June 4, 2012

50% CONSTRUCTION DOCUMENTS

SPECIFICATIONS FOR
PIMA COUNTY COMMUNITY COLLEGE DISTRICT

Northwest Campus
New Building Expansion Project
7600 North Shannon Rd
TUCSON, AZ 85709

VOLUME 1

Facilities Planning Project # 09- 013

Pima County Community College District
Facilities Division
Facilities Operations & Construction
6680 South Country Club Road
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<th>Plan/Spec Ref. No.</th>
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<th>Reviewer</th>
<th>Response/Action Taken</th>
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<tr>
<td>G1.1</td>
<td>Incorporate general notes provided by PCC; change Fire Code reference to NW Fire District</td>
<td>Ernie EH&amp;S</td>
<td>PCC notes have been incorporated into G1.1 NW Fire District has been referenced</td>
</tr>
<tr>
<td>E2.1</td>
<td>Locate annunciator panel in Fire Riser room</td>
<td>EH&amp;S</td>
<td>Annunciator panel will be located in Fire Riser room for next submittal</td>
</tr>
<tr>
<td>Special Systems Spec</td>
<td>Remove vandall shields from FA pull stations</td>
<td>EH&amp;S</td>
<td>Vandal shields have been removed from FA pull stations</td>
</tr>
<tr>
<td>G1.2</td>
<td>Does Chemical Storage req. 1-Hr Rating?</td>
<td>EH&amp;S Ernie</td>
<td>IBC does not require 1HR rating, however, it does require a smoke barrier for this space</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Add dedicated split system for Chemical Storage room 307 for use after hours Leave exist. split system in room E307 - verify capacity for Autoclave room</td>
<td>EH&amp;S</td>
<td>Dedicated split system for 307 has been provided. Existing split system in E307 will be verified before next submittal.</td>
</tr>
<tr>
<td>A4.1 Roof Plan</td>
<td>Per PCC, roof top perimeter guarding shall meet OSHA 29 CFR 1910.23(e) (Chris to confirm requirements)</td>
<td>EH&amp;S</td>
<td>Rooftop equipment will be kept 10' from edge of parapet</td>
</tr>
<tr>
<td>A4.1</td>
<td>Roof hatch should have guardrail &amp; gate (and ship's ladder access)</td>
<td>EH&amp;S</td>
<td>A ship's ladder has been provided; guardrail and gate are now specified</td>
</tr>
<tr>
<td>A4.1</td>
<td>PCC requested &quot;anchor points&quot; for future maintenance tie-offs</td>
<td></td>
<td>PCC to provide direction</td>
</tr>
<tr>
<td>Civil</td>
<td>No backflow on Fire Riser  (Brian will confirm)</td>
<td>EH&amp;S</td>
<td>Metro water requires backflow preventer on fire riser. Plumbing will spec.</td>
</tr>
<tr>
<td>Hardware Specs</td>
<td>2.6B - Arrow Q Series Locksets 2.6E Von Duprin rim type - storefront 33LUS26D slim line; 99LUS26D elsewhere 2.8A - All lockset functions Q Series 2.11 - Exit devices Von Duprin 33L, 99L rim type</td>
<td>Lockshop</td>
<td>Requested hardware has been incorporated into specifications. BWS will meet with Lockshop after 50% CD Submittal</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>Symbol Legend - refine so no 2 symbols look alike (need symbol for lecture floor box, change symbol for wall mtd. video proj. input)</td>
<td>IT</td>
<td>Symbol legend has been revised to address IT comment</td>
</tr>
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<td>-------------------</td>
<td>-----------------------------------------------------------------------------------------------------------</td>
<td>----</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>All voice &amp; data cables to be CAT5E not CAT6</td>
<td>IT</td>
<td>All voice &amp; data cables are CAT6</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>Exterior WIFI outlet box 14x12x4 (not 4&quot; sq.) Needs (2) data cables to IDF</td>
<td>IT</td>
<td>Exterior WIFI outlet box is 14x12x4 w/ (2) data cables to IDF</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>Wall mounted voice/data outlet should be at 32&quot; AFF, unless noted otherwise</td>
<td>IT</td>
<td>Voice/data outlets are 32&quot; AFF U.N.O.</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>1&quot; conduit from outlet boxes - stub out above ceiling &amp; turn to cable tray only</td>
<td>IT</td>
<td>1&quot; conduit from outlet boxes provided w/ stub out above ceiling &amp; turn to cable tray</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>Voice/data outlet - 3 jacks (yellow-voice/ red-data/blue-data)</td>
<td>IT</td>
<td>(3) Color coded voice/data outlet jack provided</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>Voice/data outlet: 3 CAT5E cables from jacks to patch panel - (1) yellow for voice/ (2) blue for data</td>
<td>IT</td>
<td>(3) Color coded CAT5E voice/data cables from jacks to panel provided</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>Voice/data outlet with 4: 5 CAT5E cables from jacks to patch panel - (1) yellow for voice/ (4) blue for data</td>
<td>IT</td>
<td>(5) Color coded CAT5E cables from jacks to patch panel provided</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>WIFI - use Panduit CBXJ2EI-1 instead of gang ring on 4&quot; sq. box</td>
<td>IT</td>
<td>Panduit CBXJ2EI-1 provided</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>Voice/data outlets to align with electric outlets</td>
<td>IT</td>
<td>Voice/data outlets align w/ electrical outlets</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>Redraw rack layouts in IDF rooms - PCC to provide</td>
<td>IT</td>
<td>Rack layouts in IDF rooms have been redrawn</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>Coordinate symbols with Lab drawings</td>
<td>IT</td>
<td>Symbols are now coordinated with Lab drawings</td>
</tr>
<tr>
<td>Telecomunications</td>
<td>Provide (2)data &amp; voice - (1) per office Double voice for fax locations only Coordinate w/ furniture</td>
<td>IT</td>
<td>(2) data &amp; voice have been provided Fax locations should be identified by PCC Coordination w/ furniture on-going</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Responsible Party</td>
<td>Notes</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>All voice/data from F and LF sheets to be transferred to T Sheets</td>
<td>IT</td>
<td>F sheets do not have voice/data on them LF sheets will continue to show voice/data; symbols will be coordinated with T sheets</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Chemical Storage 307 to have exhaust, AC from building and split system AC similar to electrical room</td>
<td>OPS</td>
<td>Exhaust, AC from building and split system has been provided for 307 - ref. M1.3</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Existing AC in Autoclave Room E307 can remain - verify capacity for new use</td>
<td>OPS</td>
<td>Will verify prior to next submittal.</td>
</tr>
<tr>
<td>Plumbing/Civil</td>
<td>Verify if duel check backwater valve is req. with Metro Water &amp; NW Fire</td>
<td>OPS</td>
<td>Backwater valve is required per Metro Water.</td>
</tr>
<tr>
<td>Plumbing/Mech.</td>
<td>No equipment within 10' of parapet</td>
<td>EH&amp;ES</td>
<td>There is no equipment within 10' of parapet.</td>
</tr>
<tr>
<td>Plumbing</td>
<td>Backwater valve is required for First Floor</td>
<td>OPS</td>
<td>Backwater valve for first floor sewer has been provided.</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Add Alt #1: 6 snorkles in Organic Chem Lab</td>
<td>OPS</td>
<td>Will provide prior to next submittal.</td>
</tr>
<tr>
<td>Mechanical</td>
<td>VFDs for fume hood exhaust fans still being discussed (will add about $1500/fan) (2) at Organic Chemistry Only</td>
<td>OPS</td>
<td>VFDs for fume hood exhaust fans have been provided - ref. M1.3 Organic Chemistry only</td>
</tr>
<tr>
<td>Electrical</td>
<td>Provide (1) dedicated 20 amp circuit in each IT room - on generator</td>
<td>OPS</td>
<td>One equipment rack in each IDF room will have a UPS connected to the generator</td>
</tr>
<tr>
<td>Mechanical</td>
<td>New system will have Alerton Bacnet Controls Existing controls are CSI - PCC to verify compatibility</td>
<td>OPS</td>
<td>Will complete prior to next submittal.</td>
</tr>
<tr>
<td>Mech/Plumb</td>
<td>Reference specific Lab LF sheets for better coordination</td>
<td>Ernie</td>
<td>Lab LF sheets have been referenced on P1.2 and P1.3</td>
</tr>
<tr>
<td>Plumbing/Civil</td>
<td>Take rainwater leader(s) to detention basin on east side (to reduce piping and provide water harvesting)</td>
<td>Ernie</td>
<td>As discussed, rainwater leaders will continue to drain to front. Water harvesting grading will be eliminated.</td>
</tr>
<tr>
<td>Landscape</td>
<td>Reduce planting area on east &amp; south - seed to control erosion Planting should be low-maintenance</td>
<td>Ernie</td>
<td>Basin removed; all container planting south of utility yard removed; hydroseed w/ DG surfacing used to control erosion</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Owner</td>
<td>Notes</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Landscape</td>
<td>Remove and replace 4 southern Palo Verde trees on west side</td>
<td>Ernie</td>
<td>Plan updated w/ 4 new replacement trees</td>
</tr>
<tr>
<td>Landscape</td>
<td>Provide new location for existing tree shown on sheet A0.2 keynote 11</td>
<td>Ernie</td>
<td>(E) Ironwood tree noted for salvage and relocation to SE corner of site</td>
</tr>
<tr>
<td>Irrigation</td>
<td>Move controller around corner (north) inside utility yard</td>
<td>Ernie</td>
<td>Controller now relocated W of utility yard entry door</td>
</tr>
<tr>
<td>Irrigation/Elect.</td>
<td>Remove and relocate existing irrigation controller - coordinate w/ electrical</td>
<td>Ernie</td>
<td>Existing irrigation controller has been relocated</td>
</tr>
<tr>
<td>Electrical</td>
<td>Provide light fixture cut sheets. Confirm selections with Plant Options.</td>
<td>Ernie</td>
<td>Light fixture cut sheets are provided in 50% CD Spec book</td>
</tr>
<tr>
<td>Electrical</td>
<td>Confirm loads on existing generator</td>
<td>Robin</td>
<td>Preliminary load estimate is complete. Additional load verification will be performed</td>
</tr>
<tr>
<td>Specs/Architectural</td>
<td>Provide broom finish on flatwork Show control joints</td>
<td>Ernie</td>
<td>Specs have been updated to include broom finish</td>
</tr>
<tr>
<td>Specs/Architectural</td>
<td>Door stops - locate with care on exterior to protect EIFS</td>
<td>Ernie</td>
<td>Door stop placement will be specified after 50% CD Submittal meeting w/ lockshop</td>
</tr>
<tr>
<td>A0.1</td>
<td>Show construction staging area, names of campus drives, graphics</td>
<td>Ernie</td>
<td>Staging area now shown; names have been added to campus drives; line weights modified</td>
</tr>
<tr>
<td>A0.2</td>
<td>Modify line weights of existing</td>
<td>Ernie</td>
<td>Line weights have been modified</td>
</tr>
<tr>
<td>A2.1</td>
<td>Correct keynotes</td>
<td>Ernie</td>
<td>Keynotes have been corrected</td>
</tr>
<tr>
<td>A2.1</td>
<td>Look at area adjacent to Stair G2 - potential for bad things to happen</td>
<td>Ernie</td>
<td>Area in question has been eliminated</td>
</tr>
<tr>
<td>Architectural</td>
<td>Move door frames to outside face of exterior wall - to protect EIFS - coord. w/ door stops</td>
<td>Ernie</td>
<td>Window details in 50% CD submittal will show frames to align w/ EIFS at exterior face</td>
</tr>
<tr>
<td>A2.2</td>
<td>Flip door 216A</td>
<td>Ernie</td>
<td>Door has been flipped</td>
</tr>
<tr>
<td>A2.2</td>
<td>Window type C at south wall - should be glass block?</td>
<td>Ernie</td>
<td>Yes, these windows have been changed to glass block</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
<td>Assignee</td>
<td>Notes</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>A2.2 &amp; A2.3</td>
<td>Raise sill height of masonry opening at north end of exterior corridor</td>
<td>Ernie</td>
<td>Complete - sill height has been raised to 4'-8&quot; AFF</td>
</tr>
<tr>
<td>A2.3</td>
<td>Move roof hatch access ladder to NW corner</td>
<td>Ernie</td>
<td>Complete - ship's ladder did not fit so alternating tread stair provided.</td>
</tr>
<tr>
<td>A2.3</td>
<td>Define railing/guardrail between stair tower and restroom volume</td>
<td>Ernie</td>
<td>Complete - 42&quot; high frame wall w/ EIFS both sides and pre-cast concrete cap</td>
</tr>
<tr>
<td>A3.1, 3.2, 3.3</td>
<td>Remove ceilings from all Electrical, Janitor and IT rooms</td>
<td>Ernie</td>
<td>Ceilings have been removed</td>
</tr>
<tr>
<td>A2.1, 2.2, 2.3</td>
<td>Provide 3/4&quot; void-free plywood to 8' w/ (2) coats white fire retardent paint in all IT rooms</td>
<td>Ernie</td>
<td>Plywood has been added to IT rooms</td>
</tr>
<tr>
<td>A2.1, 2.2, 2.3</td>
<td>No floor drain required in Janitor closets</td>
<td>Ernie</td>
<td>No floor drain provided</td>
</tr>
<tr>
<td>A4.1/Spec</td>
<td>Provide roof maintenance mats from roof hatch to AH</td>
<td>Ernie</td>
<td>Roof maintenance mats have been added to Roof Plan and have been addressed in the specifications</td>
</tr>
<tr>
<td>A4.1</td>
<td>Provide roof access to low roof on east side</td>
<td>Ernie</td>
<td>BWS to evaluate during CD phase</td>
</tr>
<tr>
<td>Architectural/ Plumbing</td>
<td>Identify overflow vs. roof drains @ daylight/ scupper/nozzle</td>
<td>Ernie</td>
<td>Overflow outlets on wall face</td>
</tr>
<tr>
<td>A5.2</td>
<td>Reduce height of ceiling in Office 233 to match other offices</td>
<td>Ernie</td>
<td>Ceiling height has been reduced</td>
</tr>
<tr>
<td>A2.2 &amp; A2.3</td>
<td>Provide display cabinets on outside wall of Staff work room - coordinate w/ PCC</td>
<td>Ernie</td>
<td>Display cabinet design has been completed; needs to be reviewed by users</td>
</tr>
<tr>
<td>F2</td>
<td>Provide furniture layout for open office 230</td>
<td>Ernie</td>
<td>Furniture layout for 230 has been provided in 50% CD submittal</td>
</tr>
<tr>
<td>P2.1</td>
<td>Provide waterless urinals</td>
<td>Ernie</td>
<td>Waterless urinals have been provided - ref. P4.1</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Requirer</td>
<td>Action</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>----------</td>
<td>--------</td>
</tr>
<tr>
<td>E1.2, 1.3</td>
<td>Relocate outlets on outside wall of offices to an inside wall for easier access</td>
<td>Ernie</td>
<td>Outlets are relocated on plans on sheets E2.2 and E2.3</td>
</tr>
<tr>
<td>E2.1, 2.2, 2.3</td>
<td>Provide card access at doors 105A, 105B, 210, 216A, 230, 307A, 307B and 320 only</td>
<td>Ernie</td>
<td>Card readers and magnet switches are added on plans on sheets E2.1, E2.2, E2.3</td>
</tr>
<tr>
<td>Specifications 024119-2</td>
<td>Add note to 3.2 Salvage &quot;Except as noted on drawings&quot;</td>
<td>Ernie</td>
<td>Note added to section 3.2</td>
</tr>
<tr>
<td>Specifications 890001-3</td>
<td>Confirm finish on exterior sun control devices (Details will be removed from specs and included in drawings)</td>
<td>Ernie</td>
<td>Clear anodized finish provided on sun control devices - details will be provided in next submittal</td>
</tr>
<tr>
<td>Specifications</td>
<td>Change header from &quot;Classroom Expansion&quot; to &quot;Northwest Campus Expansion&quot;</td>
<td>Ernie</td>
<td>Headers have been changed</td>
</tr>
<tr>
<td>PCC OPS Full Size Review set</td>
<td>No comments</td>
<td>OPS</td>
<td></td>
</tr>
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6680 South Country Club Road  
Tucson, AZ 85709-1810

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TECHNICAL SPECIFICATIONS – SEE CONTENTS FOLLOWING DIVISION 1

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010000 DIVISION I - GENERAL REQUIREMENTS

SECTION
011100 SUMMARY OF THE WORK

011100.01 GENERAL:

A. Requirements of "Instructions to Bidders" become a part of this work.

B. The scope of this contract consists of all supervision, labor, materials, equipment, appliances, transportation, tools, permits, fees, taxes and incidentals necessary to perform all operations required to install, alter, construct and complete, all in accordance with these specifications and the applicable drawings and documents, and work reasonably inferable from the specifications and drawings, and subject to the terms and conditions of the contract.

New Building Expansion: Three story Classroom, Math and Science Lab Building per plans and specifications.

C. Contract Time:

<table>
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<tr>
<th>Event</th>
<th>Date</th>
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<tr>
<td>Anticipated Notice of Intent to Award Contract:</td>
<td>2012</td>
</tr>
<tr>
<td>Anticipated Date of Notice to Proceed:</td>
<td>2012</td>
</tr>
<tr>
<td>Start Construction:</td>
<td>2012</td>
</tr>
<tr>
<td>Substantial Completion:</td>
<td>2012</td>
</tr>
<tr>
<td>Final Completion:</td>
<td>2012</td>
</tr>
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If the Contractor is delayed at any time in the progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, which the Architect determines justifies relief, then Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

1. An extension of time shall be the Contractor's sole remedy for delay. The Contractor expressly agrees not to make, and hereby waives any claim for damages against the Owner on account of any delay, obstruction, or hindrance for any cause whatsoever, and agrees that the Contractor's sole right and remedy in the case of delay shall be an extension of the time fixed for completion of the contract.

2. Contract Time shall not be adjusted unless a change affects the critical path of the Work.

D. Warranty: If, within two years after the date of Substantial completion of the work, 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. See also Section 01 78 36.

E. Liquidated Damages: See also Contract Article VI, Paragraph 8 "Special Conditions of the Contract".

1. If the Contractor neglects, fails or refuses to substantially complete the Work within the Contract Time, or any extension granted by Change Order, then the Contractor shall, as part consideration for the award of this contract, pay to the Owner a sum of not less than [one thousand dollars ($1,000.00)] per calendar day, not as a penalty, but as liquidated damages for such breach of contract, for each and every calendar day that the Contractor fails to substantially complete the work.

2. Early Completion Bonus: If the Contractor completes the work prior to the expiration of the Contract Time, the Contractor shall be paid an Early Completion Bonus at the rate of [five thousand dollars ($5,000.00)] for each calendar day the work is Substantially Complete in advance of the expiration of the Contract Time up to a maximum of [five thousand dollars ($5,000)]. For purposes of the Early Completion Bonus, the Contract Time shall not be extended or changed for any reason.
011100.02  DEFINITIONS:

A. The term "Contractor" means the person or organization awarded the contract to complete work specified herein, and shall be a General Contractor registered and licensed by the State of Arizona, who has successfully completed a minimum of three comparable projects and can provide references for those projects.

B. The term "Owner" as used herein means Pima County Community College District of the State of Arizona. The Owner's Representative is the Director of Facilities Operations & Construction, or his designee, and shall act on behalf of the Owner. Communication is not received unless directed to the attention of the Owner's Representative.

C. The term "Architect" as used herein means BWS Architects (Burns Wald-Hopkins Shambach Architects).

011100.03  INTENT OF DOCUMENTS:

A. Drawings and Specifications are cooperative and supplementary. Portions of the work which can be best illustrated by drawings may not be included in specifications, and portions best described by specifications may not be depicted on the drawings. The Intent of the Bid Documents is to include labor, materials and services necessary for proper completion of this project.

B. Completeness and correctness of Bid Documents shall be verified before execution by Contractor who shall notify the Architect of any errors, inconsistencies or omissions within ten (10) days. The Contractor shall be liable to the Owner or the Architect for any damages resulting from any errors, inconsistencies or omissions and knowingly failed to report it to the Architect. If the Contractor performs any construction activity knowing it involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the Architect, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

C. Where drawings and specifications appear to conflict, specifications shall govern. Detail drawings have priority over other drawings and large scale plans have priority over small scale plans. Discrepancy in figures, drawings or specifications shall be promptly submitted to the Architect, who shall promptly make a determination in writing.

011100.04  DETAIL DRAWING INTERPRETATION:

Before doing any work or ordering any materials, Contractor shall verify measurements of existing and new work and be responsible for their correctness. Differences which may be found shall be submitted to the Architect for consideration before proceeding with the work. No extra compensation will be allowed because of differences between actual dimensions and those indicated on working drawings. The Contractor will be responsible for the locations and elevations of all the construction indicated by the construction documents.

011100.05  PROTECTION OF ADJACENT PROPERTY:

A. Contractor is responsible for preservation of public and private property on the surface or underground, along and adjacent to the work, and shall conduct his operations so as to ensure the prevention of injury or damage thereto.

B. Whenever direct or indirect damage or injury is done to public or private property by or on account of acts, omissions, neglect or misconduct in the execution of the work, or in consequence of non-execution thereof on the part of the Contractor, such property shall be restored by Contractor at his expense, to a condition equal to that existing before such damage or injury was done, by repairing,
rebuilding or otherwise restoring same, or the contractor shall make good such damage or injury in an acceptable manner to the Owner.

END OF SECTION

012300 ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITION

A. An Alternate is an amount proposed by Bidders and stated on the Bid Form for certain construction activities defined in the Bidding Requirements that may be added to or deducted from Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract Documents.

1.3 COORDINATION

A. Coordinate related Work and modify or adjust adjacent work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the project. Include as part of each Alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation which are reasonably inferable from the specifications and drawings describing the Alternate.

1.4 BID

A. Indicate the amount of each alternate separately on the bid form. Indicate if the alternate amount is to be added to the base bid or deducted from the base bid. The alternate amount must include all costs related to the alternate such as, but not limited to, cost to coordinate related Work, subcontractor costs, taxes, and cost of bond.

1.5 NOTIFICATION

A. Immediately following the award of the Contract, prepare and distribute to each party involved, notification of the status of each Alternate. Indicate whether Alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to Alternates.
1.6 SCHEDULE OF ALTERNATES

A. Schedule of Alternates is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the Work described under each Alternate.

Alternate 1: Moveable Partition Walls - see Drawings
Alternate 2: Building D Renovation (Student Life) - see drawings
Alternate 3: Building C Renovation (Bookstore) - see drawings
Alternate 4: Provide snorkels at Organic Chemistry classroom - see drawings.

END OF SECTION 012300

012400 VALUE ANALYSIS

012413 VALUE ENGINEERING

A. Following execution of the contract, the Contractor is encouraged to develop, prepare, and submit value engineering change order proposals (VECOP's). The Contractor shall share equally in any contract savings realized from accepted VECOP's.

B. The Contractor shall include the following information in each VECOP:

1. A description of the difference between the existing contract requirement and that proposed VECOP which includes 1) the requirements of Section 01 25 00.02, 2) the comparative advantages and disadvantages of each, and 3) a justification when an item's function or characteristics are being altered.

2. A separate, detailed cost estimate for (a) the affected portions of the original contract requirement and (b) the VECOP. The cost reduction associated with the VECOP shall be accounted for in the Contractor's overhead and profit.

3. A statement of the time by which a contract modification accepting the VECOP must be issued in order to maximize cost reduction, and the effect, if any, on the Contract Time.

C. Submission, review, and acceptance or non-acceptance of VECOP's shall be in accordance with standard change order proposal requirements. Change orders shall be issued for accepted VECOP's, reducing the Contract Sum by one-half the amount(s) indicated on the VECOP(s).

