any testing hereinafter specified deemed necessary by Soils Engineer or requested by the Owner Representative.
 - 5) A test location plan shall be included with each submittal.

1.6 QUALITY ASSURANCE

- A. Geotechnical Engineer: The Contractor shall retain a licensed independent Geotechnical Engineer and Test Laboratory approved by the Owner to insure that earthwork meets the requirements of the specifications for density and moisture content. The Geotechnical Engineer shall attend the Pre-Construction Conference.
- B. Inclement Weather: When fill operations are ceased due to weather (rain, freezing, snow, etc.), construction shall not be resumed until the Geotechnical Engineer has verified soil strength has not been adversely affected. If soil strength has been decreased, the affected portion of fill shall be rescarified, moistened, or dried as required and recompacted to the specified density.
- C. Inspection: The Contractor shall conduct daily inspections and more often if necessary to verify that the specifications are being met for the installation of materials.
- D. Coordination: The Contractor shall coordinate the work with the Owner's Representative by notifying the Inspector of any scheduled work in advance. The Contractor shall coordinate work with other trades whose work will be affected on the site.
- E. Utilities: Prior to any excavation the Contractor shall verify the locations of all utilities which may be in the area. Contractor shall make all contacts with MISSDIG811 and adhere to all requirements.
- F. Drainage: The Contractor shall be responsible for the proper drainage of the site during construction of the project. Water shall not be allowed to accumulate in any of the excavated areas. Storm or ground water collecting on site during construction shall be removed by pumping, ditching, or other suitable means. Requirements of Section 015000 and Section 015713 shall apply.

1.7 PROJECT CONDITIONS

- A. Topographic Survey: Topographic information and boundary survey is contained in the Contract Documents and is the basis for guidelines contained therein.
- B. Test Borings: A subsurface investigation has been made at the site of the project in order to ascertain character of materials to be excavated. This information is provided in the Contract Documents for general information only. Attention is directed to the fact that these logs indicate materials encountered at boring locations only. Nothing in the plans or specifications shall be taken as a guarantee that materials other than those disclosed by borings will be encountered or that proportions of various materials will not vary from those indicated. If the Contractor has any questions or desires additional information it is their responsibility to acquire this information at their own expense. All excavation for project is to be considered and bid as "unclassified" and no allowances will be made for rock encountered or removal and replacement of unsuitable material.
- C. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
 - 1) Should uncharted, incorrectly charted, unmarked in field, or incorrectly marked in the field, piping or other utilities be encountered during excavation, Contractor shall consult the applicable utility

Owner immediately for directions. Contractor shall cooperate with Owner, their Representatives and all utility companies in keeping respective services and facilities in operation, and shall repair or arrange for repair, any damaged utilities to the satisfaction of utility owner.