END OF SECTION

SECTION

012500 SUBSTITUTION PROCEDURES

012500.01 AFTER AWARD

Within 10 days after the award of contract, formal requests will be considered for substitutions of products specified as a minimum standard. After the end of that period,
substitution requests will be considered only if the specified product or system has gone out of production, or has been deemed illegal or dangerous subsequent to bidding.

012500.02  SUBMITTING SUBSTITUTION

Submit separate requests for each substitution per 01 33 00. Include, at a minimum, in each request:

A. Complete data substantiating compliance of proposed substitution with contract documents, include:
   1. Product identification, manufacturer’s name and address.
   2. Product specifications and data per 01 33 00.
   3. Samples per 01 33 00 if applicable.

B. Itemized comparison of proposed substitution with specified products, listing all variations, including size and weight.

C. Data relating to changes in the construction schedule.

D. Any effect on in-place construction or other materials and systems to be installed.

E. Cost data comparing proposed substitution with specified products.

F. Designation of availability of maintenance services and sources of replacement materials.

G. Advantages to the owner of accepting the substitutions.

012500.03  SUBSTITUTIONS NOT CONSIDERED

Substitutions will not be considered when:

A. They are indicated or implied on submittals without formal request.

B. Acceptance may require revision of contract documents, unless contractor agrees to compensate owner for Architect’s additional service.

012500.04  SUBSTITUTE PRODUCT

Substitute products shall not be ordered or installed without written acceptance of Architect.

0125 00.05  SUBSTITUTION DATA

Based on the submitted data, the Architect will determine if the proposed substitution meets the requirements of the contract documents.

END OF SECTION

SECTION
012600  CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL
0126 33  MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, “Architect’s Supplemental Instructions.”
CONSTRUCTION CHANGE DIRECTIVE


1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of the 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. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

2. Within 10 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

   a. Include a list of quantities of materials, supplies, and equipment (including cost of transportation, whether incorporated or consumed) required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

   b. Include applicable costs of premiums for all bonds and insurance, permit fees, taxes, delivery charges, equipment rental (exclusive of hand tools), and amounts of trade discounts required or eliminated.

   c. Include costs of labor and supervision directly attributable to the change, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance required or eliminated.

   d. 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.

   e. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

   f. For deductive change order proposals, Contractor may add appropriate preparation costs.
B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect, properly itemized and supported by sufficient substantiating data to permit evaluation, plus a fee; such costs shall be itemized by crafts as defined within the schedule of values and limited to the following items directly attributable to the change in the Work:

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 materials, supplies, and equipment (including cost of transportation, whether incorporated or consumed) required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3. Include applicable costs of premiums for all bonds and insurance, permit fees, taxes, delivery charges, equipment rental (exclusive of hand tools), and amounts of trade discounts required or eliminated.

4. Include costs of labor and supervision directly attributable to the change, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance required or eliminated.

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 Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

7. For deductive change order proposals, Contractor may add appropriate preparation costs.

01 26 57 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701. Change Orders may combine more than one Proposal Request.

END OF SECTION

SECTION
012900 APPLICATIONS FOR PAYMENT

01 29 00.01 PAYMENT APPLICATION

Applications for payment must be submitted, in triplicate, to the attention of the Architect for certification and processing. Applications for payment will normally be processed and a check ready within 14 days after receipt of the certified pay application by the Owner. Applications for payment which are not properly submitted will be delayed. Applications for payment mailed to Pima College Accounts Payable are NOT properly submitted.
01 29 00.02 PROGRESS PAYMENT PROCEDURES

Contractor shall provide the items listed below with each application for payment. Applications for payment which do not include these items will not be certified.

A. A copy of the Schedule of Values completed for the period of time covered by the application, including the percent of each task complete as shown on the updated project schedule. Use AIA document G703 certificate for payment continuation sheet. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of the Applications for Payment and progress reports. Correlate line items in the Schedule of Values with the Construction Schedule and sub-contractor list.

B. Updated project schedule per section 01 32 16 showing the actual progress for each task during the pay application period.

C. Invoices for materials stored on-site. Payment will not be made for materials stored off-site.

D. Lien Waivers: after the first pay application, the contractor shall submit with each pay application a partial lien release for the work and partial lien releases from each subcontractor and/or for each separate line item on the schedule of values, for the work equal to the amount approved on the last application for payment, less retainage.

E. As-built drawings for completed elements of the Work (indicated as 100% completed on G703).

F. Operation and maintenance manuals for fully-installed and operational equipment (indicated as 100% completed on G703).

01 29 00.03 PROGRESS PAYMENT

Payments on account of this Contract will be made monthly as Work progresses. The Contractor shall submit to the Owner through the Architect, in the manner and form prescribed by the Owner, an application for each payment, and, if required, receipts or other vouchers showing its payments for materials suitably stored at the construction site and labor, including applications from and payments to Subcontractors.

01 29 00.04 INVOICE DETAIL

Invoices shall include the following: Contractor’s invoice number; invoice date; official project title; current purchase order number and reference to any change orders for which payment is being requested; number of invoice pages; and dates covered by the invoice. Payment of invoices that do not contain the correct current purchase order may be delayed.

01 29 00.05 RETENTION

Retention: All invoices shall provide a line item indicating retention of 10% of the dollar amount due at the time. Retention will be held until the end of the project. Final Payment of retention will not occur until all punchlist items are completed in a manner acceptable to the Owner.
PROMPT PAY

The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor’s portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such 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.

SECTION
013119 PROJECT MEETINGS:

013119.01 PRECONSTRUCTION MEETINGS

A pre-construction conference will be called by the Owner’s Representative for the purpose of discussing execution of the work. The Contractor and any subcontractors whose presence is necessary or requested must attend.

013119.02 COORDINATION MEETINGS

Job site Coordination Meetings may be called by Owner as deemed necessary to coordinate, expedite, or schedule the work of this contract.

013119.03 PROGRESS MEETINGS

When installation begins, weekly Progress Meetings will be held at the job site with the Owner’s representative, Architect’s representative, and Contractor’s Project Manager and Site Superintendent. The Contractor will report on the progress of the construction, review "as-built" conditions, provide an update on the schedules, and notify the Architect and/or Owner of any action required on their part prior to the next meeting.

SECTION
013200 CONSTRUCTION PROGRESS DOCUMENTATION:

013216 CONSTRUCTION SCHEDULE

A. Work schedule shall be coordinated with the Owner’s Representative.

B. Prepare the construction schedule as follows:

1. The schedule shall be a Gantt (bar chart) with a horizontal time scale and activities listed vertically or a time scaled network diagram (CPM). Note on the schedule any assumptions made, including but not limited to, request for information (RFI) turnaround times.

2. At a minimum, no task on the schedule shall have duration greater than 15 (calendar) days. All activities shall include tasks for shop drawing review or other submittals, approvals, procurement, fabrication, delivery, installation, start-up and testing as required. The schedule shall clearly indicate the start and completion date of each activity.
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C. The schedule shall anticipate the following number of days as normal adverse weather (rain) days: [???]. No extension of the Contract Time will be granted unless the actual adverse weather days exceed the cumulated normal adverse weather days for the duration of the Contract Time and the actual adverse weather days had an effect on the scheduled construction. The number of adverse weather days was determined by using the following number of average days with greater than one quarter (1/4) inch of rain in Tucson:

D. If the architect determines that the start or completion of any activity on the schedule deviates from the schedule by more than seven days, the contractor shall revise and reissue the schedule within seven days of the determination that an activity has deviated by more than seven days.

E. A CPM schedule will be required to request an adjustment in the Contract Time.

SECTION 013300 SUBMITTAL PROCEDURES:

013300.01 START-UP SUBMITTALS

Start-up Submittals: Within 10 days after the award of the contract, submit:

A. Three (3) copies of schedule of values per Division 1, Section 01 29 00.02.

B. Three (3) copies of the shop drawing review schedule per Division 1, Section 01 33 23.

C. Three (3) copies of the construction schedule for the work per Division 1, Section 01 32 16.

D. A letter stating which individual within the Contractor's organization is authorized to sign change orders on behalf of the Contractor.

E. No construction work shall be started and no progress payments made until the above are submitted and accepted.

013300.02 OTHER COMMUNICATIONS

A. Project Communications: Routine written communications between the contractor and the architect shall be in letter, field memo or fax format. Such communication shall not substitute for any other written requirement or submittal.

B. Request for Information (RFI): A request from the Contractor seeking an interpretation or a clarification of some requirement of the contract documents. The contractor shall clearly and concisely set forth the issue for which they seek clarification or interpretation and why a response is needed. The contractor shall, in the written request, set forth their interpretation or understanding of the contract's requirements along with the reasons why they have reached such an understanding. Responses to the RFI will not change any requirements of the...
contract documents unless so noted in the Request for Information Response.

C. Drawing/Plan Clarification: An answer from the architect, in response to an inquiry from the contractor, intended to make some requirement(s) of the drawings or plans clearly understood. Drawing clarifications/plan clarifications may be sketches, drawings or in narrative form and will not change any requirements of the drawings or plans.

013300.03 MATERIAL SAFETY DATA SHEETS (MSDS)
A. Provide the Owner with MSDS for all material which may affect the Owner's students or staff 10 days prior to delivery of material to the job site.
B. Contractor shall maintain binder at the job site with MSDS for all materials used in the work.

013323 SHOP DRAWINGS AND MANUFACTURER'S DATA
A. Review Times: the shop drawing review schedule shall include 10 working days for review of submittals by the architect. Revise shop drawing review schedule and resubmit when progress deviates from previous schedule by 7 days. The shop drawing review tasks must be included with the construction schedule. (See section 01 32 16)
B. Submit four (4) copies of shop drawings (owner will retain one set). Provide drawing scale large enough to clearly show all elements of the work. Show how adjacent work relates. Reference to sheet, detail and/or schedule.
C. Submit four (4) copies of manufacturer's standard product data. Include reference standards and warranty information. Provide references to sheet, detail, schedule, and/or specification section. Show dimensions and clearances specific to the work.
D. Submittals without indication of Contractor's review and approval will be returned without Architect's review.

END OF SECTION

SECTION
014100  REGULATORY REQUIREMENTS:

014100.01 STANDARDS, CODES, AND LAWS:
A. Project shall be completed in accordance with federal, state, and local codes, laws, regulations, and rules that govern such operations, including fire codes.
B. Material and products are specified for their appropriateness in the completed work. The contractor is responsible for: Providing training and education to the Contractor's employees and obtaining and distributing information regarding the potential dangers and appropriate safety measures for material and products during the work as required by the Occupational Safety and Health Administration, Hazard Communication Standard and the State of Arizona.

014100.02 PERMITS AND LICENSES:
The Owner shall make all document submittals and secure all required permits, paying all fees in that regard. The Contractor shall arrange for inspections as required, and secure necessary approvals. [No City or County permits except dust control are required for College work.]
SECTION 015000 TEMPORARY FACILITIES AND CONTROLS:

SECTION 015100 TEMPORARY UTILITIES:

A. Prior to start of ANY trenching or excavation, Contractor shall employ a specialist to locate all utilities; including irrigation lines, in areas not under the jurisdiction of Bluestake, and shall include expense of such work in Bid. Contractor shall call for Bluestake, review As-Built drawings and other information supplied by the Owner, as well as information provided by utility location specialist, prior to submitting the initial Construction Schedule. Any down time for utilities that may be required due to the location of utility lines found, shall be shown on the initial Construction Schedule. See Section 01 32 16.

B. Owner will furnish temporary water and electricity from existing points of connection. Temporary extensions shall be the responsibility of the Contractor and shall be made and maintained in a safe and secure condition. Any meters, backflow preventers, or temporary use permits shall be the responsibility of the Contractor.

SECTION 015200 CONSTRUCTION FACILITIES:

015213 FIELD OFFICES AND SHEDS:

A. Field Office will be Required - a minimum of 12’X 30’ portable

B. Contractor's superintendent shall have, as a minimum, a cellular telephone and shall provide the telephone number to the owner and architect.

015219 SANITARY FACILITIES:

A. The contractor shall not use College rest rooms for any construction purpose. Arrangements may be made to use existing toilet facilities for non-construction purposes. [Provide portable toilets for contractor personnel.]

SECTION 015500 VEHICULAR ACCESS AND PARKING

015500.01 TEMPORARY ACCESS ROADS AND PARKING:

A. General Access to the site shall be off of Shannon Road on south access drive
see plans for contractor access.

B. Parking arrangement for Contractor’s crew to be made during pre-construction conference. Contractor will be responsible for restricting employees’, subcontractors’ and suppliers’ vehicles to the designated area.

END OF SECTION

SECTION
015600 TEMPORARY BARRIERS AND ENCLOSURES

015616 TEMPORARY DUST BARRIERS:

Controlling construction-related dust and preventing the spread of flying particles is the Contractor’s responsibility. HVAC return air paths must be sealed to prevent dust and odors from spreading to occupied parts of the building.

015623 TEMPORARY BARRICADES AND WARNING SIGNS:

A. Contractor shall furnish, erect, and maintain barricades, barriers, and warning signs, etc., required for protection of persons and property in compliance with applicable statutes

015636 TEMPORARY SECURITY ENCLOSURES:

A. Contractor is responsible for: providing appropriate safety and warning signs; securing materials stored on site to prevent theft; and securing the work in-place to prevent vandalism.

B. The contractor will be issued a set of keys for access to existing Owner facilities if required. The contractor will be responsible for loss or theft of keys issued and will be liable for the cost of re-keying all or a portion of the Owner’s existing facilities.

END OF SECTION

SECTION
016000 PRODUCT REQUIREMENTS

016000.01 PRODUCT OPTIONS

ANY BRAND NAMES OR NAMES OF MANUFACTURERS LISTED IN THE CONTRACT DOCUMENTS ARE ONLY PROVIDED AS GUIDELINES FOR THE PURPOSE OF ESTABLISHING MINIMUM ACCEPTABLE STANDARDS, UNLESS SPECIFICALLY IDENTIFIED AS SOLE SOURCE ITEMS.

END OF SECTION

SECTION
016500 PRODUCT DELIVERY REQUIREMENTS

016500.01 DELIVERY & STORAGE

A. Deliveries may be made directly to job site, however, it shall be the sole responsibility of the Contractor to receive, handle, and store such items in a safe
and secure manner.

B. Materials required for this project shall be stored on-site at locations and in a manner mutually acceptable to Owner and Contractor. Store materials per the manufacturer’s written instructions.

016500.02 MAINTENANCE OF IN-PLACE MATERIALS AND CONSTRUCTION

A. Provide maintenance per manufacturer’s written instructions and recommendations, and industry recommendations until substantial completion.

B. Maintenance required elsewhere in the contract documents shall continue after substantial completion if specified.

016500.03 INSTALLATION INSTRUCTIONS

A. Materials and equipment incorporated into the work shall be installed or applied per the manufacturer’s written instructions, specifications (including guide specifications), and recommendations; unless specifically modified by written instruction from the manufacturer. Submit any modifications to Architect as product data.

016500.04 ITEMS OF THE SAME KIND ARE TO BE BY THE SAME MANUFACTURER.

END OF SECTION

SECTION
017329 CUTTING AND PATCHING

017329.10 GENERAL

017329.11 RELATED DOCUMENTS

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

017329.12 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:

1. Division 1 Section “Selective Demolition” for demolition of selected portions of the building.
2. Divisions 2 through 48 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

017329.13 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 surfaces to original conditions after installation of other Work.

017329.14 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. 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 those results in increased maintenance or decreased operational life or safety. Operating elements include the following:

1. Primary operational systems and equipment.
2. Fire-suppression systems.
3. Mechanical systems piping and ducts.
4. Control systems.
5. Communication systems.
6. Electrical wiring systems.

C. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

017329.20 PRODUCTS

017329.21 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials 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 match the visual and functional performance of in-place materials.

SECTION
017329.30 EXECUTION

017329.31 EXAMINATION
A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. 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.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. 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 minimize interruption to occupied areas.

PERFORMANCE

A. 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. 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 as small as possible, neatly to 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 and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

4. Proceed with patching after construction operations requiring
cutting are complete.

C. 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 possible. Provide materials and comply with installation requirements specified in other Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate 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 eliminate 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 from 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.
   a. Where patching occurs in a painted surface, apply primer and intermediate paint coats 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 re-hang 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

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329
Prior to substantial completion complete the following

A. Contractor prepared punchlist of all incomplete items and corrections to be made.

B. Punchlist: When the Contractor considers that the Work is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected. By submitting a request for substantial completion inspection the Contractor thereby certifies that the Work, or the designated portion, is functionally ready for Occupancy by the Owner and that the remaining incomplete or defective work required by the Contract Documents shall be completed within 30 days. The Contractor shall provide an itemized list and correct items on the list. Failure to include an item on the list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents.

C. Schedule punchlist inspection with the Owner's Representative in order to exhibit the completeness of the work. Owner's Representative will not participate in an inspection unless a full punchlist is submitted 5 days prior to inspection.

D. Remove all temporary facilities and controls.

E. Complete final cleanup requirements, including touchup painting.

PUNCHLIST:

A. If the Architect's inspection discloses an item, whether or not included on the Contractor's Punchlist, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct the item upon notification by the Architect to determine Substantial Completion. When the Work or designated portion is substantially complete, the Architect will prepare and issue a Certificate of Substantial Completion which shall establish responsibilities of the Owner and Contractor for maintenance, damage to the Work, insurance, and the Final Punchlist and shall fix the time within which the Contractor shall finish all items on the Final Punchlist accompanying the Certificate. Satisfactory completion of all items on the Final Punchlist shall be final completion of the work. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion unless otherwise provided in the Certificate of Substantial Completion. The Project shall not be deemed substantially complete until the Certificate is issued.

B. Neither Final Payment nor any remaining retainage or substituted securities shall become due until the Contractor submits to the Owner:

1. an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work have been paid or otherwise satisfied,

2. consent of surety to final payment or release of substituted securities and 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.

C. Acceptance of final payment by the Contractor, 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 Invoice.

D. The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the contract documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The contractor shall bear costs of correcting such rejected work,
including additional testing and inspections and compensation for the Architect’s services and expenses made necessary thereby

E. If the Contractor fails to correct nonconforming Work within a reasonable Time, the Owner may correct it. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Architect, the Owner may remove it and store the salvageable materials at the Contractor’s expense.

017700.04 RECORD DRAWINGS AS-BUILTS:

A. Maintain a clean, undamaged set of blue or black line white-prints of Contract Documents and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Tape or paste addenda, architect’s supplemental instructions, proposal requests and other information onto the appropriate sheet to provide a complete record of the work.

B. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.

C. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.

D. Note related Change Order numbers where applicable.

E. Organize record Shop Drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set. Upon completion of the work, submit complete sets to the Architect.

F. Upon completion of the work, the Contractor shall deliver to the Architect these record drawings “as-builts”. These record drawing “as-builts” shall be transferred to electronic media by the owner.

017700.05 MAINTENANCE MANUALS:

Provide four (4) copies of the closeout submittals in three ring notebooks with section tabs, organized in CSI format:

A. Updated subcontractor list with names and phone numbers.

B. From each subcontractor and material and equipment supplier, provide the following:

1. Guarantees and Two (2) year Warranties.

2. Operation and Maintenance data, including:
   a. Emergency instructions
   b. Spare Parts list
   c. Wiring diagrams
   d. Recommended “turn around” cycles
e. Inspection procedures
f. Shop Drawings and Product Data
g. Special inspection documentation

3. Testing Reports.

017700.06 PRIOR TO FINAL PAYMENT

Prior to Final Payment complete the following:

A. Schedule a time with the Architect and Owner to inspect the work following the completion by the Contractor of the final punchlist.

B. Provide a letter documenting that the project has been completed in accordance with Contract Documents and Warranting materials and work.

B. Provide Operations and Maintenance instructions

1. Maintenance Manuals
2. Record Documents
3. Cleaning
4. Warranties and Bonds.

C. Certificate of occupancy. (If applicable)

D. Submit a final Liquidated Damages or Early Completion Bonus settlement statement.

017700.07 CLEANING:

A. Final Cleaning:

1. Thoroughly clean the interior and exterior of the project areas, removing misplaced mastic, paint, and other finishes. Remove dust, dirt, and stains from new and existing materials.

2. Sweep all exterior paving areas, remove debris and stains. Remove debris from landscaping areas. Rake and/or remove debris from all other areas affected by the work. [Add more as needed].

END OF SECTION

SECTION
017836 WARRANTIES:

017836.01 WARRANTY PERIOD

Unless noted otherwise as extended, standard warranty period shall be two (2) years from the date of Substantial Completion.
EXCLUSIONS

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage.

CONTRACTOR GUARANTEE

Neither the final payment nor any provision in the Contract Documents shall constitute an acceptance of the Work not done in accordance with the Contract Documents or relieve the Contractor or its sureties of liability with respect to any warranties or responsibility for faulty materials and workmanship. The Contractor guarantees that the Work will conform to the Contract Documents.

FAILURE TO REMEDY DEFECTS

If the Contractor fails to remedy any defects or damage, the Owner may correct the Work or repair the damages, and the cost and expense incurred in such event shall be paid by or be recoverable from the Contractor or Surety, or offset against any amounts owing the Contractor.

TIME OF WARRANTY SUBMISSION

Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

WARRANTY SUBMISSION

Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

A. Bind warranties and bonds in 3-ring, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8 ½ x 11.
B. Provide dividers with plastic-covered tabs for each separate warranty. Mark tab to identify 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 the installer.
C. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

ADDITIONAL COPIES

Provide additional copies of each warranty to include in operation and maintenance manuals.
SECTION
018930 SELECTIVE DEMOLITION

018930.10 GENERAL

018930.11 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building or structure.
2. Salvage of existing items to be reused or recycled.

018930.12 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

018930.13 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI A10.6 and NFPA 241.

018930.14 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be
maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

   1. Maintain fire-protection facilities in service during selective demolition operations.

018930.20 PRODUCTS (Not Used)

018930.30 EXECUTION

018930.31 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

018930.32 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

   1. Arrange to shut off indicated utilities with utility companies.

   2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

018930.33 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used
facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

018930.34 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.

4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

5. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

018930.35 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner’s property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
B. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

018930.36 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 018930

END OF DIVISION 1
## TECHNICAL SPECIFICATIONS

**Division 2 – Existing Conditions**
024119 Selective Demolition

**Division 3 - Concrete**
033000 Cast-In-Place Concrete

**Division 4 - Masonry**
042000 Unit Masonry

**Division 5 - Metals**
051200 Structural Steel
051213 Architecturally Exposed Structural Steel
052100 Steel Joist Framing
053100 Steel Deck
054000 Cold-Formed Metal Framing
055000 Metal Fabrications
055100 Metal Stairs
057000 Decorative Metal

**Division 6 – Wood, Plastics, and Composites**
060600 Plastic Fabrications
061000 Rough Carpentry
061600 Sheathing
064023 Architectural Woodwork
066400 Fiberglass Reinforced Plastic Panels
Division 7 - Thermal and Moisture Protection
071326  Self-Adhering Sheet Waterproofing
071330  Split Slab Waterproofing Membrane
071416  Cold-Applied Waterproofing
072100  Insulation
072413  Polymer Based Exterior Insulation and Finish System (EIFS)
074113  Metal Wall Panels for Roof Top Mechanical Screen
074219  Metal Plate Wall Panels
075113  Built Up Roofing
077100  Aluminum Copings and Trim
077200  Roof Hatch
078413  Firestopping
078900  Architectural Joint Systems
079200  Joint Sealers

Division 8 - Doors and Windows
081113  Steel (Hollow Metal) Doors and Frames
081210  Interior Aluminum Door Frames
081416  Flush Wood Doors
084413  Aluminum Doors, Entrances and Framing
084500  Sliding Aluminum-Framed Glass Doors
087100  Finish Hardware and Hardware Schedule
087113  Automatic Door Operator
088000  Glazing
088001  Decorative Exterior Glazing
089001  Exterior Sun Control Devices

Division 9 - Finishes
092116  Gypsum Board Shaft Wall Assemblies
092900  Gypsum Drywall Systems
093000  Tile
095133  Acoustical Panel Ceilings
096500  Resilient Flooring and Resilient Accessories
096900  Modular Carpet
099100  Painting

Division 10 - Specialties
102113  Toilet Compartments
102226  Paired Panel Operable Partitions
102800  Toilet Accessories
Pima Community College  
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50% CONSTRUCTION DOCUMENTS

104413    Fire Extinguishers and Cabinets

Division 11 – Equipment  
115310    Laboratory Casework and Other Furnishings  
115313    Fume Hoods and Other Air Containment Units  
115343    Laboratory Service Fittings and Fixtures  
115350    Laboratory Equipment

Division 12 – Furnishings – Not used  
Division 13 - Special Construction – Not used

Division 14 – Conveyances  
142400    Hydraulic Elevator
### Division 21 - Fire Protection
- 210500 Common Work Results for Fire Suppression
- 210523 Valves
- 210529 Supports, Anchors, and Sleeves for Fire Suppression
- 211313 Wet Pipe Sprinkler Systems

### Division 22 - Plumbing
- 220500 Common Work Results for Plumbing
- 220523 Valves for Plumbing
- 220529 Supports, Anchors and Sleeves for Plumbing
- 220640 Plumbing Fixtures
- 220719 Plumbing Piping Insulation
- 221100 Plumbing Piping
- 221119 Plumbing Specialties
- 222000 Laboratory Plumbing

### Division 23 - Heating, Ventilating and Air Conditioning
- 230500 Common Work Results for HVAC
- 230519 Piping Specialties
- 230523 Valves for HVAC
- 230529 Supports, Anchors and Sleeves for HVAC
- 230593 Testing, Adjusting, and Balancing
- 230713 Duct Insulation
- 230719 HVAC Piping and Equipment Insulation
- 230900 Instrumentation and Control for HVAC
- 230901 Variable Frequency Drives
- 232113 HVAC Piping Systems
- 232300 Refrigerant Piping
- 233100 HVAC Ducts
- 233300 Duct Accessories
- 233353 Duct Liners
- 233423 Power Ventilators
- 233600 Air Terminal Units
- 233713 Diffusers, Registers, and Grilles
- 233723 Weatherhoods
- 237413 Modular, Outdoor, Central Station Air Handling Units
- 238126 Split System Air Conditioning Units
Division 26 – Electrical
260500 Common Work Results for Electrical
260519 Low-Voltage Electrical Power Conductors and Cables
260526 Grounding and Bonding for Electrical Systems
260529 Hangers and Supports for Electrical Systems
260533 Raceway and Boxes for Electrical Systems
260543 Underground Ducts and Raceways
260553 Identification for Electrical Systems
260923 Lighting Control Devices
262200 Low-Voltage Transformers
262416 Panelboards
262726 Wiring Devices
262813 Fuses
262816 Enclosed Switches and Circuit Breakers
262913 Enclosed Controllers
265100 Interior Lighting
    Lighting Fixture Cutsheets
266000 Laboratory Electrical

Division 27 - Communications
271100 Telephone System
271500 Structured Data Cabling Plants

Division 28 – Electronic Safety And Security
280500 Common Work Results For Electronic Safety And Security
283100 Fire Detection and Alarm

Division 31 – Earthwork
312000 Earthwork
    Geotechnical Engineering Report
313116 Termite Control

Division 32 – Exterior Improvements
321216 Hot-Mixed Asphalt Paving
321313 Portland Cement Concrete Paving
328400 Landscape Irrigation
329000 Planting

Division 33 – Utilities – Not Used
END OF INDEX
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DRAWING LIST

G1.1 INDEX AND CODE REVIEW
D2.1 DEMOLITION PLAN

ARCHITECTURAL

STRUCTURAL

MECHANICAL

PLUMBING

ELECTRICAL
SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section requires the selective removal and subsequent offsite disposal of the following:

1. Existing interior and exterior construction as noted.

1.3 JOB CONDITIONS

A. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable.

B. Damages: Promptly repair damages caused by demolition work to adjacent work to remain.

C. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with adjoining buildings and student/teacher pedestrian circulation. Provide barriers, tape, fencing and other means to ensure safety of occupants of adjacent structures.

D. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.

E. Environmental Controls: Use temporary enclosures, ongoing cleaning procedures, extra ventilation or exhaust, and other methods as needed to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.

1. Protect openings made in exterior walls or roof against weather. Close openings with new work as quickly as possible, and while open protect with plywood, plastic sheeting or another material against weather intrusion. If openings present a security risk, cover with temporary fencing.
F. Hazardous Materials: If the Contractor suspects the presence of asbestos-containing or other hazardous materials at an area on the job site, stop work in this area immediately, leave the materials undisturbed and immediately contact the Architect's Representative for direction.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Provide shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.

1. Cease operations and notify Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

2. Erect and maintain weatherproof closures for exterior openings resulting from demolition work.

3. Locate, identify, stub off, and disconnect utility services that are not indicated to remain.

3.2 SALVAGE: Owner will remove any materials they wish to salvage from the structures prior to the beginning of the work. Everything remaining will become the property of the Contractor unless otherwise noted on the drawings.

3.3 DEMOLITION

A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

1. Drill holes or perform cutting in concrete or masonry using suitable tools to minimize damage to adjacent materials to remain, and not to create larger openings than required for removal of materials.
B. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

C. Provide temporary shoring as needed to support openings or areas where removal of elements could compromise structural integrity. Leave in place until permanent support has been installed.

3.3 DISPOSAL OF DEMOLISHED MATERIALS: Remove from the site and dispose of in a legal manner. Recycling, reuse, or resale of materials is encouraged.

3.4 PATCHING: Patch areas where new work has impinged on existing structures or materials to remain. Use materials of composition, color and texture that are indistinguishable from the adjacent remaining work.

END OF SECTION 024119
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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies concrete work, including formwork, reinforcing, mix design, placement procedures, and finishes.

B. Concrete work includes the following:

1. Foundations and walls.
2. Regular weight aggregate concrete slabs-on-grade and elevated slabs.
3. Underslab vapor barrier.
4. Sealing of interior exposed concrete floors as scheduled on drawings.

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. See Section 321313 - Portland Cement Concrete Paving for non-structural concrete paving and walks.
2. Section 042000 – Unit Masonry for concrete masonry units.
3. Penetrating water repellent for exterior elevated concrete walkways and stairs is specified in Section 099100 – Painting.
4. Between-slab waterproofing is specified in Section 071326.

1.3 SUBMITTALS

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

1. Product data for proprietary materials and items, including reinforcement and forming accessories including form boards, sealers, admixtures and additives, patching compounds, joint systems, curing compounds, and others if requested by Architect.
2. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of
3. Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.

B. Concrete mix designs for each concrete mixture and strength.

C. Laboratory test reports for concrete materials and mix design tests.

D. Material certificates are acceptable instead of material laboratory test reports. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

E. QUALITY ASSURANCE

Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
3. ACI 318, "Building Code Requirements for Reinforced Concrete."

1.4 Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
B. Forms for Exposed Finish Concrete: Provide stud and waler supported forms with form faces of medium density overlay plywood, fiberglass, steel, or other material able to produce smooth, consistent finish.

C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. Equal of Nox-Crete Form Coating.

D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Steel Wire: ASTM A 82, plain, cold-drawn steel.

C. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

D. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type II. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

B. Fly Ash: ASTM C 618, Type F.

C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete. Sand shall be clean manufactured or natural sand.

D. Water: Potable.

E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
G. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

I. Water-Reducing Admixture: ASTM C 494, Type A.

J. Interior Concrete Floor Sealer: High solids content, penetrating, transparent, VOC-compliant, low-luster acrylic resin sealer, equal of WR Meadows VOCOMP-25.

2.4 RELATED MATERIALS

A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

B. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
   1. Waterproof paper.
   2. Polyethylene film.
   3. Polyethylene-coated burlap.

C. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal. V.O.C. compliant.

D. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.

E. Vapor Barrier: A vapor-impermeable barrier shall be provided beneath structural slabs on grade.

   Permeance after mandatory conditioning: Less than 0.01 Perms
   ASTM E 1745 Section 7.1, Subparagraphs 7.1.2-.5
   Strength: ASTM E 1745 Class A
   Thickness: 15 mils minimum
   Product: Stego Wrap Vapor Barrier with accessories (Stego Tape, Stego Mastic), Reef VaporGuard, or approved equal.

2.5 PROPORTIONING AND DESIGNING MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to
Architect for preparing and reporting proposed mix designs.

1. Do not use the same testing agency for Field quality control testing.
2. Limit use of fly ash to not exceed 15 percent of cement content by weight.
3. Water to cement ratio: 0.50 or less.

B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.

C. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
   1. Slabs, and sloping surfaces: Not more than 3 inches.
   2. Reinforced foundation systems: Not less than 3 inches and not more than 5 inches.
   3. Other concrete: Not more than 4 +/- 1" inches.

D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

E. Proportion concrete mixtures as follows:
   1. 3000 psi Concrete: 480 lbs. minimum cement per cubic yard.
   2. 4000 psi Concrete: 560 lbs. minimum cement per cubic yard.

2.6 ADMIXTURES

A. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer’s prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits: All concrete 2 - 4%.

B. Use water-reducing admixture in pumped concrete as needed to enhance placement and workability.
2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.

1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
2. Use prepackaged or regulated injection of integral colorant to provide consistent color from load to load.

PART 3 - EXECUTION

3.1 GENERAL: Coordinate the installation of joint materials and other related materials with placement of forms and reinforcing steel.

3.2 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions. Lap joints 6 inches and seal with associated tape.

B. Tape all around penetrations and at terminations.

3.3 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement to top or bottom of slab. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as shown on shop drawings and reviewed by the Structural Engineer.

D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold
reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

3.4 JOINTS

A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure and in a regular and symmetrical arrangement as much as possible, as acceptable to Architect.

B. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

C. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.

1. Exposed Concrete: Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.

2. Non-Exposed or Functional Spaces (mech, elec, T/D, etc.): Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

   a. If joint pattern is not shown, provide joints not exceeding 12 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
   b. Joint fillers and sealants are specified in Section 079200 - Joint Sealants.

3.5 INSTALLING EMBEDDED ITEMS

A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.
3.6 FORMS

A. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

B. Forms for Cast-In-Place Items: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position as shown in final shop drawings.

1. Provide Class A tolerances for all exposed formed concrete surfaces.
2. Provide Class B tolerances for non-exposed concrete surfaces.

C. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide rubber or wood chamfer strips at all vertical and horizontal corners. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.

E. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.

F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces after each use. Remove chips, wood, sawdust, dirt, or other debris, and coat with form-release in accordance with manufacturer's instructions; do not allow
excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

1. Retighten forms and bracing before placing concrete, as needed to prevent mortar leaks and maintain proper alignment. Take extreme care at horizontal changes in directions, and undersides of flat horizontal surfaces, to prevent form leaks.

3.7 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.


C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309. Keep a spare vibrator at the site whenever placing concrete.

2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.

2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

3. Maintain reinforcing in proper position on chairs during concrete placement.

F. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

G. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.

1. Do not use frozen material.
2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F. Mixing water may be chilled 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. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.

3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.

4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.
3.8 MONOLITHIC SLAB FINISHES

A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified.

1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units.

   Typical Surfaces: Finish surfaces to tolerance of 1/4" in 10 ft. measured using a 10 ft. straightedge consistently across the slab.

   Cut down high spots and fill low spots. Uniformly and positively slope surfaces to drains as shown. Immediately after shaping surfaces or leveling, relloat surface to a uniform, smooth, granular texture.

B. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view in the finished work and to those to receive a broom finish.

   1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerance of 1/4" in 10 ft. measured using a 10 ft. straightedge at several points on the slab. Grind smooth any surface defects that would telegraph through applied floor covering system.

   2. Use wood trowels at colored concrete and do not overfloat.

C. Broom Finish: Apply medium broom finish at all exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

D. Scratch Finish: Provide a light scratch finish at all interior surfaces to receive finish flooring and at exterior decks to receive waterproofing system and tile.

3.9 FINISHING FORMED SURFACES

A. Cast-In-Place Concrete: Remove forms after adequate set-up and curing period so that concrete will not be damaged by removal of forms. Remove all fins back to base surface of concrete. Clean-out and regularize edges of form-tie holes and provide reveal-type gray-cement-compound snap-plugs.
permanently adhered/sealed into holes as far back from face of concrete as possible.

B. Related Unformed Surfaces: Strike-off smooth and finish with smooth texture to closely match that of formed surfaces.

3.10 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.

B. 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.

C. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Provide non-slip nosing detail as shown. Screed, tamp, and trowel finish concrete surfaces.

3.11 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer’s instructions after screening and bull floating, but before power floating and troweling.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Curing Methods

1. Interior Concrete to Receive Finishes: Provide moisture or moisture-retaining cover curing by the following methods:

   a. Keep concrete surface continuously wet by covering with water.
   b. Use continuous water-fog spray.
   c. Cover concrete surface with specified absorptive cover,
thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.

d. Provide moisture-retaining cover curing as follows: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

D. Apply curing compound on exposed exterior slabs, walks, and curbs as follows:

1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoil areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.12 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms.

B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.

2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas 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.
C. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.

3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.

4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

D. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.

E. Repair methods not specified above may be used, subject to acceptance of Architect.

3.13 INTERIOR CONCRETE FLOOR SEALING: Apply sealer/hardener to flooring at scheduled locations following manufacturer's directions. Brush away excess sealer prior to set.

3.14 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. General: The Owner will employ a testing agency to perform tests and to submit test reports.
B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
   a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
   b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
   c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below, when 80 deg F and above, and one test for each set of compressive-strength specimens.
   d. Compression Test Specimen: ASTM C 31; one set of three standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
   e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, one specimen tested at 28 days, and one specimen retained in reserve for later testing if required.

2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
3. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.
4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
C. Test results will be reported in writing to Architect, Structural Engineer, Owner, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

E. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION 033000
SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Concrete unit masonry, grout, and mortar – various types.

B. Masonry penetrating sealer and application for exposed masonry is specified in Section 099000 – Painting.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops the following installed compressive strengths (f'm):

1. Concrete unit masonry: Minimum f'm = 1500 psi.

1.4 SUBMITTALS

A. Product data for each different masonry unit, accessory, and other manufactured product specified.

B. Shop drawings for reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcing" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement.

C. Material certificates for the following signed by manufacturer and Contractor certifying that each material complies with requirements.

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

D. Material test reports from a qualified independent testing laboratory employed and paid for by Owner indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:

1. Mortar complying with property requirements of ASTM C 270.
2. Grout mixes. Include description of type and proportions of grout ingredients.
3. Masonry units.

E. Cold-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

F. Hot-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

G. Mockups: See Section 014000 – Quality Requirements and drawings for general mockups.

1.5 QUALITY ASSURANCE


1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry materials to project in undamaged condition. Store and handle masonry units off the ground, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not place until units are in an air-dried condition.

B. Store cementitious materials off the ground, under cover, and in dry location. Store aggregates where grading and other required characteristics can be maintained and contamination avoided. Store masonry accessories including metal items to prevent corrosion and accumulation of dirt and oil.
1.7 PROJECT CONDITIONS

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

B. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that come in contact with such masonry.

D. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

E. Protect sills, ledges, and projections from mortar droppings. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from mortar droppings.

F. Hot-Weather Construction: Protect unit masonry when temperature and humidity condition produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg. and above.

G. Cold-Weather Construction: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace units damaged by frost or freezing conditions. Comply with following requirements:

1. When the ambient temperature is within the limits indicated, use the following procedures:
   a. 40 to 32 deg F: Heat mixing water or sand to produce mortar temperatures between 40 and 120 deg. F.

2. Cold Weather Protection:
   a. 40 to 25 deg F: Cover masonry with a weather-resistant membrane for 48 hours after construction.
3. **Cold-Weather Cleaning:** Use liquid cleaning methods only when air temperature is 40 deg. F and above and will remain so until masonry has dried out, but not less than 7 days after completion of cleaning.

**PART 2 - PRODUCTS**

**2.1 CONCRETE MASONRY UNITS**

A. **General:** Comply with requirements indicated below applicable to each form of concrete masonry unit required.

1. Provide special shapes where indicated and as follows:
   a. Square-edged units for outside corners.

2. **Size:** Provide concrete masonry units complying with requirements indicated below for size that are manufactured to specified face dimensions within tolerances specified in the applicable referenced ASTM specification for concrete masonry units.
   a. Concrete Masonry Units: Manufactured to specified dimensions of 3/8 inch less than nominal widths by nominal heights by nominal lengths indicated on drawings.
   b. Hollow Load-Bearing Concrete Masonry Units: ASTM C 90, Grade N and as follows:
      1) Unit Compressive Strength: Provide units with minimum average net area compressive strength indicated below:
         a) 1900 psi.
         b) Not less than the unit compressive strengths required to produce concrete unit masonry construction of compressive strength indicated.
         c) Weight Classification: Normal weight.

3. **Type I, moisture controlled units,** cured to comply with ASTM C 90 Type 1. Limit linear shrinkage from 0.03% to 0.045% at a moisture absorption of 30% during delivery and until time of installation.
4. Faces:

   a. Exposed:

      1) Block Type 1: Plain face, integral color block.
         a) Color(s): As noted on elevations.

   b. Unexposed:

      1) Block Type 2 – Plain gray concrete block.

2.2 MORTAR AND GROUT MATERIALS

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

   1. Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C150, Type I or Type II, and hydrated lime complying with ASTM C207, Type S. Mix shall be based on proportions by volume per ASTM C270. No proportions based on weight is acceptable.

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

   3. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4 inch use aggregate graded with 100 percent passing the No. 16 sieve.

   4. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.


B. Fly Ash: Not allowed.

2.3 REINFORCING STEEL

A. Steel Reinforcing Bars: Material and grade as follows:

   1. Billet steel complying with ASTM A 615, Grade 60.

   2. Deformed Reinforcing Wire: ASTM A 496.


UNIT MASONRY

2.4 JOINT REINFORCEMENT

A. General: Provide joint reinforcement complying with the following:
   
   2. Description: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:
   3. Wire Diameter for Side and Cross Rods: 0.1483 inch (9 gage).
   4. For single-wythe masonry provide type as follows with single pair of side rods:
      
      a. Ladder design with perpendicular cross rods spaced not more than 16 inches o.c.

2.5 MISCELLANEOUS ANCHORS

A. Unit Type Masonry Inserts in Concrete: Cast iron or malleable iron inserts of type and size indicated.

B. Anchor Bolts: Steel bolts complying with A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of diameter and length indicated and in the following configurations:

C. Headed bolts.

D. Nonheaded bolts, bent in manner indicated.

2.6. POST-INSTALLED ANCHORS

A. Anchors as described below, with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E 488, conducted by a qualified independent testing laboratory.

B. For postinstalled anchors in grouted concrete masonry units: Capability to sustain, without failure, a load equal to 6 times loads imposed by masonry.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler Strips: Premolded filler strips complying with ASTM D
1056, Type 2 (closed cell), Class A (cellular rubber and rubber-like materials with specific resistance to petroleum base oils), Grade 1 (compression-deflection range of 2-5 psi), compressible up to 35 percent, of width and thickness indicated, formulated from the following material:

1. Neoprene.
2. Preformed Control Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

2.8 MASONRY CLEANER

A. Plain or Colored Block: Job-Mixed Detergent Solution: Solution of trisodium phosphate (1/2-cup dry measure) and laundry detergent (1/2-cup dry measure) dissolved in one gallon of water.

2.9 MORTAR AND GROUT MIXES

A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

B. Do not use calcium chloride in mortar or grout.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar indicated below:

1. Limit cementitious materials in mortar to portland cement-lime.
2. Grout for Unit Masonry: Comply with ASTM C 476. Use grout of consistency indicated. The use of fly ash in grout will not be allowed. Use grout with minimum compressive strength of 2000 psi at 28 days, proportioned per Table 1 of ASTM C 476, delete reference to mix proportion per compressive strength in paragraph 5.2 of ASTM C 476.
3. Use fine grout in grout spaces less than 2 inches in horizontal dimension, unless otherwise indicated.
4. Use coarse grout in grout spaces 2 inches or more in least horizontal dimension, unless otherwise indicated.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of unit masonry.

B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.

C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

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

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

3.3 CONSTRUCTION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces of columns, walls, and arrises, do not exceed 1/4" in 10', or 3/8" in 20', or 1/2" in 40'. For external corners, expansion joints, control joints, or other conspicuous lines, do not exceed 1/4" in 20', or 1/2" in 40'. For vertical alignment of head joints, do not exceed plus or minus 1/4" in 10', or 1/2" maximum.

B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4" in 20', or 1/2" in 40' or more. For top surface of bearing walls, do not exceed 1/8" in 10', nor 1/16" within a single unit.

C. Variation of Linear Building Line: For position shown in plan and related portions of columns, walls, and partitions, do not exceed 1/2" in 20' or 3/4" in 40' or more.
D. Variation in Cross Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed -1/4" or +1/2".

E. Variation in Mortar Joint Thickness: Do not vary from bed-joint thickness indicated by more than plus or minus 1/8" with a maximum thickness limited to 1/2". Do not vary bed joint thickness from bed-joint thickness of adjacent course by more than 1/8". Do not vary from bed-joint or head-joint thickness indicated by more than plus or minus 1/8". Do not vary from collar-joint thickness indicated by more than minus 1/4" or plus 3/8".

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations. Mix blocks from several pallets to avoid blotchy color.

B. Lay up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.

C. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond or 1/3-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry and remove loose masonry units and mortar prior to laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

F. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow concrete masonry as follows:

1. With full mortar coverage on horizontal and vertical face shells.
2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.

   a. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

3. Maintain consistent mortar joint width, typically 3/8". Tool joints consistently dense and slightly concave. Where joints will be covered with other materials (such as furring, insulation or lathing and plaster), strike flush and smooth with face of block.

3.6 HORIZONTAL JOINT REINFORCEMENT

A. General: Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcing a minimum of 6 inches.

1. Space reinforcement not more than 16" o.c. for typical walls. Space not more than 8" o.c. in foundation walls and parapet walls.
2. Provide reinforcement in mortar joint 1 block course above and below wall openings and extending 12" beyond opening.

   a. Reinforcement above is in addition to continuous reinforcement.

3. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
4. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joints in unit masonry where indicated. Build in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
1. Form control joints in concrete masonry as follows:
   a. Fit bond breaker strips into hollow contour in ends of block units on one side of control joint. Fill the resultant core with grout and rake joints in exposed faces.
   b. Install preformed control joint gaskets designed to fit standard sash block.
   c. Install special shapes designed for control joints. Install bond breaker strips at joint. Keep head joints free and clear of mortar or rake joint.

2. Install temporary filler in head joints and remove when unit masonry is complete.

3.8 INSTALLATION OF REINFORCED UNIT MASONRY

A. Temporary Formwork: Construct formwork and shores to support reinforced masonry elements during construction.

B. Construct formwork to conform to shape, line, and dimensions shown. Make sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

C. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.

D. GROUTING

1. Provide minimum clear dimensions of 2" and clear areas of 8 sq. in. in vertical cores to be grouted.

2. Place vertical reinforcement prior to laying of CMU. Extend above elevation of maximum pour height as required for splicing. Support in position at vertical intervals not exceeding 5'.

3. Lay CMU to maximum pour height. Do not exceed 5' height, or if bond beam occurs below 5' height, stop pour at course below bond beam.

4. Pour grout using chute or container with spout. Mechanically vibrate grout during placing. Place grout continuously, do not interrupt pouring of grout for more than one hour. Terminate grout pours 1-1/2" below top course of pour.
5. Bond Beams: Stop grout in vertical cells 1-1/2" below bond beam course. Place horizontal reinforcement in bond beams; lap at corners and intersections as shown. Place grout in bond beam course before filling vertical cores above bond beam.