- 2) Contractor shall demolish and completely remove all existing underground utilities as indicated on the plans and shall coordinate with utility companies for shut-off of services of all active lines located with the Construction Limits. Restoration of any temporary relocations shall be a part of this specification section.
- D. Blasting: Blasting will not normally be allowed nor required on this project. If permission to blast is granted following a written request, blasting shall be performed in compliance with the Occupational Safety and Health Standards for the Construction Industry, Subpart U. Damage of any nature resulting from blasting operations shall be satisfactorily corrected by the Contractor at no additional expense to the Owner.
- E. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights as deemed necessary.
- 1) The Contractor shall install, maintain and operate warning lights as recommended by local authorities having jurisdiction. It shall be the Contractors responsibility to verify and confirm any such requirements prior submitting their Bid.
 - 2) The Contractor shall protect structures, utilities, sidewalks, pavements, trees and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations, inclusive of personnel and equipment.
 - 3) The Contractor shall protect, maintain and restore bench marks, monuments, and other reference points affected by this work. If bench marks, monuments or other permanent reference points are displaced or destroyed, these points shall be re-established and markers reset by a Michigan licensed Land Surveyor at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials: All fill materials shall be free from mud, refuse, construction debris, organic material, rock or gravel greater than 6 inches in any dimension, frozen or otherwise unsuitable, deleterious material. Materials for fills shall meet **MIDOT Specification for Granular Material** and be secured from excavation after rejection of any unsuitable materials. Materials from other sources may be used upon approval by the Geotechnical Engineer. Fill materials in the uppermost 2 feet shall not have any rocks larger than 2 inches in diameter. Locations of material is as follows:
1. FOUNDATION WALLS: MIDOT. At perimeter of all foundation lines. Compaction shall be in 12 inch lifts and achieve compaction of 95% Modified Proctor. ASTM D 1557/AASHTO T180.
 2. FLOOR SLABS: MIDOT - beneath slab and over vapor barrier. Compactable. Use of MIDOT Binder Soil is permitted to achieve density test of 95% Modified Proctor – ASTM D 1557/AASHTO T180.
 3. DRAINAGE FILL: MIDOT – located as detailed. Building perimeter at footing line, 24 inches above footing bottom, set in 12 inch lifts, each side of foundation wall. Filter fabric above final layer.
- B. Borrow: Material for use in replacing undercut areas or in construction of embankments shall be approved by the Geotechnical Engineer and obtained from approved sources. MIDOT.
- C. Rock: Rock shall be removed to a minimum depth of 12 inches below the subgrade elevation. The excavated area shall be brought up to subgrade with approved material placed and compacted as described herein. Other applicable specifications are listed in MIDOT concerning undercutting rock.
- D. Unsuitable Materials: Areas that exhibit excessive pumping or that do not meet density requirements due to unsuitable materil or failed compaction test as determined by Geotechnical Engineer, shall be undercut and replaced with approved material in accordance with PART 3, EXECUTION.

PART 3 - EXECUTION

3.1 TOPSOIL

- A. Conservation of Topsoil: Topsoil shall be removed as required without contamination with subsoil and stockpiled convenient to areas for later application or at locations specified. Any surplus of topsoil from excavations and grading shall be stockpiled in location approved by the Owner. A silt fence shall be installed on the downslope side and the stockpiles seeded.
- B. Placing Topsoil: On areas to receive topsoil, the compacted subgrade shall be scarified to a 2 inch depth for bonding of topsoil with subsoil. Topsoil then shall be spread evenly and graded to the elevations and slopes shown. Topsoil shall not be spread when frozen or excessively wet or dry. All areas disturbed by work in this project shall be seeded in accordance with Section 02921 - Seeding.

3.2 EXCAVATION

- A. Excavation: After topsoil removal has been completed, excavation of every description, regardless of material encountered, within the grading limits of the project shall be performed to the lines and grades indicated. Satisfactory excavation material shall be transported to and placed in fill areas within the limits of the work. All unsuitable material including any soil which is disturbed by the Contractor's operations and any surplus material shall be disposed of at locations off site, as secured by Contractor and approved by the Owner. Excavations carried below the depths indicated, shall, except as otherwise specified, be refilled to the proper grade with satisfactory material as directed. All additional work of this nature shall be at the Contractor's expense. Excavation and filling shall be performed in a manner and sequence that will provide drainage at all times. Excavations shall be kept free from water while construction is in progress. If the Contractor fails to provide adequate drainage and any material becomes soft or otherwise unsuitable as a result, such material shall be removed and replaced with satisfactory on-site material or borrow material from approved sources, or shall be dried and recompacted as directed by the Geotechnical Engineer at no additional cost to the Owner.
- B. Excavation for Structures: Excavation shall be performed as indicated on the Contract Documents. Lines shall be straight, true and level in accordance with elevations indicated on the Contract Documents. Excavations shall meet industry and OSHA standards for slope and angle for the depths required.
- C. Excavation for Utilities: Trench excavation shall be performed as indicated on the Contract Documents. Lines shall be straight, true and level in accordance with elevations indicated on the Contract Documents. Excavations shall meet industry and OSHA standards for slope and angle for the depths required. Verify locations, distances and depth required. All excavations under this section shall be maintained until final acceptance of the work. Satisfactory material excavated from ditches and channel changes may be placed in approved fill areas. Unsuitable and excess material shall be disposed of in designated waste areas or as directed.
- D. Ditches: Ditches indicated on the Contract Documents which are disturbed, or to be maintained shall have all roots, stumps, rock, and foreign matter in the sides and bottom of ditches trimmed and dressed or removed to conform to the slope, grade, and shape of the section indicated. Care shall be taken not to excavate ditches below grades indicated. Excessive ditch excavation shall be backfilled to grade with compacted material or stone cobble to form an adequate gutter paving as directed. Any ditches excavated under this section or shown on the Contract Documents shall be maintained until final acceptance of the work. Satisfactory material excavated from ditch changes shall be placed in approved fill areas. Unsuitable and excess material shall be disposed of as directed.
- E. Unauthorized Excavation:
 - 1) Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific instruction from the Owner, his Representative or the Geotechnical Engineer.
 - 2) Under footings or foundations, fill unauthorized excavations by extending the indicated bottom elevation of the footing or base to the unauthorized excavation bottom, but in no way altering the required top elevation. Maintain and assure design bearing capacities are maintained.
 - 3) Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations, unless otherwise directed by the Geotechnical Engineer.