E. Placing Reinforcement:

1. Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross section due to excessive rusting or other causes.
2. Position reinforcement accurately at spacing indicated. Support and secure vertical bars against displacement. Horizontal reinforcement may be placed as the masonry work progresses. Where vertical bars are shown in close proximity, provide a clear distance between bars of not less than nominal bar diameter or 1" (whichever is greater).
3. Splice reinforcement bars where shown; do not splice at other points unless acceptable to Architect. Provide lapped splices, unless otherwise indicated. In splicing vertical bars or attaching to dowels, lap ends, place in contact and wire tie.

   a. Provide not less than minimum lap indicated, or if not indicated, as required by Code.

3.9 FIELD QUALITY CONTROL

A. The Owner will employ and pay a qualified independent testing agency to perform the following testing and submit test reports for field quality control.

B. Sampling and Testing Mortar and Grout:

1. Mortar and grout samples shall be secured from field mixed materials. Do not use retempered mortar.
2. Compressive Test Specimens: ASTM C 780 for mortar and UBC standards 24-28 for grout; one set of four molds each for mortar and grout for each compressive strength test. Molding and field and laboratory storage of molds shall be per UBC standard.
3. Compressive Strength Tests: ASTM C 780 for mortar and ASTM C1019 for grout; one set (four molds) for each material the first day it is used and averaging every third or fourth day that the material is used thereafter, but not less than one set for each 2,000 sf of wall for each material; one specimen for each material tested at seven days, two specimens tested at 28 days, and one specimen retained in reserve for
later testing if required.

a. Strength level of mortar and grout will be considered satisfactory if average sets of three consecutive strength test results equal of exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 300 psi.

4. Test results will be reported in writing to Architect, Structural Engineer, Owner, and Contractor on same day that tests are made. Reports of compressive strength tests will contain the project identification name and number, date of material placement, name of testing service, location of material in structure, design compressive strength at 28 days, material mix proportions and materials; compressive breaking strength for both seven day and 28 day tests.

5. If testing service reports and inspections indicated specified materials strengths and other characteristics have not been attained in the structure, the testing service will make additional tests of in-place mortar or grout, as directed by the Architect. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable material is verified.

a. Complete cost of retesting and/or reinspection shall be the Contractor's responsibility. Retesting and reinspection shall be performed by the Owner's testing and inspection service.

3.10 REPAIRING, POINTING AND CLEANING

A. At any exposed work, remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units and in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Fill all small cracks and beeholes. Point-up all joints including corners, openings, and adjacent construction to provide a neat, uniform appearance, prepared for application of sealants.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears prior to tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleared for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
   a. Protect adjacent nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
   b. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly and completely by rinsing thoroughly with clear water.
   c. Clean concrete masonry by means of cleaning method indicated in NCMA TEK 45 applicable to type of stain present on exposed surfaces.

E. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure unit masonry is without damage and deterioration at time to apply coatings.

3.11 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Excess masonry materials are Contractor's property. On an ongoing basis, remove all excess materials, waste and debris from Project site and legally dispose of.

END OF SECTION 042000
1.1 RELATED DOCUMENTS

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

B. Additional criteria for architecturally exposed structural steel are specified in Section 051213.

1.2 SUMMARY

A. This Section includes fabrication and erection of structural steel work, as shown on drawings including schedules, notes, and details showing size and location of members, typical connections, and types of steel required.

1. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.

2. Miscellaneous Metal Fabrications are specified in Section 055000.

3. Touching-up of steel primers.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards). Include certification of V.O.C. compliance.

1. Structural steel primer paint.

2. Shrinkage-resistant grout.
C. Shop drawings, including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.

1. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols and show size, length, and type of each weld.

2. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.

D. Test reports conducted on shop- and field-bolted and welded connections. Include data on type(s) of tests conducted and test results.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:


   a. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence:

   1) "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any detail configuration of connections developed by the fabricator as a part of his preparation of these shop drawings."

2. AISC "Specifications for Structural Steel Buildings," including "Commentary."


5. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."

6. Attachment and inspection of headed studs shall conform to all

STRUCTURAL STEEL

B. Qualifications for Welding Work: Qualify welding procedures and welding operators in accordance with AWS "Qualification" requirements.

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

2. If recertification of welders is required, retesting will be Contractor's responsibility.

3. High-strength bolting shall be inspected by an independent testing laboratory to ensure bolt tension.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. If bolts and nuts become dry or rusty, clean and relubricate before use.

1. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.
2.1 MATERIALS

A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and applying surface finishes.

B. W-Shapes: ASTM A992 Grade 50.

C. Channels and Angle Shapes, Plates, and Bars: ASTM A 36, Fy = 36 KSI.

D. Cold-Formed Steel Tubing (rectangular HSS): ASTM A 500, Grade B, Fy = 46 KSI.

E. Cold-Form Steel Piping (round HSS): ASTM A 50, Grade B, Fy = 42 KSI.

F. Bolts: ASTM A 325N, Type 1.

G. Headed Studs: Nelson Type H4L or S3L or approved equal and shall conform to ASTM A 108, grades 1015 or 1020 with a minimum tensile strength of 60 KSI.

H. Deformed Bar Anchor Studs: Nelson D2L studs or approved equal with a minimum tensile strength of 80 KSI. Anchor Bolts: ASTM A 36 or A307. Anchor rods shall be ASTM F1554, Grade 36.


J. Epoxy Bolts or Dowels: Threaded rod or reinforcing steel installed with set adhesive by Simpson per ICBO Report ER-5279.

K. Expansion Anchors for Concrete: "Kwik bolt TZ" by Hilti installed per ICBO Report ESR-1917. Expansion bolts for masonry shall be "Kwik Bolt III" by Hilti, installed per ICBO Report ESR-1335.
L. Electrodes for Welding: Comply with AWS Code. E70 Series low hydrogen rods unless noted otherwise; E90 series for Grade 60 reinforcing bars.

M. Structural Steel Primer Paint: SSPC - Primer: SSPC-Paint 23, latex primer.

N. Nonmetallic Shrinkage-Resistant Grout: Shall be 5000 psi – Five Star, Sika 212 or equal.

2.2 FABRICATION

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.

2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

   1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.

   2. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.

   3. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.

   4. Fabricate to the tolerances specified in AISC 303.

B. Connections: Weld or bolt shop connections, as indicated.

C. Bolt field connections, except where welded connections or other connections are indicated.
D. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

1. Grind smooth and flush with adjacent surfaces all welds on exposed structural steel.

E. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

G. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work.

H. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.3 SHOP PAINTING

A. General: Shop-paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only.

1. Do not paint surfaces to be welded or high-strength bolted with friction-type connections.
2. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
B. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:

1. Interior: SSPC-SP 7/NACE No. 4, "Brush-Off Blast Cleaning."
2. Exterior: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

C. Painting: Immediately after surface preparation, apply structural steel primer in at least two coats in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils per coat. Use painting methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.4 SOURCE QUALITY CONTROL

A. General: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

1. Promptly remove and replace materials or fabricated components that do not comply.

B. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.

1. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.
PART 3 - EXECUTION

3.1 ERECTION

A. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

B. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

C. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

1. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. See Structural Notes for sequence of grouting. Finish exposed surfaces, protect installed materials, and allow to cure.
4. For proprietary grout materials, comply with manufacturer's instructions.

D. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

E. Level and plumb individual members of structure within specified AISC tolerances.
F. Splice members only where indicated and accepted on shop drawings.

G. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces.
   1. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
   2. Do not enlarge unfair holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

H. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.

I. Touchup Painting: Clean and touchup field welds, bolted connections, and abraded areas of shop paint on structural steel.

3.2 QUALITY CONTROL

A. Owner will engage an independent testing and inspection agency to perform inspections as detailed on the drawings.

B. Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations.

C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

D. Testing agency may inspect structural steel at plant before shipment.

E. Correct deficiencies in structural steel work that inspections and laboratory
test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.

F. Shop-Bolted Connections: Inspect or test in accordance with AISC specifications.

G. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:

2. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
3. Perform visual inspection of all welds.

H. Field Welding: Inspect and test during erection of structural steel as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
2. Perform visual inspection of all welds.
3. Multi-pass fillet welds and full penetration welds shall be continuously inspected.

END OF SECTION 051200
SECTION 051213 - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING

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 architecturally exposed structural-steel framing.

   1. All typical requirements in Section 051200 - Structural Steel Framing also apply to AESS framing.

B. Related Sections:

   1. Section 055100 - Metal Stairs.
   2. Section 099000 – Painting for surface preparation and priming requirements.

1.3 DEFINITIONS

A. Architecturally Exposed Structural Steel: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.

B. Category 1 AESS: AESS that is within 96 inches vertically and 36 inches horizontally of a walking surface and is visible to a person standing on that walking surface or is designated as "Category 1 architecturally exposed structural steel" or "AESS-1" in the Contract Documents.

C. Category 2 AESS: AESS that is within 20 feet vertically and horizontally of a walking surface and is visible to a person standing on that walking surface or is designated as "Category 2 architecturally exposed structural steel" or "AESS-2" in the Contract Documents.

D. Category 3 AESS: AESS that is not defined as Category 1 or Category 2 or that is designated as "Category 3 architecturally exposed structural steel" or "AESS-3" in the Contract Documents.
1.4 SUBMITTALS

A. Shop Drawings: Show fabrication of AESS components.
   1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
   2. Include embedment drawings.
   3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
   4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
   5. Indicate exposed surfaces and edges and surface preparation being used.
   6. Indicate special tolerances and erection requirements.

B. Samples: Submit samples of AESS to set quality standards for exposed welds for Category 1 AESS.
   1. Two steel plates, 3/8 by 8 by 4 inches, with long edges joined by a groove weld and with weld ground smooth.
   2. Steel plate, 3/8 by 8 by 8 inches, with one end of a short length of rectangular steel tube, 4 by 6 by 3/8 inches, welded to plate with a continuous fillet weld and with weld ground smooth and blended.
   3. Round steel tube or pipe, minimum 8 inches in diameter, with end of another round steel tube or pipe, approximately 4 inches in diameter, welded to its side at a 45-degree angle with a continuous fillet weld and with weld ground smooth and blended.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

   1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
1.6 PROJECT CONDITIONS

A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers’ recommendations to ensure that shop primers and topcoats are compatible with one another.

PART 2 - PRODUCTS

2.1 BOLTS, CONNECTORS, AND ANCHORS: See Section 051200.

2.2 PRIMER

A. Primer: SSPC-Paint 25 BCS, Type II, zinc oxide, alkyd, linseed oil primer.

2.3 FABRICATION

A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.

B. In addition to special care used to handle and fabricate AESS, comply with the following:

1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
2. Grind sheared, punched, and flame-cut edges of Category 1 AESS to remove burrs and provide smooth surfaces and edges.
3. Fabricate Category 1 AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.
4. Fabricate Category 1 AESS with exposed surfaces free of seams to maximum extent possible.
5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
7. Fabricate Category 1 <Insert categories> AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
8. Fabricate Category 2 and Category 3 AESS to the tolerances specified in AISC 303 for steel that is not designated AESS.
9. Seal-weld open ends of hollow structural sections with 3/8-inch closure plates for Category 1 AESS.

C. Coping, Blocking, and Joint Gaps: Maintain uniform gaps of 1/8 inch with a tolerance of 1/32 inch for Category 1 AESS.

D. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

E. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
   1. Cut, drill, or punch holes perpendicular to steel surfaces.
   2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
   3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.4 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified. Tightening by any means allowable by AISC. All high strength bolting inspected by an Independent Testing Laboratory to ensure bolt tension.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:
   1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
   2. Use weld sizes, fabrication sequence, and equipment for AESS that limit distortions to allowable tolerances.
   3. Provide continuous welds of uniform size and profile where Category 1 AESS is welded.
   4. Make butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus 0 inch for Category 1 AESS. Do not grind unless required for clearances or for fitting other components, or unless directed to correct unacceptable work.
   5. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for Category 1 AESS.
6. At locations where welding on the far side of an exposed connection of Category 1 AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.

7. Make fillet welds for Category 1 and Category 2 AESS of uniform size and profile with exposed face smooth and slightly concave. Do not grind unless directed to correct unacceptable work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.

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

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.

2. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
1. Erect Category 1 AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
2. Erect Category 2 and Category 3 AESS to the tolerances specified in AISC 303 for steel that is not designated AESS.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
   1. Orient bolt heads in same direction for each connection and to maximum extent possible in same direction for similar connections.

   1. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for Category 1 AESS.
   2. Remove erection bolts in Category 1 and Category 2 AESS, fill holes, and grind smooth.
   3. Fill weld access holes in Category 1 and Category 2 AESS and grind smooth.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect AESS as specified in Division 05 Section "Structural Steel Framing." The testing agency will not be responsible for enforcing requirements relating to aesthetic effect.

B. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

3.6 REPAIRS AND PROTECTION

A. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Grind steel smooth.

B. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

END OF SECTION 051213
SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes steel joists for floor and roof framing. Type of joists required is:

   K-Series Open Web Steel Joists.

1.3 SUBMITTALS

A. Product data and installation instructions for each type of joist and accessories.

   1. Include manufacturer's certification that joists comply with SJI "Specifications."

B. Shop drawings showing layout of joist members, special connections, joining and accessories. Include mark, number, type, location and spacing of joists and bridging.

C. The manufacturer shall submit drawings for approval prior to fabrication. The shop drawings shall include, but not be limited to, the applicable details, design loads, allowable stresses, structural analysis (calculations), erection drawings, and all the necessary installation instructions and details, and other necessary information required for review. Structural calculation shall be prepared by an Arizona-registered Structural Engineer.

1.4 QUALITY ASSURANCE

A. General: Provide joists fabricated in compliance with Steel Joist Institute (SJI) "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

C. Inspection: Inspect joists and girders in accordance with SJI "Specifications."

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle steel joists as recommended in SJI "Specifications." Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel: Comply with SJI "Specifications" for chord and web sections.

B. Steel Bearing Plates: ASTM A 36.


D. Steel Prime Paint: Comply with SJI "Specifications."

2.2 FABRICATION

A. General: Fabricate steel joists in accordance with SJI "Specification."

B. Ceiling Extension: Provide ceiling extensions in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface, unless otherwise indicated.

C. Bridging: Provide horizontal or diagonal type bridging for joists and joist girders, complying with SJI "Specifications."

   1. Provide bridging anchors for ends of bridging lines terminating at walls or beams.
D. End Anchorage: Provide end anchorages, including steel bearing plates, to secure joists to adjacent construction, complying with SJI "Specifications."

E. Header Units: Provide header units to support tail joists at openings in floor or roof system not framed with steel shapes.

F. Shop Painting: Remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories before application of shop paint.

1. Apply one shop coat of steel prime paint to joists and accessories, by spraying, dipping, or other method to provide a continuous dry paint film thickness of not less than 0.50 mil.

PART 3 - EXECUTION

3.1 ERECTION

A. Place and secure steel joists in accordance with SJI "Specifications," final shop drawings, and as herein specified.

B. Anchors: Furnish anchor bolts, steel bearing plates, and other devices to be built into concrete and masonry construction.

1. Provide unfinished threaded fasteners for anchor bolts, unless high strength bolts indicated.

C. Placing Joists: Do not start placement of steel joists until supporting work is in place and secured. Place joists on supporting work, adjust and align in accurate locations and spacing before permanently fastening.

D. Provide temporary bridging, connections, and anchors to ensure lateral stability during construction.

1. Where "open-web" joist lengths are 40 feet and longer, install a center row of bolted bridging to provide lateral stability before slackening of hoisting lines.

E. Bridging: Install bridging simultaneously with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.
F. Fastening Joists: Comply with the following:

1. Field weld joists to supporting steel framework and steel bearing plates where indicated in accordance with SJI "Specifications" for type of joists used. Coordinate welding sequence and procedure with placing of joists.

G. Touch-Up Painting: After joist installation, wire brush welded areas, abraded or rusty surfaces, and clean with solvent. Paint field-applied bolt heads and nuts and prepared surfaces on joists and steel supporting members. Use same type of paint as used for shop painting.

END OF SECTION 052100
SECTION 053100 - STEEL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Roof deck.
2. Composite floor deck.

B. Related Sections include the following:

1. Section 033000 - Cast-in-Place Concrete for concrete fill.
2. Section 051200 - Structural Steel.
3. Section 055000 - Metal Fabrications.
4. Section 099000 – Painting.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

C. Product Certificates: For each type of steel deck, signed by product manufacturer.

D. Welding certificates.

E. Field quality-control test and inspection reports.

F. Research/Evaluation Reports: For steel deck.
1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes and standards, except as otherwise indicated:

1. American Iron and Steel Institute (AISI), "Specification for the Design of Cold-Formed Steel Structural Members."
3. Steel Deck Institute (SDI), "Design Manual for Composite Decks, Form Decks and Roof Decks."

B. Qualification of Field Welding: Use qualified welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS.

1. Welded decking in place is subject to inspection and testing. Owner will bear expense of removing and replacing portions of decking for testing purposes if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work.

C. FM Listing: Provide steel roof deck units that have been evaluated by Factory Mutual System and are listed in "Factory Mutual Approval Guide" for "Class I" fire-rated construction.

D. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.

E. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
PART 2 - PRODUCTS

2.1 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), 40 minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.
2. Deck Profile: Type WR, wide rib.
3. Profile Depth: 1-1/2 inches and 3", see plans.
4. Design Uncoated-Steel Thickness: As indicated.
5. Span Condition: As indicated.
6. Side Laps: Overlapped or interlocking seam at Contractor's option.
7. Mechanical Concrete Deck areas, as shown on Structural Roof Framing Plans: Provide galvanized steel sheet, ASTM A 653/A 653M, Structural Steel (SS), G60 zinc coating.

2.2 COMPOSITE FLOOR DECK

A. Composite Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following:

1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), G60 zinc coating.
2. Profile Depth: 1-1/2 inches.
3. Design Uncoated-Steel Thickness: 20 ga. And 18 ga., see plans.
4. Span Condition: As indicated.

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
D. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

E. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 30 for overhang and slab depth.

F. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

G. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, with factory-punched hole of 3/8-inch minimum diameter.

H. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.

C. Locate deck bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work and as shown on Structural Details.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

3.3 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as shown on Structural.

1. Weld Washers: Install weld washers at each weld location.

B. Side-Lap and Perimeter Edge Fastening: See Structural Drawings.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Lapped 2 inches minimum or butted at Contractor's option.

D. Roof Sump Pans: Install over openings provided in roof deck and mechanically fasten flanges to top of deck.

1. Install reinforcing channels or zees in ribs to span between supports.

E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions.

1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.

F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.
3.4 FLOOR-DECK INSTALLATION

A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated.

B. Weld Washers: Install weld washers at each weld location.


D. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
   1. End Joints: Butted.

E. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.

F. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: [Owner will engage] [Engage] a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field welds will be subject to inspection.

C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.

D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on top surface of prime-painted deck immediately after installation, and apply repair paint.

C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 053100
SECTION 054000 - COLD-FORMED METAL FRAMING

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. Exterior non-load-bearing wall framing.
2. Soffit framing.

B. Related Requirements:

1. Section 055000 - Metal Fabrications for masonry shelf angles and connections.
2. Section 092116 - Gypsum Board Shaft Wall Assemblies for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cold-formed steel framing product and accessory.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. Delegated-Design Submittal: For cold-formed steel framing.
1.4 INFORMATIONAL SUBMITTALS

A. Product Data: For each type of steel framing product and accessory.

B. Welding certificates.

C. Product Test Reports: For each listed product, for tests performed by a qualified testing agency.
   1. Expansion anchors.
   2. Power-actuated anchors.
   3. Mechanical fasteners.
   4. Vertical deflection clips.
   5. Horizontal drift deflection clips
   6. Miscellaneous structural clips and accessories.

D. Research Reports: For cold-formed steel framing, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

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

D. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.
PART 2 - PRODUCTS

2.1 COLD-FORMED STEEL FRAMING, GENERAL

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

2. Coating: G60 (Z180).

B. Steel Sheet for Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: 50 (340), Class 1.
2. Coating: G60 (Z180).

2.2 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as shown on drawings.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as shown on drawings.

C. Vertical Deflection Clips: Manufacturer's standard clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as shown on the drawings.

E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.3 SOFFIT FRAMING

A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as shown on drawings.
2.4 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
   1. Supplementary framing.
   2. Bracing, bridging, and solid blocking.
   3. Web stiffeners.
   4. Anchor clips.
   5. End clips.

2.5 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

C. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
   1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

D. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A 780.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-
compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.7 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
   a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.
4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing 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 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

C. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.

D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.
C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
   1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
   1. Cut framing members by sawing or shearing; do not torch cut.
   2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
      a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
      b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

H. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:


C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

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 and Architect.

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.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000
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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Steel framing and supports for mechanical and electrical equipment.
   2. Loose bearing and leveling plates.
   3. Steel lintels.
   4. Steel connective hardware.
   5. Vertical wall ladder at elevator pit.
   6. Perforated metal panels.

B. Related Sections include the following:
   1. Section 033000 - Cast-in-Place Concrete for installing anchor bolts, steel pipe sleeves, wedge-type inserts and other items indicated to be cast into concrete.
   2. Section 051200 - Structural Steel.
   3. Section 054000 – Cold-Formed Steel Framing.
   4. Section 055100 – Metal Stairs.
   5. Section 055133 – Alternating Tread Stair
   6. Section 057000 – Decorative Metals
   7. Section 061000 – Rough Carpentry
   8. Section 077200 – Roof Hatch
   9. Section 099000 - Painting.

1.3 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F ambient; 180 deg F, material surfaces.

1.4 SUBMITTALS

A. Product Data: For the following:
   1. Paint products.
   2. 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.
   2. Provide templates for anchors and bolts specified for installation under other Sections.
   3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Welding certificates.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.1, "Structural Welding Code--Steel."
   2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
   2. Provide allowance for trimming and fitting at site.
1.7 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. 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.

B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. 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. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500, cold-formed steel tubing.

C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

D. Stainless Steel Piping: ASTM A 312/A 312M, Grade TP 304.

E. Iron Castings: Gray iron, Class 35-B, or better, for heavy duty use.

F. Perforated Metal: 1/8" thickness perforated metal panels, same pattern as existing.

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, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.
B. Anchor Bolts: ASTM F 1554, Grade 36.
   1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

C. Eyebolts: ASTM A 489.

D. Machine Screws: ASME B18.6.3.

E. Lag Bolts: ASME B18.2.1.

F. Wood Screws: Flat head, ASME B18.6.1.


I. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
   1. Threaded or wedge type; 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, hot-dip galvanized per ASTM A 153/A 153M.

J. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, 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.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.

METAL FABRICATIONS 055000 - 4

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, 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 true to line and level 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 where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, 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.
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 retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
      1. Furnish inserts if units are installed after concrete is placed.

2.7 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.

2.8 LOOSE STEEL LINTELS
   A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
   B. Weld adjoining members together to form a single unit where indicated.
   C. Size loose lintels as shown on structural drawings.

2.9 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.

2.10 VERTICAL METAL WALL LADDERS: Provide ladder for access to roof hatch and at elevator sump pit.
   A. General:
1. Comply with ANSI A14.3 unless otherwise indicated.

B. Steel Ladders:
   1. Space siderails 16 inches apart.
   4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
   5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
   6. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
   7. Prime ladders, including brackets and fasteners.

2.11 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.

2.12 STEEL AND IRON FINISHES
   A. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
      1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
      2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
   B. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. 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. Coat iron that will be in contact with fresh concrete as recommended by manufacturer.
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 bolts, 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.

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.
3.3 INSTALLING BEARING AND LEVELING 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 nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, 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 dry film thickness.

END OF SECTION 055000
SECTION 055100 - METAL STAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Exterior stairs with concrete-filled metal pan treads.
   2. Steel pipe, tube or solid guard rails and railings.
   3. Perforated metal panel.

B. Related Sections include the following:
   1. Section 033000 – Cast-In-Place Concrete.
   2. Section 051200 – Structural Steel.
   3. Section 099000 – Painting.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance of Stairs: Provide metal stair treads capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated. Exterior treads shall also be designed to withstand all required design loads (i.e., wind, snow, seismic, etc.) in accordance with the required codes of the applicable project.

1. Uniform Load: 100 lbf/sq. ft.
2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
5. Limit deflection of treads, platforms, and framing members to L/240 or 1/4 inch, whichever is less.
B. Structural Performance of Railings: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Guardrails:
   a. Uniform load of 50 lbf/ft. applied in any direction.
   b. Concentrated load of 200 lbf applied in any direction.
   c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Top Rails of Guards:
   a. Uniform load of 50 lbf/ft. applied in any direction.
   b. Concentrated load of 200 lbf applied in any direction.
   c. Uniform and concentrated loads need not be assumed to act concurrently.

1.4 SUBMITTALS

A. Product Data: For metal stairs and the following:
   1. Paint products.
   2. Grout.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Provide templates for anchors and bolts specified for installation under other Sections.
   2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples: Submit a sample of a section of railing and posts at least 3 feet long to show quality of workmanship. Submit color chips for precast treads for selection. Submit samples of “rust” finish for exterior railings.

D. Welding certificates.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for stairs and railings.
   1. Test railings according ASTM E 894 and ASTM E 935.
1.5 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.


C. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.1, "Structural Welding Code—Steel."
   2. AWS D1.3, "Structural Welding Code—Sheet Steel."

1.6 COORDINATION

A. Coordinate installation of anchorages for metal stairs. 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.

B. Coordinate locations of hanger rods and struts with other work so that they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
   1. Provide cast-metal brackets with flange tapped for concealed anchorage to threaded hanger bolt.
   2. Provide either formed- or cast-metal brackets with predrilled hole for exposed bolt anchorage.
   3. Provide formed-steel brackets with predrilled hole for bolted anchorage and with snap-on cover that matches rail finish and conceals bracket base and bolt head.
C. FERROUS METAL

1. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

2. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304.


4. Tubing: ASTM A 500 (cold formed).

5. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, either commercial steel, Type B, or structural steel, Grade 30, unless another grade is required by design loads.

6. Perforated Metal Panel: 1/8" thickness steel, pattern to match existing.

2.2 FASTENERS

A. General: Provide zinc-plated fasteners with coating complying Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.

B. 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. Anchor Bolts: ASTM F 1554, Grade 36.


E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).


H. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, 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.

I. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

J. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
   1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).


L. Concrete Materials and Properties: Comply with requirements in Section 033000 - Cast-in-Place Concrete for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

M. Precast Tread Units: Factory cast tread units reinforced with 3/8” coated rebar, integrally colored and textured. Nominal 2” thickness, configuration equal of Wausau Tile C-31 Treat and Riser, width as shown.

N. Setting Material for Treads: Thinset epoxy mortar, equal Mapei Kerapoxy.

O. Finish for Exterior Railings: Section 099000 – Painting.

2.3 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
   1. Join like materials by welding; mechanically fasten unlike materials; provide separation between all aluminum and steel components, such as neoprene sheet.
   2. Use connections that maintain structural value of joined pieces.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, 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 true to line and level with accurate angles and surfaces and straight edges.
E. Weld connections 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 where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

2.4 STEEL-FRAMED STAIRS

A. Stair Framing:

1. Fabricate stringers of steel shapes as shown.
   a. Provide closures for exposed ends of channel or tube stringers.

2. Construct platforms of steel headers and miscellaneous framing members as indicated.

3. Weld stringers to headers; weld framing members to stringers and headers.

B. Metal-Pan Stairs: Form risers, subread pans, and subplatforms to configurations shown from steel sheet of thickness indicated.

1. Steel Sheet: Uncoated hot-rolled steel sheet.
2. Directly weld metal pans to stringers; locate welds on top of subreads where they will be concealed by concrete fill. Do not weld risers to stringers.
3. Shape metal pans to include nosing integral with riser.
4. At Contractor's option, provide stair assemblies with metal-pan subreads filled with reinforced concrete during fabrication.
5. Provide subplatforms of configuration indicated or, if not indicated, the same as subreads. Weld subplatforms to platform framing.
6. Coordinate for insetting of nosings into concrete-filled pans with back of nosing snug to face of steel.
2.5 Guard Rails and Rails: Fabricate of steel pipe, tube or solid material as shown. Form all turns by cleanly bending or welding and grinding.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal stairs after assembly.

C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed products:


D. Apply shop primer consistently to uncoated surfaces of metal stair components, except those to be embedded in concrete or masonry unless otherwise indicated. 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.

E. Exterior Railings: Section 099000 – Painting.

PART 3 - EXECUTION

2.7 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.

C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete, unless otherwise indicated.
D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

E. 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.

F. 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.

G. Place and finish concrete fill for treads and platforms to comply with Section 033000 - Cast-in-Place Concrete.

H. Weld steel railings to supports.

2.8 INSTALLING METAL STAIRS WITH GROUTED BASEPLATES


B. Set steel stair baseplates on wedges, shims, or leveling nuts. After stairs have been positioned and aligned, 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 nonmetallic, nonshrink grout, unless otherwise indicated.
   2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

C. Attach brackets for handrails to wall. Use type of bracket with predrilled hole for exposed bolt anchorage. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction:
   1. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.
2.9 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed 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 dry film thickness.

END OF SECTION 055100
SECTION 057000 - DECORATIVE METAL

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. Stainless steel counter supports at Student Life.

B. Related Sections:
   1. Section 055000 - Metal Fabrications for non-decorative metal fabrications.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated, including finishing materials.

B. Shop Drawings: Show fabrication and installation details for decorative metal.
   1. Include plans, elevations, component details, and attachments to other work.
   2. Indicate materials and profiles of each decorative metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.

C. Welding certificates.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing decorative metal similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
B. Installer Qualifications: Fabricator of products.

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.6, "Structural Welding Code - Stainless Steel."

D. Mockups: Provide one support for review of fabrication quality. Acceptable sample may be incorporated into the work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store decorative metal in a well-ventilated area, and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

1.6 COORDINATION

A. Coordinate installation of anchorages for decorative metal items. 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 DECORATIVE METAL FABRICATORS

A. Fabricators: Subject to compliance with requirements, fabricators offering decorative metal work that may be incorporated into the Work include, but are not limited to, the following:

1. Abbott Metal Fab, 888-3424
2. Caid Industries, 292-3126

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. Provide materials without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
2.3 STAINLESS STEEL

A. Pipe: ASTM A 312/A 312M, Grade TP 304 or Grade TP 316 as needed.

B. Bars and Shapes: ASTM A 276, Type 304 or Type 316 as needed.

C. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304 or Type 316 as needed.

2.4 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:
   1. Stainless-Steel Items: Stainless-steel fasteners to match type of steel.

B. Fasteners for Anchoring to Other Construction: Unless otherwise indicated, select fasteners of type, grade, and class required to produce connections suitable for anchoring indicated items to other types of construction indicated.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.6 FABRICATION, GENERAL

A. Assemble items in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

B. Form decorative metal to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

D. Form simple and compound curves in bars, pipe, tubing, and extruded shapes by bending members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces.
E. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

F. Mill joints to a tight, hairline fit. Cope or miter corner joints. Fabricate connections that will be exposed to weather in a manner to exclude water.

G. Provide necessary rebates, lugs, and brackets to assemble units and to attach to other work. Cut, reinforce, drill, and tap as needed to receive finish hardware, screws, and similar items unless otherwise indicated.

H. Comply with AWS for recommended practices in shop welding. Weld behind finished surfaces without distorting or discoloring exposed side. Clean exposed joints of flux, and dress exposed and contact surfaces.

1. Where work cannot be concealed behind finished surfaces, finish joints to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 2 Welds: completely sanded joint, some undercutting and pinholes okay.

I. General: Fabricate to designs indicated from steel bars and shapes of sizes and profiles indicated. Form steel bars by bending, forging, coping, mitering, and welding.

J. Welding: Interconnect members with full-length, full-penetration welds unless otherwise indicated. Use welding method that is appropriate for metal and finish indicated and that develops full strength of members joined. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces.

K. Brackets, Fittings, and Anchors: Provide wall brackets, fittings, and anchors to connect to other work unless otherwise indicated.

1. Furnish inserts and other anchorage devices to connect decorative window grilles to concrete and masonry work. Coordinate anchorage devices with supporting structure.
2. Fabricate anchorage devices that are capable of withstanding loads indicated.

2.7 FINISHES, GENERAL

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.
2.8 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
   1. Run grain of directional finishes with long dimension of each piece.

C. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of decorative metal.

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

3.2 INSTALLATION, GENERAL

A. Provide anchorage devices and fasteners where needed to secure decorative metal to in-place construction.

B. Perform cutting, drilling, and fitting required to install decorative metal. Set products accurately in location, alignment, and elevation, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items to be built into concrete, masonry, or similar construction.

C. Fit exposed connections accurately together to form tight, hairline joints or, where indicated, uniform reveals and spaces for sealants and joint fillers. Where cutting, welding, and grinding are required for proper shop fitting and jointing of decorative metal, restore finishes to eliminate evidence of such corrective work.

D. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.
E. Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal arc welding and requirements for welding and for finishing welded connections in "Fabrication, General" Article. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.

3.3 CLEANING AND PROTECTION

A. Unless otherwise indicated, clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and drying with soft cloths.

B. Protect finishes of decorative metal from damage during construction period with temporary protective coverings approved by decorative metal fabricator. Remove protective covering at time of Substantial Completion.

C. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 057000
SECTION 060600 – PLASTIC FABRICATIONS AND SUPPORT HARDWARE
FOR DIVIDER WALL AT STUDENT LIFE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the Plastic Fabrications and support systems as shown and specified in the described system(s):

1. Divider wall
2. Wall Cladding

B. Related Sections include the following:

1. Section 057000- Decorative Metal Fabrications for stainless steel elements.
2. Section 064023 – Architectural Woodwork for plastic sheet countertops.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s product data; include product description, fabrication information, and compliance with specified performance requirements.

B. Shop Drawings/Assembly Instructions: Submit drawings showing all components of the system with complete fabrication and assembly instructions. Include all applicable details and attachment to other work.

C. Submit product test reports from a qualified independent 3rd party testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed test reports will be acceptable if for current manufacturer and indicative of products used on this project.

1. Test reports required are:
   a. Rate of Burning (ASTM D 635)
   b. Self-Ignition Temperature (ASTM D 1929)
c. Density of Smoke (ASTM D 2843)
d. Flame spread and Smoke developed testing (ASTM E 84)
e. Room Corner Burn Test (NFPA 286)
f. Extent of Burning (UL 94)
g. Impact strength (ASTM D 3763)
h. Safety glazing impact resistance (ANSI Z97.1-2004)
i. UPITT Test for Combustion Product Toxicity
j. Dynamic environmental testing (ASTM standards D 5116 and D 6670)

D. Samples for Verification:
   1. Submit minimum 4-inch by 4-inch sample for each type, texture, pattern and color of solid plastic fabrication.

E. Mockups:
   1. Provide one four foot long section of the divider wall, incorporating all attachment hardware, posts, and plastic sheeting, cut and attached as it will be in the finished work.

   2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Maintenance Data: Submit manufacturer’s care and maintenance data, including care, repair and cleaning instructions. Include in Project closeout documents.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications
   1. Materials and systems shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least five (5) consecutive years and which can show evidence of those materials being satisfactorily used on at least six (6) projects of similar size, scope and location. At least three (3) of the projects shall have been successful for use five (5) years or longer.

   2. Manufactured panels must be produced from a minimum of 40% post-industrial recycle content. This recycle content must be certified by a recognized 3rd party certification group, such as Scientific Certification Systems (SCS).

   3. Manufacturer must offer a documented reclaim process that will take back, at the manufacturers cost, panels that are at their end-of life cycle.
1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver Plastic Fabrications, systems and specified items in manufacturer's standard protective packaging.

B. Do not deliver Plastic Fabrications, system, components and accessories to Project site until areas are ready for installation.

C. Store materials in a flat orientation in a dry place that is not exposed to exterior elements.

D. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent damage or staining following installation for duration of project.

E. Before installing Plastic Fabrications, permit them to reach room temperature.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install Solid Polymer Fabrications until spaces are enclosed and weatherproof, and ambient temperatures and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 WARRANTY

A. Manufacturer's Special Warranty on Plastic Fabrications: Manufacturer's standard form agreeing to repair or replace units that fail in material or workmanship within the specified warranty period.

B. Warranty Period: 1 year after the date of substantial completion.

C. The warranty shall not deprive the owner of other rights or remedies the Owner may have under other provisions of the Contract Documents, and is in addition to and runs concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturer: 3form, Inc., Salt Lake City, Utah, USA / telephone 801-649-2500

2.2 MATERIALS

A. Varia™ produced from ecoresin™ Sheet
   1. Engineered polyester resin
   2. Sheet Size: Maximum 4' x 10'
   3. Thickness: 1/4" typical
Basis of Design Product: The design of Plastic Fabrications is based on Varia™ produced with ecoresin™ as provided by 3form, Inc. Products from other manufacturers must be approved by the Architect or Designer prior to bidding.

B. Sheet minimum performance attributes:

1. Rate of Burning (ASTM D 635). Material must attain CC1 Rating for a nominal thickness of 1.5 mm (0.060 in.) and greater.
2. Self-Ignition Temperature (ASTM D 1929). Material must have a Self-ignition temperature greater than 650°F.
3. Density of Smoke (ASTM D 2843). Material must have a smoke density less than 75%.
4. Flame spread and Smoke developed testing (ASTM E 84). Material must be able to meet a level of Class A (Flame spread less than 25 and smoke less than 450) at thickness of 1”.
5. Room Corner Burn Test (NFPA 286). Material must meet Class A criteria at ¼” thickness as described by the 2006 International Building Code.
9. UPITT Test for Combustion Product Toxicity: Product must be recorded as “not more toxic than wood”.
10. Dynamic environmental testing (ASTM standards D 5116 and D 6670). Panels must not have detectable VOC off-gassing agents and must be have Greenguard™ Indoor Air Quality certified.
11. Panels must be produced from a minimum of 40% post-industrial recycle content. This recycle content must be certified by a recognized 3rd party certification group, such as Scientific Certification Systems (SCS).
12. Building Approvals: Plastic Fabrications are to have been evaluated and must be registered with and comply to requirements of the following jurisdictions:
   a. New York Department of Buildings (Product must have an MEA [Materials and Equipment Acceptance] number) for use as Interior Finishes
   b. Los Angeles Department of Building and Safety (Product must have a LARR [Los Angeles Research Report] number) for use as Light-transmitting Panels

C. SUPPORT SYSTEMS: Aluminum extrusions, castings and steel fabrications by the manufacturer of the plastic sheeting system, particularly for support and fastening of the sheets. Includes:
a. Post bottom plate (3-15-1736-K)
b. Blade (post) (3-15-1729-K)
c. Slot covers for blade (3-15-1732)
d. Blade cap (3-15-1728-K)
e. M8 T-nut (3-15-0826) for attachment of spiders
f. 2-leg 3D spider support (3-15-1735-K) for sheets
g. Low-profile standoff cap (3-15-1717-K) to fasten sheets to spiders

2.3 FABRICATION

A. General: Fabricate Plastic Fabrications to designs, sizes and thicknesses indicated and to comply with indicated standards. Sizes, profiles and other characteristics are indicated on the drawings.

B. Comply with manufacturer’s written recommendations for fabrication.

C. Machining: Acceptable means of machining are listed below. Ensure that material is not chipped or warped by machining operations and that all exposed edges are smooth with no rough edges.

1. Sawing: Select equipment and blades suitable for type of cut required.
2. Drilling: Drills specifically designed for use with plastic products.

D. Forming: Form products to shapes indicated using the appropriate method listed below. Comply with manufacturer’s written instructions.

1. Cold Bending

2.4 MISCELLANEOUS MATERIALS

A. General: Provide products of material, size, and shape required for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaner: Type recommended by manufacturer.

C. Fasteners: Use screws designed specifically for plastics manufactured by the system manufacturer. Self-threading screws are acceptable for permanent installations. Provide threaded metal inserts for applications requiring frequent disassembly such as light fixtures.

D. Bonding Cements: May be achieved with solvents or adhesives, suitable for use with product and application.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where installation of Plastic Fabrications will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for installation and comply with requirements specified.

3.2 INSTALLATION

A. General: Comply with manufacturer's written instructions for the installation of Plastic Fabrications.

B. Manufacturer's shop to fabricate items to the greatest degree possible.

C. Utilize fasteners recommended by manufacturer for type of installation indicated. Material that is chipped, warped, hazed or discolored as a result of installation or fabrication methods will be rejected.

D. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.

E. Form field joints using manufacturer's recommended procedures. Locate seams in panels so that they are not directly in line with seams in substrates.

3.3 CLEANING AND PROTECTION

A. Protect surfaces from damage until date of substantial completion. Repair work or replace damaged work, which cannot be repaired to Architect's satisfaction.

END OF SECTION 060600
SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Dimensional wood framing and supports, grounds, nailers, blocking and hardware.

B. Structural steel is specified in Section 051200.

C. 061600 – Sheathing for wall and soffit sheathing.


1.3 DEFINITIONS: Rough carpentry includes carpentry work not specified as part of other Sections.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Material certificates for dimensional lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use as well as design values approved by the Board of Review of American Lumber Standards Committee.
C. Wood treatment data as follows including chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material:

1. For each type of preservative treated wood product include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.

2. For fire-retardant-treated wood products include certification by treating plant that treated material complies with specified standard and other requirements.

3. Material test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.

4. Warranty of chemical treatment manufacturer for each type of treatment.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Inspection Agencies: Inspection agencies and the abbreviations used to reference them with lumber grades and species include the following:

1. WCLIB - West Coast Lumber Inspection Bureau.
2. WWPA - Western Wood Products Association.
C. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
   1. Provide dressed lumber, S4S, unless otherwise indicated.
   2. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

E. Dimension Lumber: Provide Douglas-fir-larch lumber with grade and allowable stresses as indicated on the structural drawings.

2.2 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 19 percent for 2-inch nominal thickness or less, no limit for more than 2-inch nominal thickness.

2.3 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction including bucks, nailers, blocking, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

D. Grade: "Standard" grade light-framing-size lumber of any species or board-size lumber as required. "No. 3 Common" or "Standard" grade boards per WCLIB or WWPA rules or "No. 2 Boards" per SPIB rules.

2.4 CONSTRUCTION PANELS, GENERAL

A. Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood construction panels and, for products not manufactured under PS 1 provisions, with APA PRP-108.

B. Trademark: Furnish construction panels that are each factory-marked with
APA trademark evidencing compliance with grade requirements.

2.5 CONCEALED PERFORMANCE-RATED CONSTRUCTION PANELS

A. General: Where construction panels are indicated for the following concealed types of applications, provide APA Performance-Rated Panels complying with requirements designated under each application for grade designation, span rating, exposure durability classification, edge detail (where applicable), and thickness.

B. Construction Panels for Backing:

1. Plywood Backing Panels: For mounting electrical or communications equipment, provide fire-retardant-treated plywood panels with grade designation, APA C-D PLUGGED EXTERIOR, not less than 15/32 inch, unless otherwise indicated.

2. Paint all backing panels same as adjacent walls.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture. Fasteners used in exterior applications shall be non-corrosive.


D. Wood Screws: ANSI B18.6.1. Provide flat washers at all attachments of hardboard panels.

E. Lag Bolts: ANSI 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.

2.7 METAL FRAMING ANCHORS

A. General: Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:

1. Current Evaluation/Research Reports: Provide products for which model code evaluation/research reports exist that are acceptable to
authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with the building code in effect for this Project.

2. Allowable Design Loads: Provide products for which manufacturer publishes allowable design loads that are determined from empirical data or by rational engineering analysis and that are demonstrated by comprehensive testing performed by a qualified independent testing laboratory.

2.8 PRESERVATIVE TREATMENT: Where lumber of plywood is indicated as "Treated," or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood). Mark each treated item with the AWPB Quality Mark Requirements.

1. Typical at all locations within 18 inches of concrete floor slabs.
2. In connection with roofing, including curbs, perimeter nailers, blocking, crickets, etc.

2.9 FIRE-RETARDANT TREATMENT BY PRESSURE PROCESS

A. General: Where fire-retardant-treated wood is required by an assembly, pressure impregnate lumber and plywood with fire-retardant chemicals to comply with AWPA C20.

1. Interior Type A: For interior locations, including backing boards in electrical and telephone rooms.

2. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

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 nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated. All nailing shall be according to Table 2304.9.1 of the International Building Code.

C. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.

D. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.

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.
   2. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

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.

   Use inorganic boron for items that are continuously protected from liquid water. 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.

J. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.
   1. Fit rough carpentry to other construction; scribe and cope as required for...
accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

2. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.

3. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.2 WOOD GROUNDS, NAILERS AND BLOCKING

A. Install wood grounds, nailers and blocking where shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Where possible, anchor to formwork before concrete placement.

3.3 INSTALLATION OF CONSTRUCTION PANELS


3.4 Fastening Methods: Fasten construction panels as shown on structural and as indicated below:

1. Plywood Backing and Wall Panels: Screw to supports.

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. Soffit sheathing.
   2. Wall sheathing.

B. Related Requirements:
   2. Section 054000 – Cold-Formed Framing.

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.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
PART 2 - PRODUCTS

2.1 SHEATHING

A. Glass-Mat Gypsum Wall and Soffit Sheathing: ASTM C 1177/1177M.

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. CertainTeed Corporation; GlasRoc.
   b. G-P Gypsum Corporation; Dens-Glass Gold.
   c. National Gypsum Company; Gold Bond e(2)XP.
   d. Temple-Inland Inc.; GreenGlass
   e. United States Gypsum Co.; Securock.

2. Type and Thickness: Regular, 1/2 inch.

2.2 SHEATHING JOINT-AND-PENETRATION TREATMENT and ANCHOR MATERIALS

A. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches of type recommended by sheathing and tape manufacturers.

B. Screws: ASTM C1002, corrosion resistant treated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

   1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."

D. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

E. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.
   1. Fasten gypsum sheathing to metal framing with screws.
   2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
   3. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing. Apply at spacings in accordance with manufacturer's instructions.

C. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints.

END OF SECTION 061600
SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Wood cabinets and casework, with wood or plastic laminate faces.
2. Plastic laminate, solid surface covered or plastic counter tops.
3. Translucent plastic countertops.

B. Supports for countertop at curved walls are decorative stainless steel fabrications, specified in Section 057000.

C. Laboratory casework and furniture is specified in Section 115310 – Laboratory Casework and Other Furnishings.

D. Coordinate with Division 23 for plumbing items to be installed into woodwork. Coordinate with Division 26 for electrical conduit to be installed into woodwork.

1.3 SUBMITTALS

A. Shop Drawings: Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components. Indicate finishes for each surface.

B. Product certificates signed by woodwork manufacturer certifying that products comply with specified requirements.
1.4 QUALITY ASSURANCE

A. Single-Source Manufacturing and Installation Responsibility: Engage a qualified Manufacturer to assume undivided responsibility for woodwork specified in this section, including fabrication, finishing, and installation. Woodwork shipped to site and installed by others is not acceptable.

B. Quality Standard: Comply with applicable requirements of "Architectural Woodwork Standards" Edition 1, published by the Architectural Woodwork Institute (AWI) and the Woodwork Institute, except as otherwise indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soiling, and deterioration.

B. Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. Areas shall be conditioned to temperature and humidity at which they will remain in the finished work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of the woodworking standard for each type of woodwork and quality grade indicated and, where the following products are part of woodwork, with requirements of the referenced product standards, that apply to product characteristics indicated:

1. Hardboard: ANSI/AHA A135.4
2. Medium Density Fiberboard: ANSI A208.2 made with binder containing no added urea formaldehyde.
7. Adhesives: Water-based, VOC compliant, standard carpenter glue.
8. Plastic Surfacing Material: Optical grade engineered resin in homogeneous solid sheets (not coated or laminated).

Thickness: 1".

Material: 3Form Chroma or equal solid translucent acrylic product
Color: As selected, top surface renewable matt

Tensile Strength – 10,000 psi (ASTM D 638)
Flexural Strength - 16,000 psi (ASTM D 790)
Hardness – M-103 (Rockwell M Scale, ASTM D 785)
Flammability (ASTM D 84) - Class C
   Flame spread - 115
   Smoke developed – 150

9. Solid Surfacing: Homogeneous solid sheets (not coated or laminated) of filled plastic resin complying with material and performance requirements in ANSI Z124.3, for Type 5 or Type 6. Thickness: 1/2".
   Equal of DuPont Corian, Meganite, or Staron solid surfacing material, color/pattern as selected.

   Tensile Strength - 6000 psi (ASTM D 638)
   Flexural Strength - 10,000 psi (ASTM D 790)
   Hardness - >85 (Rockwell M Scale, ASTM D 785)
   Gloss - 5 (ANSI-Z124)
   Fungus and Bacteria Resistance - no growth (ASTM G 21 and 22)
   Flammability (ASTM D 84) - Class A
      Flame spread - <25
      Smoke developed - <30

2.2 FABRICATION, GENERAL

A. Wood Moisture Content: Comply with requirements of referenced quality standard for moisture content of lumber in relation to relative humidity conditions existing during time of fabrication and in installation areas.
B. Fabricate woodwork to dimensions, profiles, and details indicated.

C. Complete fabrication, including assembly, finishing, and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

D. Factory-cut openings, to maximum extent possible, to receive hardware, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges of cutouts with a water-resistant coating.

2.3 WOOD CABINETS (CASEWORK) - WOOD AND PLASTIC LAMINATE FACED

A. Quality Standard: Comply with AWS Section 10 – Casework.

B. Grade: Custom for all work, with A face veneers per Section 200. Veneers and solid wood products shall be Rotary cut Birch.

C. AWI Type of Cabinet Construction: Flush overlay.

D. Laminate Faced Cabinets: NEMA LD-3 .050” thickness. Colors as scheduled on the drawings.

E. Overlay for Semiexposed Surfaces: Melamine or polyester, as appropriate to substrate, off-white color as selected by the Architect.

F. Concealed Surfaces: Any species, all surfaces sealed or painted.

2.4 HARDWARE AND ACCESSORY MATERIALS

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.
1. Hardware Standards: Except as otherwise indicated, comply with ANSI A156.9 "American National Standard for Cabinet Hardware".
   a. Quality Level: Type 2 (institutional), unless otherwise indicated.
   b. Quality Certification: Where available, provide cabinet hardware bearing the BHMA certification label, affixed either to hardware or its packaging, showing compliance with BHMA Cabinet Hardware Standard 201.

B. Cabinet Hardware Schedule: Provide following hardware for the work:

1. Cabinet Hinges: Concealed European style, field adjustable, 110 deg. opening, self-closing, Blum, Grass, or Stanley.
   a. Provide 2 for doors up to 34" high and one additional for each 16" of door height.

2. Pulls: 3" steel wire pulls.

3. Cabinet Door Locks: All brass construction, equal of National, appropriate for sliding or swinging application as required. Provide appropriate strikes.

4. Drawer Locks: Brass and steel construction, equal of National C813 series, with appropriate strikes.
   a. Keying of Locks for Doors and Drawers: Key locks alike.

5. Shelf Supports: Manufacturer's nylon or steel pin-type supports adjustable on minimum 1" centers.

6. Drawer Slides: Provide, as required, for drawers, steel ball bearing supported, side or bottom mount, full extension, 100 lb. capacity guides; Blum, Grant, Accuride or equal.

7. Grommets: Grommets shall be 2" hole, with removable cap, equal of Doug Mockett & Co. TG series, color as selected. Allow 8 to be located per drawings or at Architects direction.
C. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for BHMA code number indicated.
   
1. Aluminum or steel base with brushed clear finish

D. For concealed hardware provide manufacturer’s standard finish that complies with product class requirements of ANSI/BHMA A156.9.

E. COUNTERTOPS: Quality Standard: Comply with AWI Section 400 for fabrication requirements for plastic laminate covered countertops.
   
1. Edge Treatment: See drawings for requirements for solid edge treatment for plastic laminate covered countertops. Lumber for edge treatments shall be solid members of wood species noted, finished to match other wood, as specified.

2. Solid Surface and Plastic Counter Tops: All solid surface and plastic countertops and trim shall be solidly supported at all points.
   
   a. Joints: Joints and edges in solid surface material shall be prepared smooth and joints in finished products shall be invisible.

   b. Cutting and Shaping: Use appropriate saws to cut to shapes as shown on drawings, with all lines smooth and radiused cleanly. Ease exposed edges after cutting.

2.5 FASTENERS AND ANCHORS

A. Screws and Nails: Select material, type, size, and finish required for each use. Comply with FS FF-S-111 and FS FF-S-105, respectively, for applicable requirements.

B. Anchors: Select material, type, size, and finish required by each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts and anchors, as required, to be set into concrete or masonry work for subsequent woodwork anchorage.
2.6 FACTORY FINISHING:

A. General: Comply with referenced AWI quality standard including Section 1500 "Factory Finishing" for quality of finish – performed at the manufacturing site or in the field.

B. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect and sheen. Finishing system shall be a VOC-compliant, water based type as follows:

1. AWS Grade: Custom
3. Staining: Not required; transparent finish.
4. Effect: Open grain finish.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installing (do not move to site or install until permanent HVAC distribution is in place and is operational).

B. Coordinate to ensure that proper blocking or other supports is provided for all wall attached casework.

C. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

A. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 8'-0" for plumb and level (including tops) and with no variations in flushness of adjoining surfaces.
B. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

C. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.

D. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.

E. Tops: Anchor securely to base units or other support systems as indicated, scribe and fit carefully to surrounding walls. Seal at all wall junctures.

   1. Install grommets as shown or as directed.

F. Complete the finishing work to whatever extent not completed at shop or before installation of woodwork.

3.3 ADJUSTMENT AND CLEANING

A. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Cover countertops with kraft paper if subject to damage during completion of construction work. Clean woodwork on exposed and semiexposed surfaces at time of completion of project. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION 064023

INTERIOR ARCHITECTURAL WOODWORK 064023 - 9
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiberglass reinforced composite panels at Janitor Closets behind sinks as shown.

B. Trim and installation accessories.

1.2 RELATED SECTIONS

A. Resilient wall base is specified in Section 096500 – Resilient Flooring and Resilient Accessories.

1.3 REFERENCES


G. ASTM D 696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C and 30 degrees C.

H. ASTM D 790 - Standard Test Methods for Flexural Properties of FRP PANELS
Unreinforced and Reinforced Plastics and Electrical Insulating Materials.


1.4 SUBMITTALS

A. Product Data: Provide manufacturer’s standard details and catalog data demonstrating compliance with referenced standards. Provide installation instructions.

B. Samples:
   1. Submit samples for selection of color.
   2. Submit 6-inch samples of each trim profile and trim color required.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products indoors and protect from moisture, construction traffic, and damage.

B. Store panels flat on clean, dry surface. Do not stand on edge or stack on fresh concrete or other surfaces that emit moisture.

C. Store panels at least 24 hours temperature and humidity conditions approximating the average environment of the finish room.
PART 2 - PRODUCTS

2.1 PANEL MATERIALS

A. General:
   1. Composite plastic panels of random chopped fiber glass roving, modified polyester copolymer, inorganic fillers, and pigments.
   2. Resistant to rot, corrosion, staining, denting, peeling, and splintering.
   3. USDA accepted.

B. Properties:
   1. Surface burning classification: Class C.
      a. Flame spread (ASTM E 84): 175 or less.
      b. Smoke developed (ASTM E 84): 270.
   2. Flexural strength (ASTM D 790): No less than 9,900 psi.
   3. Flexural modulus (ASTM D 790): No less than 0.35 x 10(6) psi.
   4. Tensile strength (ASTM D 638): No less than 6,200 psi.
   5. Tensile modulus (ASTM D 638): No less than 0.65 x 10(6) psi.
   6. Impact strength, IZOD (ASTM D 256): No less than 5.5 ft.lb./in.
   8. Water absorption (ASTM D 570): Less than 0.5% in 24 hrs. @ 77 deg.F.

C. Size:
   1. Wall panel width: 48 inches.
   2. Wall panel height: 8'.

D. Thickness: 0.09 inch.

E. Dimensional Tolerances:
   1. Width and length: +/- 1/8 inch.
   2. Thickness: +/- 10%.
   3. Squareness: Not more than 1/8 inch out of square.
2.2 FINISHES

A. Exposed Surface: Pebble-like embossed finish.

B. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.

C. Color: Uniform throughout. As selected from full range of manufacturer's colors.

2.3 TRIM ACCESSORIES: Provide panel manufacturer's heavy-duty standard vinyl moldings to meet project conditions. Color to closely match panel color.

A. Fasteners: Non-staining nylon drive rivets.
   1. Match panel colors.
   2. Length to suit project conditions.

B. Adhesive: VOC-compliant structural construction adhesive as recommended by adhesive manufacturer.

C. Sealant: Clear silicone sealant as recommended by sealant manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive panels to ensure that surfaces are smooth, dry, true, and free of dirt, dust, oil, or grease.

B. Remove high spots. Fill low spots.

C. Apply leveling coat of plaster to concrete block walls, if required to bring surface to a true plane.

D. Verify that substrate construction is completed and approved.

E. Correct deficiencies in substrate before installing panels.
3.2 INSTALLATION

A. Install in accordance with manufacturer's printed installation instructions, using adhesive or adhesive and mechanical fasteners, where warranted.

B. Cutting Panels:
   1. Cut panels with carbide-tipped saw blade or swivel head shear.
   2. Allow 1/2-inch clearance in length per 8-foot panel length.
   3. Allow 1/8-inch clearance at cut-outs for penetrations.

C. Pre-drill fastener holes before applying adhesive. Use carbide-tipped drill.
   1. Drill 3/8-inch holes for 1/4-inch nominal fasteners.
   2. Space at 8 inches maximum on center at perimeter, approximately 1 inch from panel edge.
   3. Space at in field in rows 16 inches on center, with fasteners spaced at 12 inches maximum on center.

D. Apply adhesive between 50 and 90 degrees F, unless otherwise approved.
   1. Spread adhesive in accordance with adhesive manufacturer's directions to achieve 100% coverage.
   2. Do not use beads of adhesive.
   3. Do not use mechanical fasteners or adhesive alone.
   4. Allow open time recommended by adhesive manufacturer before setting panels into position.
   5. Once in position, apply sufficient pressure to make full contact between panel and wall.
   6. Roll panel surface to ensure complete contact.
   7. If necessary, install bracing to maintain close contact until adhesive cures in accordance with manufacturer's instructions.

E. Panel Fasteners:
   1. Apply silicone sealant in pre-drilled fastener holes.
   2. Drive fasteners for snug fit. Do not over-tighten.
   3. Fasten leading edge of each panel after installing moldings.

F. Moldings:
   1. Trim division bar to accommodate ceiling and base moldings.
   2. Apply bead of silicone sealant to one side of division bar and install on leading edge of first panel.
   3. Push molding all the way onto panel and pull back to allow 1/8-inch clearance.
   4. Check plumb.
5. Fasten molding with coated lath nails, installed to leading edge of molding, only.
6. Complete fastening of panel, and remove excess sealant.
7. Apply sealant to leading edge of molding to receive next panel. Allow 1/8-inch clearance when installing panel.
8. Remove excess sealant from panels and moldings.
9. Ensure that panel bottoms are securely attached with no gaps.

3.3 ADJUST AND CLEAN

A. Clean all panel surfaces with neutral cleaner. Remove scraps and debris from the site, and leave in a neat and clean condition. Check all moldings and panels for secure fastening, with no gaps or bulges.

END OF SECTION
SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING FOR WALLS

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. Modified bituminous sheet waterproofing for waterproofing subsurface exterior side of walls at inhabited spaces (vertical waterproofing at backside of 1st floor).

B. Related Requirements:

1. Section 071416 – Cold-Applied Bituminous Waterproofing (foundation coating) for use at retaining walls at site.

2. Section 071330 – Split Slab Waterproofing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.

2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

C. Sample Warranties: For special warranties.
1.5 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING ("PEEL AND STICK")

A. Modified Bituminous Sheet: Minimum 60-mil nominal thickness, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side.

1. Physical Properties:

   a. Tensile Strength, Membrane: 250 psi minimum; ASTM D 412, Die C, modified.
   b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
   d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C 836.
   e. Puncture Resistance: 40 lbf minimum; ASTM E 154.
   f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D 570.
   g. Water Vapor Permeance: 0.05 perms maximum; ASTM E 96/E 96M, Water Method.

2. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.
3. Products: Equal of Grace Waterproofing Products:

Bituthene 4000 sheet and associated products

B. Mastic, Adhesives, and Detail Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

B. Primer: Liquid primer recommended for substrate by sheet-waterproofing material manufacturer.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.

D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.

F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick, predrilled at 9-inch (229-mm) centers.

G. Protection/Drainage Course:

Vertical: Pre-fabricated geocomposite drain sheet. 0.433" thick, composed of hollow studded polystyrene core with one side non-woven needle punched polypropylene filter fabric and a smooth plastic film on the other side. Flow rate of 16 gal/minute.

Product: Equal of Grace Waterproofing Hydroduct 220
PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

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

3.2 SURFACE PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.

1. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.
F. Bridge and cover expansion joints and discontinuous deck-to-wall and
dech-to-deck joints with overlapping sheet strips of widths according to
manufacturer's written instructions.

1. Invert and loosely lay first sheet strip over center of joint. Firmly
adhere second sheet strip to first and overlap to substrate.

G. Corners: Prepare, prime, and treat inside and outside corners according
to ASTM D 6135.

1. Install membrane strips centered over vertical inside corners.
Install 3/4-inch fillets of liquid membrane on horizontal inside
corners and as follows:

a. At footing-to-wall intersections, extend liquid membrane in
each direction from corner or install membrane strip centered
over corner.

H. Prepare, treat, and seal vertical and horizontal surfaces at terminations
and penetrations through waterproofing and at drains and protrusions
according to ASTM D 6135.

3.3 MOLDED-SHEET DRAINAGE-PANEL INSTALLATION

A. Place and secure molded-sheet drainage panels, with geotextile facing
away from wall or deck substrate, according to manufacturer's written
instructions. Use adhesives or other methods that do not penetrate
waterproofing. Lap edges and ends of geotextile to maintain continuity.
Protect installed molded-sheet drainage panels during subsequent
construction.

3.4 FIELD QUALITY CONTROL

A. Flood Testing: Flood test each deck area for leaks, according to
recommendations in ASTM D 5957, after completing waterproofing but
before overlying construction is placed. Install temporary containment
assemblies, plug or dam drains, and flood with potable water.

1. Flood to an average depth of 2-1/2 inches. Maintain 2 inches for at
least 12 hours.

3.5 PROTECTION, REPAIR, AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.
B. Protect waterproofing from damage and wear during remainder of construction period.

C. Protect installed protection board or drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 071326
SECTION 071330 - SPLIT SLAB WATERPROOFING MEMBRANE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A All of the Contract Documents, including General and Supplementary Conditions and Division I General Requirements apply to the work of this section.

1.02 SCOPE

A The work of this section includes, but is not limited to, the following:

1 Installation of self-adhering sheet membrane waterproofing between slabs at elevated exterior circulation walkways.

B Related Sections: Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1 Section 071326 – Self-Adhering Sheet Waterproofing for Walls
2 Section 033000 - Cast-In-Place Concrete
3 Section 071416 – Cold-Applied Waterproofing.

1.03 REFERENCE STANDARDS

A American Society for Testing and Materials (ASTM):

D146 Sampling and Testing Bitumen Saturated Felts and Fabrics
D412 Tests for Rubber Properties in Tension
D570 Test Method for Water Absorption of Plastics
E96(b) Tests for Water Vapor Transmission of Materials in Sheet Form
E154 Test for Puncture Resistance
F2130 Resistance to Penetration by Pesticides
D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
D4533 Test Method for Trapezoid Tearing Strength of Geotextiles
D1434 Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting

1.05 SUBMITTALS

A Product Data: Submit manufacturer's product literature and installation instructions.

B Samples: Submit representative samples of the following for approval:

   Sheet Membrane
   Detailing Strips and Accessories

C Subcontractor's approval by Manufacturer: Submit document stating manufacturer's acceptance of subcontractor.

D Warranty: Submit a sample of manufacturer's warranty identifying the terms and conditions stated in 1.09

E Substitutions: To be accepted as an equal a product must have demonstrated in documented field trials over a minimum 5 year period the ability to reduce cracking and to maintain a seal even if the slab above it has cracked.

1.06 QUALITY ASSURANCE

A Manufacturer Qualifications: Sheet Membrane Waterproofing Systems must be manufactured by a company with a minimum of 10 years experience in the production and sales of self-adhesive membrane waterproofing materials.

B Applicator Qualifications: A firm having at least 3 years experience in applying these types of specified materials and specifically accepted in writing by the membrane system manufacturer.

C Materials: For each type of material required to complete the work of this section, provide primary materials which are the products of a single manufacturer.

D Pre-Application Conference: A pre-application conference shall be held to establish procedures and to review conditions, installation procedures and coordination with other related work. Meeting agenda shall include review of special details and flashing.

E Manufacturer's Representative: Arrange to have trained representative of the manufacturer on site periodically to review installation procedures.

1.07 DELIVERY, STORAGE, HANDLING

A Materials should be delivered to site in manufacturer's original, unopened containers with original labels attached and bearing the following information:

   1 Name of material.
2 Manufacturer's batch codes including date of manufacture.
3 Materials Safety Data Sheets.

B Membrane and accessories should be unloaded and stored carefully. Cartons and containers must be protected from weather, sparks, flames, excessive heat, cold and lack of ventilation. Do not stack membrane higher than 5 feet vertically, nor double stack cartons. Cartons should be stored on pallets and covered to protect from water damage. Any damaged material must be removed from the site and disposed of in accordance with applicable regulations.

1.08 PROJECT CONDITIONS

A Work shall be performed only when existing and forecasted weather conditions are within the limits established by the membrane manufacturer. Do not apply to damp, frost covered or otherwise contaminated surfaces. Membrane shall only be installed when temperatures are 40°F and rising. Consult manufacturer for information concerning cooler temperatures.

B Proceed with installation only when substrate construction and preparation work is complete. Surfaces to receive waterproofing materials must be free of voids, spalls, loose aggregate and sharp protrusions. The concrete surface must resemble a troweled finish. Broom finish concrete is not acceptable.

C Warn personnel against breathing of vapors and contact with skin and eyes; wear appropriate protective clothing and respiratory equipment.

D Keep flammable products away from spark or flame. Post “No Smoking” signs. Do not allow spark producing equipment to be used during application and until all vapors have dissipated.

E Maintain work area in a neat and workmanlike condition. Remove empty cartons and rubbish from the site daily.

1.09 WARRANTY

A Provide a written 5 year material warranty from the manufacturer upon completion and acceptance of the installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A Provide Polyguard Underseal™ Split Slab Waterproofing System as manufactured by Polyguard Products, Inc., Ennis, Texas 75120-0755, phone:
800-541-4994, or approved equal by Grace, Gaco Western, or another manufacturer.
2.02 PRODUCTS

A Self-adhesive Membrane Waterproofing: Shall be Split Slab Waterproofing Membrane, a 75 mil rubberized asphalt membrane consisting of a high strength polyethylene film bonded to a layer of rubberized asphalt meeting or exceeding the following requirements:

<table>
<thead>
<tr>
<th>Test Description</th>
<th>Value</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Resistance to Penetration by Termites</td>
<td>0.0%</td>
<td>TEXAS A &amp; M TESTING</td>
</tr>
<tr>
<td>2. Resistance to Penetration by Pesticides</td>
<td>0.0%</td>
<td>ASTM F-2130</td>
</tr>
<tr>
<td>3. Resistance to Permeance by Methane Gas</td>
<td>$6.3 \times 10^{-7}$</td>
<td>ASTM D-1434</td>
</tr>
<tr>
<td>4. Resistance to Permeance by Radioactive Radon Gas</td>
<td>$1.95 \times 10^{-15}$</td>
<td>Radon Reduction Technology Laboratory Method</td>
</tr>
<tr>
<td>5. Resistance to Diffusion by Radioactive Radon Gas</td>
<td>$4.72 \times 10^{-5}$</td>
<td>Radon Reduction Technology Laboratory Method</td>
</tr>
<tr>
<td>6. Resistance to Fungi in Soil 16 Weeks</td>
<td>No effect</td>
<td>GSA-PBS 07115</td>
</tr>
<tr>
<td>7. Resistance to Permeance by Moisture</td>
<td>0.01</td>
<td>ASTM E-96-B</td>
</tr>
<tr>
<td>US grains/sq.ft./lin. HGF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Resistance to Puncture - Membrane using 1&quot; (24mm) Rod</td>
<td>&gt;120</td>
<td>ASTM E-154</td>
</tr>
<tr>
<td>Lb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Resistance to Puncture - Membrane using .35&quot; (8mm) Rod</td>
<td>&gt;54</td>
<td>ASTM E-4833</td>
</tr>
<tr>
<td>Lb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Resistance to Tearing - Membrane Lb.</td>
<td>78</td>
<td>ASTM D-4533</td>
</tr>
<tr>
<td>11. Membrane Thickness inch</td>
<td>0.075</td>
<td>ASTM D-1000</td>
</tr>
<tr>
<td>12. Elongation - Ultimate Failure of Polyethylene Backing - %</td>
<td>&gt;850%</td>
<td>ASTM D-412</td>
</tr>
<tr>
<td>Elongation at Failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Elongation - Ultimate Failure of Adhesive Compound - % Elongation</td>
<td>&gt;1000%</td>
<td>ASTM D-412</td>
</tr>
<tr>
<td>at Failure</td>
<td></td>
<td></td>
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<tr>
<td>14. Cycling Over Crack @ -15°</td>
<td>No effect</td>
<td>ASTM C-836</td>
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<tr>
<td>15. Peel Adhesion - lb/in/ width</td>
<td>10.0</td>
<td>ASTM D-1000</td>
</tr>
<tr>
<td>16. Overlap Bond - lb/in. width</td>
<td>8.0</td>
<td>ASTM D-1000</td>
</tr>
</tbody>
</table>
17. Self Sealability - Water Vapor Transmission g/h ft²

.01* ASTM E-96*
PART 3 - EXECUTION

3.01 INSPECTION

A Before starting any waterproofing work, the applicator shall thoroughly inspect all surfaces for any conditions detrimental to the proper completion of the work. Should any deficiencies exist, the General Contractor should be made aware of such in writing immediately. Do not proceed with application until all unsatisfactory conditions are corrected.

3.02 SURFACE PREPARATION:

A Refer to manufacturer's product literature for surface preparation requirements. Surfaces should be structurally sound, free of voids, spalls, loose aggregate and sharp ridges. Remove dust, dirt, debris or any other foreign materials such as wax, oil, grease or form release agents. Use repair materials that are acceptable by the sheet membrane manufacturer.

B Cast-In-Place Concrete

1 Normal weight structural concrete must be allowed to cure a minimum of 7 days. All concrete surfaces must be dry to the touch before proceeding with the installation of the waterproofing system.