- F. Stability of Excavations: Maintain sides and slopes of excavations in a manner such that the excavation provides safety of personnel, protection of work, and compliance with requirements of governmental agencies having jurisdiction.

3.3 FILL

- A. Preparation of Ground Surface for Fill: All vegetation such as roots, brush, heavy sods, heavy growth of grass, and all decayed vegetative matter, rubbish, and other unsatisfactory material within the area upon which fill is to be placed, shall be stripped or otherwise removed before the fill is started. In no case will unsatisfactory material remain in or under the fill area. The areas shall then be scarified to a depth of at least 6 inches, moistened or aerated as required and compacted with vibratory rollers, pneumatic rollers, sheepsfoot rollers or other mechanical means acceptable to the Geotechnical Engineer. Sloped ground surfaces steeper than one vertical to four horizontal on which fill is to be placed shall be plowed, stepped, benched, or broken up, as directed, in such manner that the fill material will bond with the existing surface. Prepared surfaces on which compacted fill is to be placed shall be wetted or dried as may be required to obtain the specified moisture content and density.
- B. Fills and Embankments: Fills and embankments shall be constructed at the locations and to lines and grades indicated. The completed fill shall conform to the grading plan indicated. Approved material obtained during excavation may be used in forming required fill. Fill shall be satisfactory material and shall be free from roots, other organic material. No frozen material will be permitted in the fill. Stones having a dimension greater than 2 inches shall not be permitted in the upper 2 feet of fill or horizontal embankment. The material shall be placed in successive horizontal layers of 12 inches in loose depth for the full width of the cross section and shall be compacted as specified. Each layer shall be compacted before the overlaying lift is placed. Moisture content of the fill or backfill material shall be adjusted by wetting or aerating as necessary to provide the moisture content specified.
- C. Backfilling Structures: Backfilling for structures shall be conducted in 12 inch lifts of the specified materials. Maintain moisture content and meet or exceed recommended density specifications..

3.4 COMPACTION

- A. Subgrade Compaction: The cut subgrade material shall be compacted to 100 percent of its maximum dry density as determined by ASTM D 698. The moisture content should be within +/-5 percentage points of the material's optimum as determined by ASTM D 2216.
- B. Compaction: Each layer of the fill shall be compacted to at least 95% Modified Proctor – ASTM D 1557/AASHTO T180. Moisture content shall be within +/-2 percent points of optimum as determined by ASTM D 2216. The top 1-foot of fill under pavement areas shall be compacted to 98 percent of maximum dry density as determined by ASTM D 698.

3.5 FINISHED GRADES

- A. General: All areas covered by the project, including excavated and filled sections, as well as, adjacent transition areas, shall be uniformly smooth-graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes, tire tracks, ruts and equipment depressions. The degree of finish shall be that ordinarily obtainable from blade-grader operations, except as otherwise specified. Ditches shall be finished to permit adequate drainage.
- B. Unsatisfactory Material: Soft or otherwise unsatisfactory material shall be replaced with satisfactory excavated material or other approved materials.
- C. Finished Elevations: Low areas resulting from removal of unsuitable material or from excavation of any rock shall be brought up to required grade with satisfactory materials, and the entire area shall be shaped to line, grade, and cross section and shall be compacted as specified. The surface of embankments or excavated areas for road or driveway construction or other areas on which a base course or pavement is to be placed shall vary not more than 0.10 feet from the established grade and approved cross section. Surfaces other than those to be paved shall be finished not more than 0.20 feet above or below the established grade or approved cross section.