2 Concrete must be sloped to provide proper drainage.

3 Fill and repair bug holes in concrete. Finish flush with the surrounding surface.

4 Are cracks over 1/16 inch in width and any moving cracks under 1/16 inch shall be routed out to a minimum of 1/4 inch width and sealed using a high performance polyurethane sealant. Allow adequate curing time per the manufacturer's directions. Once cured, install an 8 inch wide strip of Polyguard 650 membrane over the crack.
Bi-level drains should be installed and have a minimum 3" flange. Drains should be installed with the flange flush and level with the surrounding concrete surface.

Masonry Surfaces: Contact manufacture for application over CMU or brick blocks.

3.03 INSTALLATION:

A Priming: Apply primer to a cleaned, dust free surface. Apply by roller or spray. Apply Polyguard 650 LT Liquid Adhesive, California Sealant or Shur-Tac Waterbase Liquid Adhesive at the rate of 250-300 sq. ft. per gallon. Allow to dry per manufacturer’s directions.

B Membrane Installation - Horizontal Surfaces:

1. Waterproofing membrane should be applied to the primed surface starting at the low point and working to the high point in a shingling technique.
2. Side laps should be a minimum of 2 ½ inches and end laps a minimum of 6 inches.
3. The entire membrane should be firmly rolled with a linoleum roller weighing approximately 75 pounds. This will insure excellent adhesion and minimize air pockets between the substrate and membrane.
4. At posts or projections, if annular space of opening is ½” or less apply liquid membrane going out at least 6 inches in all directions. If annular space of post or projection opening exceeds ½” a backer rod must be used to fill opening, then apply a patch of membrane extending 4” beyond opening required.
5. At drains, the drains must be properly designed with mechanical clamping rings and weepholes at the membrane level. Waterproofing / vapor barrier membrane must be applied from low to high pitch for maximum drainage. Multi level drainage systems are recommended at both toping and membrane level. Use linoleum roller or water filled garden roller, covered with two plies of indoor-outdoor carpet to roll membrane immediately after application, with special attention at overlaps and “T-joints”.
6. Membrane turned up on walls shall be terminated into a reglet or under a counter flashing. The membrane may also be pressed firmly to the wall, then sealed with a troweled bead of mastic.
7. Inadequately lapped seams and damaged areas should be patched with small section of seal tape. The patch area should extend a least 6 inches beyond the defect.
8. Fishmouths and severe wrinkles should be slit, flaps overlapped and repaired as above.
9 All inside and outside corners shall be treated either with a 12 inch strip of seal tape. The field membrane should be applied first and then place the 12" strip over for a double ply corner. All inside corners shall have a minimum 1 inch fillet of liquid membrane or latex modified cement mortar.

10 All permanently exposed laps must be sealed with a ½" bead of mastic.

11 At completion of horizontal membrane application, flood test the surface with 2 inches of water for 24 hours. Check with the structural engineer to make sure the deck structure will withstand the flood test.

12 Mark any leak areas found during flood test and make repairs.

13 Prior to slab pour all standing water must be removed from the membrane.

END OF SECTION
SECTION 071416 – COLD FLUID-APPLIED WATERPROOFING (FOUNDATION COATING)

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes cold fluid-applied waterproofing system for the retaining (wet) side of site retaining walls.

2. Waterproofing membrane.
3. Protection course.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 033000 - Cast-in-Place Concrete.
2. Section 042000 – Unit Masonry.
3. Section 071326 – Self-Adhering Sheet Waterproofing.
4. Section 071330 – Split-Slab Waterproofing.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide a waterproofing system that prevents the passage of liquid water under hydrostatic pressure and complies with physical requirements as demonstrated by testing performed by an independent testing agency of manufacturer's current waterproofing formulations and system design.

1.4 SUBMITTALS

A. Submit Product Data for each type of waterproofing specified, including manufacturer’s printed instructions for evaluating, preparing, and treating the substrate, technical data, and tested physical and performance properties.
1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who is certified in writing and approved by waterproofing manufacturer for the installation of the waterproofing system.

B. Manufacturer Qualification: Obtain waterproofing materials and system components from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site as specified by manufacturer labeled with manufacturer's name, product brand name and type, date of manufacture, shelf life, and directions for storing and mixing with other components.

B. Store materials as specified by the waterproofing manufacturer in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer. Protect stored materials from direct sunlight.

C. Remove and replace material that cannot be applied within its stated shelf life.

1.7 PROJECT CONDITIONS

A. Protect all adjacent areas not to be waterproofed. Where necessary, apply masking to prevent staining of surfaces to remain exposed wherever membrane abuts to other finish surfaces.

B. Perform work only when existing and forecast weather conditions are within manufacturer's recommendations for the material and application method used.

C. Ambient temperature shall be within manufacturer's specifications. (Greater than +45°F and not falling.)

D. All plumbing, electrical, mechanical and structural items to be under or passing through the waterproof membrane shall be positively secured in their proper positions and appropriately protected prior to membrane application.

1.8 WARRANTY

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

Material Warranty: 5 years.

PART 2 – PRODUCTS

2.1 WATERPROOFING MATERIALS

A. Fluid applied waterproofing system—a single course, high build, polymer modified, water-based asphalt emulsion. Waterborne and spray applied at ambient temperatures. A nominal thickness of 60 mil minimum, unless specified otherwise. Trowel-grade has similar properties with greater viscosity and is roller or brush applied.

B. Fluid applied waterproofing physical properties.

Total Solids: 62% +/- 2%
Application Temp: +20 deg.
Coverage: 25-35 sf/gal.
Elongation: 500%

C. SureDry No. 4000 Waterproofing
   Henry Aqua Bloc SB
   Or equal

2.3 AUXILIARY MATERIALS

A. Sheet Flashing: 60-mil reinforced modified asphalt sheet good with double-sided adhesive.

B. Reinforcing Strip: Manufacturer's recommended polypropylene and polyester fabric.

C. Joint Detailing Sealant Mastic: A high viscosity polymer modified water based asphalt material.

1. Back Rod: Closed-cell polyethylene foam.

2.4 PROTECTION COURSE: Fan folded, with a core of extruded-polystyrene board insulation faced on both sides with plastic film, nominal thickness 1/4 inch with compressive strength of not less than 8 psi per ASTM D 1621, and maximum water absorption by volume of 0.6 percent per ASTM C 272.
PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions under which waterproofing systems will be applied, with Installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean and prepare substrate according to manufacturer’s recommendations. Provide clean, dust-free, and dry substrate for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage or over spray affecting other construction.

C. Remove grease, oil, form release agents, paints, and other penetrating contaminants from concrete.

D. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, grout joints, tie holes, and other voids with ECOLINE-T, hydraulic cement, or rapid-set grout.

3.3 PREPARATIONS AND TREATMENT AT TERMINATIONS AND PENETRATIONS

A. Prepare vertical and horizontal surfaces at terminations, at penetrations through waterproofing material, and at expansion joints, drains, and sleeves according to ASTM C 898 and manufacturer’s recommendations.

B. Apply two coats of waterproofing and embed a joint reinforcing strip in preparation coat and apply a second coat over embedded joint reinforcing strip ensuring its complete saturation and covering.

1. Terminations should be treated 6 inches up vertical and 6 inches on horizontal.
2. Penetrations should be treated in a 6-inch radius around penetration and 3 inches onto penetrating object.

3.4 PREPARATIONS AND TREATMENT OF JOINTS AND CRACKS

A. Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 898 and waterproofing manufacturer’s recommendations. Remove dust
and dirt from joints and cracks complying with ASTM D 4258 prior to coating surfaces.

B. Vertical - Apply two coats of waterproofing, 6 inches on each side of joint and embed a joint reinforcing strip in preparation coat and apply a second coat over embedded joint reinforcing strip ensuring to complete saturation and covering.

3.5 WATERPROOFING APPLICATION

A. Set up spray equipment according to manufacturer’s instructions.

B. Mix materials according to manufacturer’s instructions.

C. Start installing waterproofing in presence of manufacturer’s technical representative.

D. Apply waterproofing, according to manufacturer’s recommendations, by spray or roller.

E. Apply one spray coat of waterproofing or four roller coats trowel-grade to obtain a seamless membrane free of entrapped gases, with an average dry film thickness of 80 mils (1.5 mm) and a minimum dry film thickness of 60 mils (1.3 mm) at any point.

F. Apply waterproofing to prepared wall terminations and vertical surfaces to heights indicated according to manufacturer’s recommendations and details.

G. Verify film thickness of waterproofing every 100 sq. ft. (9.3 sq. m).

3.6 PROTECTION COURSE INSTALLATION

A. Install protection course with overlapped seams over nominally cured membrane no later than recommended by manufacturer and before starting subsequent construction operations.

B. Secure protection course seams with sealing tape and attach to adhesive strips (sheet flashing that does not penetrate waterproofing) as recommended by manufacturer.
3.8 FIELD QUALITY CONTROL

A. Membrane may be checked for coverage with a lightly oiled, needle nose depth gauge, taking four (4) readings over a one square inch area, every 500 square feet. Record the minimum reading. Mark the test area for repair.

B. Test areas are to be patched over to an 80 mil minimum dry thickness, extending a minimum of one inch (1") beyond the test perimeter.

3.9 CURING, PROTECTING, AND CLEANING

A. Cure waterproofing according to manufacturer's recommendations, taking care to prevent contamination and damage during application stages and curing.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION
SECTION 072100 - INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. Extent of insulation work is shown on drawings and indicated by provisions of this section.

B. Applications of insulation specified in this section include the following:

1. Blanket-type building insulation for interior sound attenuation in partitions and other assemblies.
2. Blanket-type building insulation in exterior walls and roofs.

C. Drywall partitions – non-loadbearing metal framing for partitions and furring and gypsum drywall are specified in Section 092900 - Gypsum Board.

1.2 SUBMITTALS: Submit manufacturer’s product data and installation instructions for each product.

1.3 QUALITY CONTROL: Contractor shall notify Architect when first insulation is to be installed so that quality of workmanship, as specified in manufacturer’s literature and in this section, may be reviewed prior to the remainder of the work.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Glasswool insulation blankets, manufactured with renewable organic binders (non phenol, formaldehyde, acrylics, or artificial colors), and high-recycled content fiberglass.


   Thickness: Typical Interior Partitions - 3.5", R-13
Exterior Walls – 3.5", R-13  

Auxiliary Insulating Materials:

1. Mechanical Anchors: Type and size as recommended by particular insulation manufacturer for each type of application and condition of substrate.

2. Facing: Where insulation is exposed above drywall or suspended between roof framing members provide foil-scrim-kraft facing with flame spread rating of 25 or less.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION:

A. Installer shall examine substrates and conditions under which insulation work is to be performed. Obtain Installer’s written report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

B. Clean substrates of substances harmful to insulations.

3.2 INSTALLATION, GENERAL:

A. Comply with manufacturer’s instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer’s technical representative for specific recommendations before proceeding with work.

B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

1. Installation shall have no voids or gaps; insulation shall not be compressed; no misalignment (insulation shall touch the air barrier – typically drywall); and shall be neatly cut to allow passage of wires.
3.3 INSTALLATION OF GENERAL BUILDING INSULATION:

A. Apply insulation units to substrate complying with manufacturer's recommendations, using fasteners in numbers and pattern as instructed. Fit units snugly between supports and fasten as required to maintain in place until covered by other materials. Provide FSK facing at all areas not encapsulated by drywall.

B. Stuff loose insulation into all miscellaneous voids and cavity spaces. Compact to approximately 40% of normal maximum volume.

3.4 PROTECTION: Protect installed insulation from weather exposure and physical abuse.

END OF SECTION 072100
SECTION 072413 - POLYMER-BASED EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

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. Exterior insulation and finish system (EIFS) applied over masonry and gypsum sheathing.

B. Related Sections:

1. Section 061600 "Sheathing" for soffit sheathing.
2. Section 079200 "Joint Sealants" for sealing joints in EIFS with elastomeric joint sealants.

1.3 SYSTEM DESCRIPTION

A. Class PB EIFS: A non-load-bearing, exterior wall cladding system that consists of an insulation board attached adhesively, mechanically, or both to the substrate; an integrally reinforced base coat; and a textured protective finish coat.

1.4 PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with the following:

1. Bond Integrity: Free from bond failure within EIFS components or between system and supporting wall construction, resulting from exposure to fire, wind loads, weather, or other in-service conditions.
2. Weather tightness: Resistant to water penetration from exterior into EIFS and assemblies behind it or through them into interior of building that results in deterioration of thermal-insulating effectiveness or other
degradation of EIFS and assemblies behind it, including substrates, supporting wall construction, and interior finish.

B. Class PB EIFS: Provide EIFS having physical properties and structural performance that comply with the following:

1. Abrasion Resistance: Sample consisting of 1-inch- thick EIFS mounted on 1/2-inch- thick gypsum board; cured for a minimum of 28 days; and showing no cracking, checking, or loss of film integrity after exposure to 528 quarts of sand when tested per ASTM D 968, Method A.

2. Absorption-Freeze Resistance: No visible deleterious effects and negligible weight loss after 60 cycles per EIMA 101.01.

3. Accelerated Weathering: Five samples per ICC-ES AC219 showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, delamination, or other characteristics that might affect performance as a wall cladding after testing for 2000 hours when viewed under 5 times magnification per ASTM G 153 or ASTM G 154.

4. Freeze-Thaw: No surface changes, cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination, or indications of delamination between components when viewed under 5 times magnification after 60 cycles per EIMA 101.01.

5. Mildew Resistance of Finish Coat: Sample applied to 2-by-2-inch clean glass substrate, cured for 28 days, and showing no growth when tested per ASTM D 3273 and evaluated according to ASTM D 3274.

6. Salt-Spray Resistance: No deleterious effects when tested according to ICC-ES AC219.

7. Tensile Adhesion: No failure in the EIFS, adhesive, base coat, or finish coat when tested per EIMA 101.03.

8. Water Penetration: Sample consisting of 1-inch- thick EIFS mounted on 1/2-inch- thick gypsum board, cured for 28 days, and showing no water penetration into the plane of the base coat to expanded-polystyrene board interface of the test specimen after 15 minutes at 6.24 lbf/sq. ft. of air pressure difference or 20 percent of positive design wind pressure, whichever is greater, across the specimen during a test period when tested per EIMA 101.02.

9. Water Resistance: Three samples, each consisting of 1-inch- thick EIFS mounted on 1/2-inch- thick gypsum board; cured for 28 days; and showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination after testing for 14 days per ASTM D 2247.

10. Impact Resistance: Sample consisting of 1-inch thick EIFS when constructed, conditioned, and tested per EIMA 101.86; and meeting or exceeding the following:

   b. To 8' above Finish Floor: Medium Impact Resistance: 50 to 89 inch-lb.

1.5 ACTION SUBMITTALS

A. Product Data: For each type and component of EIFS indicated.

B. Shop Drawings: For EIFS. Include plans, elevations, sections, details of components, details of penetration and termination, flashing details, joint locations and configurations, fastening and anchorage details including mechanical fasteners, and connections and attachments to other work.

C. Samples for Initial Selection: For each type of finish-coat color and texture indicated.
   1. Include similar Samples of joint sealants and exposed accessories involving color selection.

D. Samples for Verification: 24-inch-square panels for each type of finish-coat color and texture indicated, prepared using same tools and techniques intended for actual work including [custom trim, each profile, an aesthetic reveal, a typical control joint filled with sealant of color selected.
   1. Include sealants and exposed accessory Samples to verify color selected.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each water-/weather-resistant barrier, insulation, reinforcing mesh, and coating.

C. Compatibility and Adhesion Test Reports: For joint sealants from sealant manufacturer indicating the following:
   1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
   2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
1.7 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is certified in writing by EIFS manufacturer as qualified to install manufacturer’s system using trained workers.

B. Source Limitations: Obtain EIFS from single source from single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with system components.

C. Fire-Test-Response Characteristics: Provide EIFS and system components with the following fire-test-response characteristics as determined by testing identical EIFS and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

2. Surface-Burning Characteristics: Provide insulation board, adhesives, base coats, and finish coats with flame-spread index of 25 or less and smoke-developed index of 450 or less, per ASTM E 84 UBC Standard 8-1.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution and set quality standards for fabrication and installation.

E. Preinstallation Conference: Conduct conference at Project site.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unopened packages with manufacturers’ labels intact and clearly identifying products.

B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.

1. Stack insulation board flat and off the ground.
2. Protect plastic insulation against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.
1.9   PROJECT CONDITIONS

A. Weather Limitations: Maintain ambient temperatures above 40 deg F for a minimum of 24 hours before, during, and after adhesives or coatings are applied. Do not apply EIFS adhesives or coatings during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

1.10   COORDINATION

A. Coordinate installation of EIFS with related Work specified in other Sections to ensure that wall assemblies, including sheathing, flashing, trim, joint sealants, windows, and doors, are protected against damage from the effects of weather, age, corrosion, moisture, and other causes. Do not allow water to penetrate behind flashing and barrier coating of EIFS.

PART 2 - PRODUCTS

2.1   MANUFACTURERS

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. Dryvit Systems, Inc.
   2. Parex, Inc.; a brand of ParexLahabra, Inc.
   3. Senergy; Degussa Wall Systems, Inc.
   4. Sto Corp.

2.2   MATERIALS

A. Compatibility: Provide adhesive, fasteners, board insulation, reinforcing meshes, base- and finish-coat systems, sealants, and accessories that are compatible with one another and with substrates and approved for use by EIFS manufacturer for Project.

B. Primer/Sealer: EIFS manufacturer's standard substrate conditioner designed to seal substrates from moisture penetration and to improve the bond between substrate of type indicated and adhesive used for application of insulation.

C. Flexible-Membrane Flashing: Cold-applied, fully self-adhering, self-healing, rubberized-asphalt and polyethylene-film composite sheet or tape and primer;
EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.

D. Insulation Adhesive: EIFS manufacturer's standard formulation designed for indicated use; compatible with substrate and complying with one of the following:

1. Job-mixed formulation of portland cement complying with ASTM C 150, Type I, and polymer-based adhesive specified for base coat.
2. Factory-blended dry formulation of portland cement, dry polymer admixture, and fillers specified for base coat.
3. Factory-mixed noncementitious formulation designed for adhesive attachment of insulation to substrates of type indicated, as recommended by EIFS manufacturer.

E. Molded, Rigid Cellular Polystyrene Board Insulation: Comply with ASTM C 578, Type I; EIFS manufacturer's requirements; and EIMA's "EIMA Guideline Specification for Expanded Polystyrene (EPS) Insulation Board" for most stringent requirements for material performance and qualities of insulation, including dimensions and permissible variations, and the following:

1. Aging: Before cutting and shipping, age insulation in block form by air drying for not less than six weeks or by another method approved by EIMA that produces equivalent results.
2. Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, per ASTM E 84.
3. Dimensions: Provide insulation boards not more than 24 by 48 inches and typically 2" thickness.
4. Foam Shapes: Provide with profiles and dimensions indicated on Drawings.

F. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. per EIMA 105.01; complying with ASTM D 578 and the following:

1. Standard-Impact Reinforcing Mesh: Not less than 4.0 oz./sq. yd.
2. Intermediate-Impact Reinforcing Mesh: Not less than 10 oz./sq. yd.
3. High-Impact Reinforcing Mesh: Not less than 15 oz. sy.

G. Base-Coat Materials: EIFS manufacturer's standard mixture complying with one of the following:

1. Job-mixed formulation of portland cement complying with ASTM C 150, Type I, white or natural color; and manufacturer's standard polymer-emulsion adhesive designed for use with portland cement.
2. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and manufacturer's standard dry mix containing portland cement.
3. Factory-blended dry formulation of portland cement, dry polymer admixture, and inert fillers to which only water is added at Project site.
4. Factory-mixed noncemementitious formulation of polymer-emulsion adhesive and inert fillers that is ready to use without adding other materials.

H. Primer: EIFS manufacturer's standard factory-mixed, elastomeric-polymer primer for preparing base-coat surface for application of finish coat.

I. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based coating complying with the following:
   1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.
   2. Colors: As selected by Architect from manufacturer's full range.

J. Water: Potable.

K. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D 1784, manufacturer's standard Cell Class for use intended, and ASTM C 1063.

2.3 ELASTOMERIC SEALANTS – See Section 079200.

2.4 MIXING
   A. General: Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by EIFS manufacturer. Mix materials in clean containers. Use materials within time period specified by EIFS manufacturer or discard.

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 EIFS.
B. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.

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

1. Begin coating application only after surfaces are dry.
2. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind EIFS and deterioration of substrates.

C. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation.

3.3 EIFS INSTALLATION, GENERAL

A. Comply with ASTM C 1397 and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

3.4 SUBSTRATE PROTECTION APPLICATION

A. Primer/Sealer: Apply over gypsum sheathing substrates to protect substrates from degradation and where required by EIFS manufacturer for improving adhesion of insulation to substrate.

B. Flexible-Membrane Flashing: Install over weather-resistive barrier, applied and lapped to shed water; seal at openings, penetrations, terminations, and where indicated by EIFS manufacturer's written instructions to protect wall assembly from degradation. Prime substrates, if required, and install flashing to comply with EIFS manufacturer's written instructions and details.
3.5 TRIM INSTALLATION

A. Trim: Apply trim accessories at perimeter of EIFS, at expansion joints and elsewhere as indicated, according to EIFS manufacturer's written instructions. Coordinate with installation of insulation.

1. Drip Screed/Track: Use at bottom edges of EIFS unless otherwise indicated.
2. Window Sill Flashing: Use at windows unless otherwise indicated.
3. Expansion Joint: Use where indicated on Drawings.
4. Casing Bead: Use at other locations.

3.6 INSULATION INSTALLATION

A. Board Insulation: Adhesively attach insulation to substrate in compliance with ASTM C 1397, EIFS manufacturer's written instructions, and the following:

1. Apply adhesive to insulation by notched-trowel method in a manner that results in coating the entire surface of sheathing with adhesive once insulation is adhered to sheathing unless EIFS manufacturer's written instructions specify using primer/sealer with ribbon-and-dab method. Apply adhesive to a thickness of not less than 1/4 inch for factory mixed and not less than 3/8 inch for field mixed, measured from surface of insulation before placement.
2. Press and slide insulation into place. Apply pressure over the entire surface of insulation to accomplish uniform contact, high initial grab, and overall level surface.
3. Allow adhered insulation to remain undisturbed for period recommended by EIFS manufacturer, but not less than 24 hours, before beginning rasping and sanding insulation, or applying base coat and reinforcing mesh.
4. Apply insulation over dry substrates in courses with long edges of boards oriented horizontally.
5. Begin first course of insulation from a level base line and work upward.
6. Begin first course of insulation from screed/track and work upward. Work from perimeter casing beads toward interior of panels if possible.
7. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern. Locate joints so no piece of insulation is less than 12 inches wide or 6 inches high. Offset joints not less than 6 inches from corners of window and door openings.

a. Adhesive Attachment: Offset joints of insulation not less than 6 inches (150 mm) from horizontal and 4 inches (100 mm) from vertical joints in sheathing.
8. Interlock ends at internal and external corners.
9. Adjoin insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16 inch occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
10. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
11. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/16 inch from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16 inch.
12. Install foam shapes and attach to sheathing.
13. Interrupt insulation for expansion joints where indicated.
14. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
15. Form joints for sealant application with back-to-back casing beads for joints within EIFS and with perimeter casing beads at dissimilar adjoining surfaces. Make gaps between casing beads and between perimeter casing beads and adjoining surfaces of width indicated.
16. After installing insulation and before applying reinforcing mesh, fully wrap board edges with strip reinforcing mesh. Cover edges of board and extend encapsulating mesh not less than 2-1/2 inches over front and back face unless otherwise indicated on Drawings.
17. Treat exposed edges of insulation as follows:
   a. Except for edges forming substrates of sealant joints, encapsulate with base coat, reinforcing mesh, and finish coat.
   b. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and other work with base coat and reinforcing mesh.
   c. At edges trimmed by accessories, extend base coat, reinforcing mesh, and finish coat over face leg of accessories.
18. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and EIFS protective-coating lamina.