3.6 PROTECTION

- A. Site Preservation: The Contractor shall protect newly graded areas from traffic and from erosion, and any settlement or washing away that may occur from any cause, prior to acceptance. Any damage shall be repaired and grades reestablished to the required elevations and slopes. All work shall be conducted in accordance with the Erosion Control provisions of these specifications.
 - B. Seeding: All areas disturbed by work in this project shall be seeded in accordance with Section 02921 - Seeding.
- 3.7 FIELD QUALITY CONTROL
- A. Testing: Testing shall be the responsibility of the Contractor and shall be performed by an approved commercial testing laboratory qualified to perform such tests and approved by the Owner. Tests conforming to ASTM Standards shall be made by the Geotechnical Engineer or his representative on each soil type found in the areas prepared to receive fill and in the soil to be used for fill. Field Density tests shall be made by the Geotechnical Engineer or his representative in accordance with ASTM D 1556 or ASTM D 2922 and ASTM D 3017 on the areas prepared to receive fill and on each layer of compacted fill. Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Owner. At least two compaction test per lineal run of foundation wall, each side, shall be performed on the compacted backfill. More tests shall be performed if in the judgment of the Inspector or Owner the compactive effort of the Contractor will not result in the specified density. In the event of a failed density test, the Contractor, at his expense, shall correct the deficient area and retest. Repeat until compliant.
 - B. Testing Frequency: The following submittals are required.
 - 1) A minimum of two moisture-density test shall be performed for each classification of fill material, and existing subgrade material.
 - 2) One Atterberg limits test and one gradation analysis is required for every six field density tests.
 - 3) Field density tests shall be performed as follows: a minimum of one test per lift per 5,000 square feet or fraction thereof is required for fill material and a minimum of one test per lift per 5,000 square feet or fraction thereof is required for subgrades prior to filling.
 - C. Visual Inspection: Upon completion of all excavation of unsuitable material, and for all footings, the Geotechnical Engineer shall visually inspect the subgrade and excavations. The visual inspection shall be conducted to assure that the data obtained from the test borings and used as a basis of design was representative of the site conditions. Upon completion of the inspection, the Geotechnical Engineer shall provide written notification to the Owner and his representatives.
 - D. Proof Rolling: Following visual inspection, Contractor shall demonstrate to the Geotechnical Engineer that the exposed subgrade does not contain previously unidentified soft areas by proof rolling. Proof rolling shall consist of rolling the entire surface with approved mechanical equipment while observing the subgrade for displacement or deformation. Density tests shall be conducted on suspicious areas and corrective measure shall be taken. At no additional cost to the Owner, Contractor shall correct and assure rolled areas meet or exceed intended design limits of the Contract Documents.

END OF SECTION

SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Traffic Paint Striping.
 - 2. Traffic Paint Logos.
- B. Related Sections:
 - 1. Contract, General, Supplementary and Other Conditions of Division 00, the General Requirements Sections of Division 01 and the Plans apply to the Work of this Section.

1.2 REFERENCES

- A. Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD).
- B. Minnesota Department of Transportation (MnDOT) Standard Specifications For Construction.
- C. United States Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices (MUTCD).

1.3 SUBMITTALS

- A. Submit schedule indicating Work sequence.
 - 1. Coordinate the schedule to allow sufficient time for required testing, inspections, and installation of work of Related Sections.
- B. Submit for all materials under the provisions of Division 01 sections.
 - 1. Submit product data for all materials required for a complete installation prior to installation demonstrating that materials meet the specifications.
 - 2. Submit manufacturer's installation instructions and recommendations prior to installation.
- C. Submit observation reports.

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen under the supervision of a Project Manager who is experienced in the necessary crafts required for proper performance of the Work Qualifications:
 - 1. Project Manager shall be completely familiar with the specified requirements.
 - a. Project Manager shall be authorized to render decisions on behalf of the Contractor.
- B. Use equipment adequate in size, capacity and number to accomplish the Work in a timely manner.
- C. Conform to applicable Minnesota State Statutes and Rules, MnDOT Specifications, and local codes and ordinances for performance of Work, dewatering, transport and disposal of excess material, dust and run-off control, and emergency access to the site.
- D. Obtain all necessary permits.
 - 1. Comply with permit requirements.
 - 2. Provide an approved traffic control plan as required.
 - 3. Provide for coordination of any required inspections by permitting authority.

1.5 PROJECT CONDITIONS

- A. Instruments of record including, but not limited to; studies, reports, facility condition assessments, surveys, or plans; furnished with the Project Manual, Project Plans or available for inspection at the office of the Property Manager are made available for information only and are not guaranteed to be inclusive.
- B. Contractor is to perform verification of existing site conditions.
 - 1. Contact Gopher One-Call online, at 811, at (651) 454-0002 or (800) 252-1166 to arrange for utility location services 48 hours minimum prior to performing any work on site.
 - 2. Request any available private utility information from Property Manager/Owner/Engineer/Architect for assessment of irrigation, electrical, and/or other utilities as to best knowledge of Owner's representative.
 - 3. Perform minor investigative excavations to verify location of various existing underground facilities at sufficient locations to assure that no conflict with the proposed work exists and sufficient clearance is available to avoid damage to existing facilities.
 - 4. Upon discovery of conflicts or problems with existing facilities, notify Owner's authorized representative.
 - a. If requested, follow notification with letter and diagrams indicating conflict or problem and sufficient measurements and details to evaluate.
- C. Contractor is to repair or replace any damaged utility line or structure at no additional cost to the Owner.
- D. Maintain benchmarks, monuments or other reference points.
 - 1. If benchmarks, monuments and other reference points are disturbed or destroyed, benchmarks, monuments and other reference points shall be replaced or relocated by a Licensed Land Surveyor.
 - 2. Cost of replacing or relocating benchmarks, monuments and other reference points shall be incidental to the project.

1.6 SEQUENCING

- A. Conduct operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied facilities.
 - 1. Do not close or obstruct roadways or sidewalks without permits.
 - 2. Provide traffic control and/or alternate routes if required.
 - 3. Maintain access to adjacent areas at all times.
 - 4. Provide facility parking as requested by Owner's representative.
- B. Contractor to provide notification:
 - 1. Provide proper advance notification to regulatory authorities in accordance with applicable code and permit requirements for observation and inspection.
- C. Obtain prior written approval from the Owner and/or regulatory authorities before deviating from the following sequence of initiation of work elements:
 - 1. Do not begin work until applicable permits are issued by authorities having jurisdiction.
 - 2. Conduct pavement marking operations.
 - 3. Remove debris and clean up site.

1.7 SCHEDULING

- A. Coordinate the schedule for pavement marking Work necessary to maintain the Critical Path for subsequent Work specified in related sections.

- B. Obtain necessary permission from Owner and/or regulatory authorities for Work that must be performed outside of normal work hours, on weekends, or over holidays, either as necessary to minimize the impact of temporary shutdown of utility services and traffic, or for the Contractor's convenience.
- C. Coordinate the schedule to provide for the Owner's continuing operations on or adjacent to the site.

1.8 WARRANTY

- A. Provide one year written warranty for all materials and workmanship against defects after completion and final acceptance of the Work under the provisions of Division 01 sections.
- B. Defects due to faulty materials or workmanship developed during the warranty period shall be satisfactorily repaired or replaced at the Contractor's expense.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The Contractor is responsible for determining the quantities of material necessary for completing the Work.
- B. Unless otherwise indicated, all required materials shall be furnished by the Contractor.
- C. Materials required for this Work shall be new material conforming to the requirements of the referenced Specifications for the class, kind, type, size, grade and other details indicated in these Specifications or on the Plans.

2.2 PAVEMENT MARKING PAINT

- A. Subject to compliance with requirements, provide products from one of the following manufacturers:
 - 1. J.E. Bauer Company – “Traffic Paint.”
 - 2. Tnemec – “Traffic Paint.”
 - 3. Glidden-Durkee – “Romark Traffic.”
 - 4. PPG – “Traffic & Zone Marking Paint.”
- B. Provide paint specifically formulated for use as exterior pavement marking paint in traffic areas, and in the colors selected by the Owner from the manufacturer's standard color range.

PART 3 – EXECUTION

3.1 LANE STRIPING AND HANDICAPPED MARKINGS

- A. Provide paint striping and handicap logos as indicated on the Plans, per MN MUTCD and per manufacturer's instructions.
- B. Sweep the pavement surface to be painted with a power broom, supplemented by hand brooms, to remove loose material and dirt.
- C. The marking lines shall be four inches wide unless shown otherwise on the Plans.
 - 1. The parking stalls shall be the width and length called for on the Plans.
 - 2. Paint the International Wheelchair Symbol of Accessibility in each handicapped parking stall.
 - 3. The painted symbol on the pavement shall be in accordance with the state code requirements.
- D. Apply the paint with mechanical equipment.

1. Provide uniform straight edges.
2. Apply two separate coats in accordance with the manufacturer's recommended rates.

3.2 PROTECTION

- A. Immediately after placement of marking paint, provide traffic cones, barricades and other devices needed to protect marking paint from mechanical injury for a minimum of 24 hours.

3.3 CLEANING

- A. When marking paint is thoroughly dry, visually inspect the entire application.
 1. Touch up paint as required to provide clean, straight lines and surfaces throughout.
 2. Using a permanently opaque paint identical in color to the surface on which the paint was applied, block out and eliminate all traces of splashed, tracked and/or spilled pavement marking paint from the background surfaces.

END OF SECTION 321723

SECTION 329100 SITE PREPARATION

PART 1 - GENERAL

1.1 SCOPE:

- A. Work included in this spec section generally includes all materials, labor, equipment, and incidentals for the completion of work shown on the Drawings, Specification and/or otherwise required herein.
- B. Site preparation includes but is not limited to existing survey, examination of site, marshaling and access, construction layout, clearing, grubbing, topsoil stockpiling, erosion control, dust control, site protection and protection of all site elements remaining.

1.2 RELATED: General Requirements Division One of this Project Manual governs and is hereby made a part of this section.

- A. 312219 FINISH GRADING.
- B. 329113 SOIL PREPARATION.

PART 2 - PRODUCTS

2.01 NOT APPLICABLE - Products do not apply to this Section of the work.

PART 3 - EXECUTION

3.1 EXAMINATION OF THE SITE: The Contractor shall visit, inspect and thoroughly familiarize himself with the site and with the scope of work to be done under his Contract.

3.2 ACCESS: The Contractor shall meet with the Owner's Representative to determine the point of access and areas to be utilized in executing the work. The Contractor shall limit his access to the job site to approved areas.

3.3 PREPARATION: Before commencement of any excavation operations this contractor shall remove from the site organic material, trash and debris, to the extent existing on the construction areas; however, payment request(s) will not be recognized for unauthorized clearing and grubbing in or outside of the construction limits defined on the Drawings.

3.4 CONSTRUCTION LAYOUT:

- A. Contractor shall refer to Construction Documents for all layout work. This includes but is not limited to sidewalks, railings, gates, and site furnishings.
- B. The Contractor shall establish and record all necessary boundary points, lines, elevation, grades and bench marks on site for proper control, coordination with subcontractors and execution of the work. The Contractor or his surveyor shall verify all furnished survey and topographic data and all points, lines and elevations, including elevations at the bases of existing trees which are to remain; the Contractor shall notify the Owner's Representative of any discrepancies between information given on drawings and actual site or field condition and shall not proceed with any affected work until the Owner's Representative issues instructions.

3.5 TOPSOIL: Topsoil is defined as friable loam surface soil found to a depth approximating 4". Satisfactory topsoil is reasonably free of subsoil, lumps, stones and other objects over 1" in diameter; without weeds, roots, other objectionable material. Landscape Architect to approve the topsoil to be reused.

- A. STRIPPING: Unless otherwise recommended in Soil Report, strip topsoil, if existing, from area(s) to be graded, to whatever depths encountered in manner to prevent intermingling with underlying subsoil or other objectionable material.
- B. STOCKPILING: Stockpile topsoil in storage piles in on-site areas where directed by the Owner's Representative, for use in sod and planting areas. Construct storage piles to freely drain surface water. Prevent / contain erosion from water by covering and erection of silt fencing around stock piles. Cover storage piles if required to prevent windblown dust.

3.6 JOB SITE CONDITIONS:

- A. WORK BY OTHERS: Primary electric, gas and telephone service is normally provided by the local utility companies; however, contractor(s) involved with these particular services shall verify, coordinate and assume responsibility with local Utility Company or Department for provision of proper and adequate temporary and permanent utility service.
- B. PROTECTION:
 - 1. PEOPLE AND PROPERTIES: Contractor(s) shall, in accord with local laws and regulations, adequately protect persons and properties from being damaged by work of this contract. Contractor(s) shall provide proper and sufficient barricades for safety and protection of persons for this work and adjacent properties during and after work hours.
 - 2. TREES AND SHRUBS: Existing trees and shrubs to remain or to be relocated shall be protected from operations related to site construction work.
 - a. Trees to remain are to be protected with approved fencing. Fencing for both deciduous and evergreen trees to include all areas within the drip lines.
 - b. Areas within the drip line of existing or relocated trees shall not have any stockpiling of materials, equipment or machinery. Grading shall not be allowed unless indicated on plans; nor will the passage of equipment such as trucks, compressors or heavy wheel driven machinery be allowed.
 - c. Damage & Repair - Retained trees or shrubs that are damaged or disturbed shall be immediately repaired or replaced if necessary by and at cost to the party responsible for the damage.
- C. DUST CONTROL: Work of this contract includes dust control as required for alleviation or prevention of dust nuisance on or about the site. Contractor(s) shall assume all liability, including court costs of codefendants, for claims related to dust or windblown materials that are attributable to this work.
- D. DRAINING: Contractor(s) shall provide for surface drainage during construction period in manner to avoid creating a nuisance to adjacent areas. Excavations, pits, trenches and sub-grade area(s) shall be kept free of water during entire progress of the work by providing and operating pumps or other equipment necessary to drain. Water shall not be discharged onto adjacent public or private properties without written permission from adjacent property owner(s).
- E. CLEANUP shall be in accord with the General Conditions and Requirements.
 - 1. ROADWAYS: Public or private ways, highways, roads, streets, alleys, drives, parking areas used as access or egress to or from the site shall be kept free from materials falling from trucks or carried to such ways on tires. Cleaning of roadways shall be done promptly and to satisfaction of Owner's Representative and public or private authority having jurisdiction.
 - 2. GROUNDS: Contractor shall clean-up and remove all debris related to construction related activities. Broom clean all walks and drives of excess soils and overburden. Use high pressure water spray as required to removed tamped or compacted materials from walks and roads.

END OF SECTION

SECTION 329113 SOIL PREPARATION

PART 1 - GENERAL

- 1.1 INCLUDED** - Work of this Spec Section generally includes provisions for soil preparations on areas to be sodded, or otherwise planted as part of earthwork operations.
- 1.2 RELATED** - General and Supplemental Conditions and all of Division One Sections govern and are hereby made a part of the work of this Section.
- A. FINISH GRADING: Spec SECTION 312219
- B. TOPSOIL: Spec SECTION 329119
- 1.3 DELIVERY/STORAGE/HANDLING** - Deliver, unload, store, and handle materials and products in dry, weatherproof, waterproof condition in manner to prevent damage, breakage, deterioration, intrusion, ignition, or vandalism. Deliver materials and products in original unopened packaging containers prominently displaying manufacturer name, proprietary, volume, quantity, contents, instructions, conformance to local, state, and federal law. Remove and replace, at the Contractor's cost: cracked, broken, spoiled, or contaminated items; and corrosive elements prematurely exposed to moisture, inclement weather, snow, ice, temperature extremes, fire or jobsite damage.
- A. SOIL AMENDMENT shall be delivered to site in bulk, measured on volume basis.
- B. DELIVERY & INSPECTION - Notify Owner's Representative of delivery schedule in advance so material may be inspected upon arrival at jobsite. Unaccepted material shall be removed immediately from jobsite.
- 1.4 SUBMITTALS:**
- A. A sample of the proposed soil amendment shall be submitted to the Owner's Representative for approval.
- B. Soil test results

PART 2 - PRODUCTS

2.1 SOIL AMENDMENTS:

- A. CHEMICAL FERTILIZER – Fertilizer shall be in slow-release granular form.
1. Contractor shall apply fertilizer in strict conformance with manufacturer's instructions.
 2. Add fertilizer to topsoil and planting areas at a rate as recommended by the results of the required soil tests.
 3. Mix into topsoil or planting soil as instructed.
 4. Any fertilizer falling on paved areas shall be promptly cleaned up.
 5. Contractor shall clean up any spills immediately.

PART 3 - EXECUTION

- 3.1 PREPARATION & TILLING OF BLUEGRASS SEEDED AREAS** - Upon completion of rough grading, soil surface shall be loosened by rototilling to minimum depth of 6", and materials over 1" in diameter shall be removed. Spread 4" topsoil evenly over sod area and mix thoroughly into soil surface to minimum depth of 6" by means of rototiller or soil mixer (rippers, discs, chisel plows, are not acceptable). After completion of soil loosening and mixing, spread chemical fertilizers evenly over surface at rate recommended by the soil test results and lightly mixed into soil surface. Surface shall then be finish graded to appropriate elevations and compaction.

END OF SECTION

SECTION 329119 TOPSOIL

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The Conditions of the Contract and the Provision of Division 01 apply to all work of this Section.
- B. This Section includes all labor, material and equipment necessary for furnishing and placing topsoil borrow over areas to receive future sod and plantings.
- C. Related Work Specified Elsewhere:
 - 1. Finish Grading: Spec SECTION 312219
 - 2. Sodding: Spec SECTION 329223

1.2 SUBMITTALS

Submit 1/8 cubic foot sample of topsoil to be used for Owners Representative for approval prior to placing any topsoil.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Topsoil Borrow - conform with MIDOT (or approved equal), Topsoil Borrow for class A Topsoil to be used as a turf growing medium. Coordinate furnishing and placing with other operations. Owner Representative shall be informed of commencement of this portion of the work.
- B. Note - If topsoil can be salvaged from the construction area, Landscape Architect and the Owner Representative shall be consulted for permission to use the topsoil.
- C. Coordinate furnishing and placing with other operations.
 - 1. CONTRACTOR shall provide following information:
 - a. TEST RESULTS showing mixture of composition and analysis.
 - b. LOADING TICKETS showing amounts of topsoil delivered to the site.
 - c. TESTS shall be by qualified soils laboratory, in accord with accepted soils amendments testing procedures, and shall be at Contractor expense.

PART 3 - EXECUTION

3.1 EXAMINATION OF SURFACES

- A. Before starting any work under this section this contractor shall examine the areas that are to receive his materials and report any deficiencies to the Owners Representative in writing. Examination shall look for any irregular or settled subgrade surfaces, soft spots or settlements causing unsatisfactory surface drainage. Such deficient areas shall be corrected by the General Contractor before any work begins. Starting of any work by this contractor shall imply his acceptance of the surfaces as suitable to receive his materials.

3.2 INSTALLATION

- A. Conform with
 - 1. Conform to MIDOT(or approved equal), Finishing Operations for placing and finish grading topsoil.
 - 2. Coordinate furnishing and placing with other operations.
 - 3. Upon completion of rough grading, soil surface shall be loosened by rototilling to minimum depth of 6", and materials over 1" in diameter shall be removed.
 - 4. After completion of sub-grade preparation, place minimum 4" settled measure depth of topsoil over entire area. Smooth grade to within 3/4" of finish grade after settlement to eliminate irregularities and to match adjacent pavements and walks. Intermix topsoil with loosened sub-grade by means of a rototiller.

END OF SECTION