B. Expansion Joints: Install at locations indicated, where required by EIFS manufacturer, and as follows:

1. At expansion joints in substrates behind EIFS.
2. Where EIFS adjoin dissimilar substrates, materials, and construction, including other EIFS.
3. Where wall height or building shape changes.
4. Where EIFS manufacturer requires joints in long continuous elevations.

3.7 BASE-COAT INSTALLATION

A. Base Coat: Apply to exposed surfaces of insulation and foam shapes in minimum thickness recommended in writing by EIFS manufacturer but not less than 1/16” dry thickness.

B. Reinforcing Mesh: Embed type indicated below in wet base coat to produce wrinkle-free installation with mesh continuous at corners and overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer’s written instructions. Do not lap reinforcing mesh within 8 inches of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are not visible.

1. Standard-impact reinforcing mesh – above 7’ on all surfaces and full height on 1st floor.
2. Intermediate-Impact reinforcing mesh – up to 7’ on 2nd and 3rd floor.
3. High-impact reinforcing mesh – behind standard mesh on 1st floor up to 7 feet.

C. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings extending 4 inches beyond perimeter. Apply additional 9-by-12-inch strip reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 8-inch wide strip reinforcing mesh at both inside and outside corners unless base layer of mesh is lapped not less than 4 inches on each side of corners.
1. Embed strip reinforcing mesh in base coat before applying first layer of reinforcing mesh.

D. Foam Shapes: Fully embed reinforcing mesh in base coat.

3.8 FINISH-COAT INSTALLATION

A. Primer: Apply over dry base coat according to EIFS manufacturer’s written instructions.

B. Finish Coat: Apply over dry primed base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

1. Texture: To match existing – verify in field prior to preparing samples.
3.9 CLEANING AND PROTECTION

A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

END OF SECTION 072413
SECTION 074113 - METAL WALL PANELS FOR ROOF TOP MECHANICAL SCREEN

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. Panels for curved screen wall are specified in Section 074219.

1.2 DESCRIPTION: Furnish all labor, material, tools, equipment and services to install metal soffit panels and trim as indicated, in accordance with the documents.

A. "V-beam" factory-finished metal panels for use at rooftop mechanical screen.

B. Although work may not be specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

1.3. RELATED SECTIONS:

A. Roof framing is shown on drawings and specified.
B. 051200 – Structural Steel.
C. 055000 – Miscellaneous Metal Fabrications.
D. Sealants for perimeters are specified in Section 079200.
E. Painting for support framing is specified in Section 099000.

1.3 REFERENCES:


B. ASTM A 653 - Grade 40 - Structural (Physical) Quality Steel Sheet
1.4 Shop Drawings: Show fabrication and installation layouts of metal panels, including plans, elevations, expansion joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
1. Details for joining and securing, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
2. Details of termination points and assemblies, including fixed points.
3. Details of expansion joints, including showing direction of expansion and contraction.
4. Details of penetrations.
5. Details of edge and terminal conditions.
6. Details of special conditions.
7. Details of connections to adjoining work.

1.5. SAMPLES: Submit two samples of each panel type.

1.6 PERFORMANCE REQUIREMENTS: General Performance: Metal panels systems shall include, but not limited to, metal wall panels, cleats, clips, anchors and fasteners, trim, and accessories shall comply with requirements indicated without failure due to defective manufacture, fabrication, installation, or other defects in construction. Sheet metal panel system shall remain watertight.

PART 2 - PRODUCTS

2.1 PANEL MATERIALS:

A. Soffit Panel Profile: "V-beam" corrugated type, 36" net coverage with interlocking side flanges.

Material and Gage: 26 ga. base metal Grade C Galvalume (Zincalume) ASTM A 792-86, AZ 55.

Product: Base panel configuration equal of AEP Span X-Panel; ASC Profiles Inc., 800-272-2466. Equal by MBCI, Berridge, RollFab.

D. Flashing materials, plain sheet, and trim shall be matching sheet and gage. and same finish as other adjacent panel materials.

E. Fasteners and Clips: Compatible with material, non-corrosive. Supply with neoprene-gasketed heads.

2.2 PRODUCT HANDLING: Care should be taken to avoid gouging, scratching, or denting of metal panels or components.

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. Check field dimensions and alignment of structural members to assure that installation will be straight and true.

3.2 PREPARATION: Field measure and verify site conditions prior to fabrication of materials. Protect elements surrounding this work from damage and disfigurement.

3.3 PANEL INSTALLATION: Install panels and accessories in accordance with approved shop drawings and manufacturer's instructions.

A. Provide panels in continuous lengths as long as possible. Cut to lengths and end conditions as shown. Overlap corrugated panels in accordance with manufacturer’s details. Laps shall always be to allow drainage over joints.
B. Work shall be installed in accordance with approved shop drawings and details under direct supervision of experienced sheet metal craftsmen. Attachments and joints shall allow for expansion and contraction from temperature changes without distortion or elongation of fastener holes. Provide continuous sealant at each panel joint or overlap.

C. Isolating materials shall be applied to mating surfaces where metal panel system will be in direct contact with substrate materials which are not compatible or could result in galvanic corrosion of either material or finishes.

D. The work shall be installed oriented to framing as shown on the drawings. Provide closures and trim as shown on final shop drawings.

E. No perforations, cuts or penetrations by fasteners shall be made in the panels except as noted on the shop drawings. All cut edges of factory finished panels shall be painted with matching air-dry paint.

F. All trim and miscellaneous items shall be carefully installed with folded edges in accordance with recommended practice in the NRCA Roofing Manual, the SMACNA Sheet Metal Manual, and details on the drawings. Provide all sealant as shown.

G. Remove drill shavings and scrap metal from panels at the end of each work period.

3.4 CLEANING AND PROTECTION: Completed work shall be plumb and true, free of scrapes and dents. Damaged panels shall be repaired or removed and replaced at the discretion of the Architect.

END OF SECTION 074113
SECTION 074219 - METAL PLATE WALL PANELS WITH CUSTOM IMAGING

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 metal plate wall panels – perforated and non-perforated and supplementary framing and support system.

B. Related Sections:
   1. Sections 051200 – Structural Steel and 054000 - Cold-Formed Metal Framing.

1.3 DEFINITION

A. Metal Plate Wall Panel Assembly: Metal plate wall panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete wall system.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal plate wall panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of metal plate wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish among factory-, shop-, and field-assembled work.

   1. Accessories: Include details of the following items, at a full scale. Not less than 12 inches in length.
      a. Manufacturers Standard Trims
C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Metal Plate Wall Panels: 2"x3" Sample Chips.

D. Coordination Drawings: Elevations, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Metal plate wall panels and attachments. Indicated perforated and non-perforated panels.
2. Girts and supplementary framing.
3. Wall-mounted items including doors, windows, louvers, and lighting fixtures.
4. Penetrations of wall by pipes and utilities.

E. Qualification Data: For Manufacturer

F. Maintenance Data: For metal plate wall panels to include in maintenance manuals.

G. Warranties: Sample of Manufacturers standard warranty

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations:

1. Source Limitations: Obtain each type of metal plate wall panel from single source from single manufacturer.
2. Installer: Pre-Qualified Company specializing in performing the work of this Section shall install the system in strict compliance with the written "Installation Guide."

C. Obtain each type of metal plate wall panel from single source from single manufacturer.
D. Pre-installation Conference:

1. Meet with Owner, Architect, and metal plate wall panel Installer, metal plate wall panel manufacturer’s representative, structural-support Installer, and installers whose work interfaces with or affects panels including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer’s personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal plate wall panel installation, including manufacturer’s written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal plate wall panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal plate wall panel assembly during and after installation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal plate wall panels, and other manufactured items so as not to be damaged or deformed. Package panels for protection during transportation and handling. Store and handle in strict compliance with manufacturers instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations.

B. Store and erect metal plate wall panels in a manner to prevent bending, warping, twisting, and surface damage. Do not store panels horizontally. Always store vertically with top of panel down.

C. Store covered with suitable weather tight and ventilated covering. Store panels to ensure dryness, with positive slope for drainage of water. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Remove strippable protective covering on metal plate wall panel prior to installation.
1.7 PROJECT CONDITIONS

A. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal plate wall panel fabrication and indicate measurements on Shop Drawings.

1.8 COORDINATION

A. Coordinate metal plate wall panel assemblies with flashing, trim, and construction of studs, soffits, and other adjoining work.

1.9 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal plate wall panel assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures, including rupturing, cracking, or puncturing.
   b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: One year from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal plate wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

A. Aluminum Plate: Alloy and temper as recommended by manufacturer for application and in strict adherence to Manufacturers "Design Guide". Dri-Design® Wall Panel System of 5005-H34 Aluminum. Thickness shall be .080" per the requirements of the project.
2.2 MISCELLANEOUS METAL FRAMING

A. Subgirts: Minimum 20ga. 7/8" hat section, C- or Z-shaped sections, Minimum 14ga. flat strap, minimum 20ga. Nominal thickness. Reference Division 5 for proper gauge.

2.3 MISCELLANEOUS MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by manufacturer for type of use and finish indicated.

B. Panel Fasteners: Suitable fasteners designed to withstand design loads. Stainless or other equivalent corrosive resistant fastener with a minimum 7/16" diameter head.

2.4 METAL PLATE WALL PANELS

A. Metal Plate Wall Panels: Provide factory-formed, metal plate wall panels fabricated from single sheets of metal formed into Dri-design dry-joint panels with Custom PERFORATED Imaging with interlocking gutter to the panel with single horizontal attachment to complete assembly.

1. Product Basis for Design: Panels shall be manufactured by Dri-Design, Holland, Michigan. (616) 355-2970
   a. Dri-design Aluminum Wall Panels w/ Custom imaging perforated artwork or plain with no artwork
   b. Imaging artwork shall be as indicated by architect. Artwork will be furnished in digital form as required by the manufacturer of the panel system.

2. Material: Tension-leveled, smooth 5005-H34 Aluminum. Thickness of shall be .080"

3. Panel Depth: 1.25"

4. Exterior Finish: Class 1 Anodized as chosen by Architect.

5. Color: As indicated by manufacturer's designations selected by Architect.

2.5 ACCESSORIES

A. Metal Plate Wall Panel Accessories: Provide components required for a complete metal plate wall panel assembly including trim, copings, fascia, mullions, sills, corner units, flashings, and similar items. Match material and finish of panels unless otherwise indicated.
B. Manufacturers Standard Extrusions: Formed from extruded aluminum. Provide integral drainage system and manufactures standard extrusions at termination of dissimilar materials.

C. Flashing and Trim: Same material, finish, and color as adjacent metal plate wall panels, minimum 0.050 inch thick unless otherwise indicated.

2.6 FABRICATION

A. General: Panels shall be factory fabricated and finished by Dri-Design to fulfill indicated Imaging artwork, panel layouts and comply with indicated profiles and agreed upon dimensional and structural requirements.

2.7 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.8 ALUMINUM FINISHES – VERIFY FINISH WITH DESIGNER

A. Color Anodic Finish: AAMA 611-98, Class I, 0.7 mills.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal plate wall panel manufacturer.

B. Examine roughing-in for components and systems penetrating metal plate wall panels to verify actual locations of penetrations relative to seam locations of panels before installation.

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

A. Miscellaneous Framing: Install subgirts, base angles, sills, furring, and other miscellaneous metal plate wall panel support members and anchorage according to ASTM C 754 and panel manufacturer’s written instructions.

3.3 METAL PLATE WALL PANEL INSTALLATION

A. General: Install metal plate wall panels according to manufacturer’s written instructions in orientation, sizes, and locations indicated on Drawings. Install panels according to manufacturer’s installation method in strict accordance to the manufacturer’s installation guidelines. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Commence metal plate wall panel installation
2. Shim or otherwise plumb substrates receiving metal plate wall panels.
3. Install flashing and trim as metal plate wall panel work proceeds.

B. Fasteners:

1. Aluminum Plate Wall Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior and aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by metal plate wall panel manufacturer.

D. Attachment System, General: Install attachment system required to support metal plate wall panels and to provide a complete wall system, including subgirts, manufacturer’s extrusions, flashings and trim.

1. Include attachment to supports and extrusion trims at dissimilar-materials
2. Do not apply sealants to joints unless otherwise indicated on Drawings or Manufacturers Shop Drawings.
3. Include manufactures standard trims as indicated on the drawings.
4. Install metal plate wall panels with single top attachment in pre-punched holes to allow individual panels to free-float.
3.4 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weather tight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal plate wall panel assembly including trim, copings, corner and standard extrusion covers, flashings and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

3.5 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal plate wall panel units within installed tolerance of 1/4 inch in 20 feet, non-cumulative, on level, plumb, and location lines as indicated.

3.6 CLEANING

A. On completion of metal plate wall panel installation, clean finished surfaces as recommended by panel manufacturer.

B. After metal plate wall panel installation, clear weep holes and drainage channels of obstructions, dirt.

C. Replace metal plate wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074219
A. Description of Work:
   1. Coated built-up roofing over underlayment and flashing.

B. Related Work
   A. Rough carpentry for nailers, blocking is specified in Section 061000.
   B. Expansion joints are specified in Section 078900.
   C. Aluminum parapet caps are specified in Section 077100 – Aluminum Copings and Trim.

C. Submittals: Product Data, including manufacturer’s technical product data, installation instructions and recommendations for each type of roofing product required. Include data substantiating that materials comply with requirements.

D. Project Conditions
   1. Weather Condition Limitations: Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturers’ recommendations and warranty requirements.
   2. Coordinate with Owner to ascertain if there is a warranty in place for this area of roof. If so, perform work in such a manner as to maintain warranty.

E. Delivery, Storage, and Handling
   1. Store and handle roofing materials in a manner which will ensure that there is no possibility of significant moisture pick-up. Store in a dry, well ventilated, weather-tight place. Unless protected from weather or other moisture sources, do not leave unused felts on the roof overnight or when roofing work is not in progress. Store rolls of felt and other sheet materials on end on pallets or other raised surface. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck.
1.04 PERFORMANCE REQUIREMENTS

A. Provide an installed roofing membrane and base flashing system that does not permit the passage of water, and will withstand the design pressures determined in FM Global’s Loss Prevention Data Sheet 1-28, to meet a 1-90 wind uplift rating.

B. Installer shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.

C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspection agency to resist uplift pressure calculated according to ASCE 7.

D. FMG Listing: provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG’s Approval Guide for Class 1 or noncombustible construction, as applicable. Identify material with FMG markings.

   1. Fire/Windstorm Classification: Class 1A-90
   2. Hail Resistance: MH

F. WARRANTY: The roofing contractor shall provide a written warranty to the Owner that during a period of TWO YEARS from the date of Substantial Completion of the building he will, at his own expense, make or cause to be made any repairs that may be necessary as a result of defects in workmanship or materials and/or wear and tear by the elements and will maintain the roofing and flashing in a watertight condition free from all leaks arising from such causes.

   Manufacturer’s Warranty
   Provide Non-Prorated Limited Warranty for Built-Up Roofing Systems.

   1. Duration: Fifteen (15) years from the date of completion.

PART 2 - PRODUCTS

2.1 MATERIALS: Roofing system shall be a 4-ply fiberglass-ply system, consisting of the following:

   A. Built-Up Roofing: System shall be a hot-mopped system
1. Provide built-up asphalt roof system with underlayment, glass-fiber felts, emulsion and reflective coatings.
   a) Underlayment: 1-1/2" thickness noncombustible expanded perlite board.
   
   1) Tapered Insulation for Crickets: Provide tapered polyisocyanurate board – ½" per foot – to provide slopes as shown. Overlay with perlite board to achieve final required elevation.
   
   b) Ply Felts: Asphalt-impregnated glass-fiber felts, complying with ASTM D 2178, Type IV, weighing approximately 7.5 lbs. per square.
   
   c) Bitumen: Roofing asphalt, complying with ASTM D 312, Type IV.

2. Built-up Asphalt Roofing System Edge/Penetration Materials
   
   a) Roofing Cement: Asphalthic cement; comply with ASTM D 2822.
   
   b) Lead Flashing: 4 pound sheet of common desilverized pig lead, as provided by plumber with roof drains.
   
   c) Performed Edge Strips: Rigid insulation units, asphalt-impregnated organic fiber insulation units or perlite, molded to form 3-1/2 inch by 3 1/2 inch by 45 degree cant strips and 1-5/8 inch by 18 inch tapered edge strips to receive roofing ply-sheet courses and lift edges above main roofing surface.
   
   d) Flashing Sheet: A matching granule coated heavy-duty polyester or fiberglass reinforced SBS-modified bitumen flashing sheet.

3. Coating Materials
   
   
   b) Elastomeric Top Coating: Water-based 100% acrylic based elastomeric reflective roof coating. Elastek #109 Solar Magic or equal in performance by another manufacturer.

   Solids by weight: 68%
   Solids by volume: 53%
   CRRC reflectivity: 84.22%
Reflectivity: 88%
Elongation: 300% @ 75 deg. F.
Tensile strength: 300 lb/sq. in. @ 75 deg. F.
VOC: <50 g/l
Color: White – Energy Star rated

B. Sheet Metal Accessory Materials

1. Zinc-Coated Steel: ASTM A 526/A 526M, with 0.20 percent copper, G90 galvanized, mill phosphatized where indicated for painting; 0.0359 inches thick (24 gauge), except as otherwise indicated.

2. Solder for Sheet Metal: Except as otherwise indicated or recommended by metal manufacturer, provide 50/50 tin/lead type (ASTM B 32) for tinning and soldering joints; use rosin flux.

3. Lead: 4 lb. pig lead.

C. Miscellaneous Materials

1. Wood Members, Units: Provide wood pressure treated with water-borne preservatives for above-ground use (AWPB LP-2), in accordance with Section 06100 – Rough Carpentry.

2. Mastic Sealant: Polyisobutylene (plain or bituminous modified), nonhardening, nonmigrating, nonskinning and nondrying.

3. Asphalitic Primer: Comply with ASTM D 41.

4. Fasteners: Provide fasteners, recommended by roofing system manufacturer. Provide fasteners in type, quantity, and pattern to insure FM1-90 uplift installation throughout roof areas, including supplemental fastening as required at corners and parapets.

D. Fabrication of Sheet Metal Accessories

1. SMACNA and NRCA Details: Conform work with details shown, and with applicable fabrication requirements of "Architectural Sheet Metal Manual" by SMACNA. Comply with installation details of "Roofing and Waterproofing Manual" by NRCA.

2. Prefabricate units as indicated, or provide standard manufactured units complying with requirements; fabricate from sheet metal indicated or, as approved by Architect and determined compatible with roofing system by Roofing System Manufacturer.

BUILT-UP ROOFING
3. Provide 4 inch wide flanges for setting on built-up asphalt roofing system membrane with concealment by composition stripping.
4. Fabricate work with flat-lock soldered joints and seams; except where joint movement is necessary provide 1 inch deep interlocking hooked flanges, filled with mastic sealant.
5. Fabricate penetration sleeves with minimum 8 inch high stack, of diameter 1 inch larger than penetrating element.
6. Fabricate curb units for large or multiple pipe/conduit penetrations as detailed, or per NRCA construction details.

PART 3 - EXECUTION

A. Inspection of Substrate: Examine substrate surfaces to receive built-up roofing system patching or shingle and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

B. General Installation Requirements

1. Protect other work from spillage of built-up roofing materials, and prevent liquid materials from entering or clogging drains and conductors. Replace/restore other work damaged by installation of built-up roofing system work.

2. Insurance/Code Compliance: Install built-up roofing system for (and test where required to show) compliance with governing regulations and with the following insurance requirements:
   a. Factory Mutual requirements for zoned wind resistance Class 1-90.
   b. Underwriters Laboratories "Fire Classified Class-A".
   c. Ratings and classifications shall apply throughout roof area.

3. Coordinate the installation so that felts are not exposed to precipitation or exposed overnight. Provide cut-offs at end of each day's work, to cover exposed felts and insulation with a course of coated felt with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work. Temporarily fill any open holes in roofing prior to patching.
   a. Provide and keep a daily log verifying that both the General Contractor's Field Superintendent and Roofing Installer's Foreman
have policed the roof(s) for placement of required cut-offs, and that all drains, overflows, etc. are free from obstructions.

b. Remove and replace any water or weather damaged material resultant from failure to place required cut-offs, before proceeding with installation of roofing.

4. Asphalt Bitumen Heating: Heat and apply bitumen according to equiviscous temperature method (EVT Method) as recommended by NRCA.

5. Bitumen Mopping Weights: For interply mopping, and for other moppings, except as otherwise indicated, apply bitumen between plies at the average rate of 30 lb of asphalt per roof square (100 sq. ft.), or as otherwise required by a particular manufacturer.

6. Substrate Joint Penetrations: Do not allow bitumen to penetrate substrate joints and enter building or damage insulation, vapor retarders, or other construction. Where mopping is applied directly to a substrate, tape joints or, in the case of steep asphalt, hold mopping back 2 inches from both sides of each joint.

7. Cutoffs: At the end of each day’s roofing installation, protect exposed edge of incomplete work, including ply sheets and insulation, if inclement weather threatens. Provide temporary covering of two plies of No. 15 roofing felt set in full moppings of hot bitumen; remove at beginning of next day’s work.

C. Underlayment and Tapered Board: Install across the metal deck in a single layer with edges lightly butted. Provide mechanical fasteners in quantity and arrangement to meet uplift criteria. There shall be no offset between edges.

D. Roof Membrane Installation: Install membrane with ply sheets shingled uniformly to achieve required amount of membrane thickness throughout.

1. Set-On Accessories: Where small roof accessories are set on built-up roofing membrane, set metal flanges in a bed of roofing cement and seal membrane penetration with a bead of roofing cement to prevent a flow of bitumen from the membrane.

2. Flashing and Stripping: Install composition or SBS modified stripping where metal flanges are set on roofing. Provide not less than one ply of base sheet and one ply of modified bitumen flashing; set each in a continuous coating of roofing cement and extended onto the deck 4
inches and 8 inches up wall. Fasten top edge of flashing every 6-8" through metal disk. Seal the top edge of the flashing using roof cement.

3. Allow for expansion of running metal flashing and edge trim which adjoins roofing. Do not seal or bond membrane or composition flashing and stripping to metal flanges over 3 feet in length.

4. Counter Flashings: Install counter flashings, cap flashings, and similar work associated with built-up roofing work. Coordinate for installation of roof expansion joint assemblies, roof hatch, and skylight.

5. Coatings: Provide complete emulsion coating across patched areas and allow to cure. Apply elastomeric coating to these areas in two coats at a rate of 1 gallon per 100 sf.

E. Protection and Warranty of Roofing:

1. Upon completion of roofing work (including associated work) Installer shall advise Contractor of recommended procedures for surveillance and protection of roofing during remainder of construction period. Traffic on completed work shall be minimized. At end of construction period, or at a time when remaining construction work will in no way affect or endanger roofing (at Contractor's option), Contractor and manufacturer's representative shall make a final inspection of roofing and prepare a written report describing nature and extent of damage or deterioration found in the work.

   a. Repair or replace (as required) deteriorated or defective work found at time of final inspections. Installer shall be engaged by Contractor to repair damages to roofing which occurred subsequent to roofing installation and prior to final inspection. Repair or replace the roofing and associated work to a condition free of damage and deterioration at time of substantial completion.

   b. After completion of roof repairs, issue specified warranty for repaired areas.

END OF SECTION 075113
SECTION 077100 – ALUMINUM COPINGS AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following manufactured roof specialties:

1. Aluminum coping and trim system.

B. Related Sections include the following:

1. Section 061000 – Rough Carpentry for blocking and supports.
2. Section 075113 – Built-Up Roofing.
3. Section 079200 - Joint Sealers for field-applied sealants.

1.3 PERFORMANCE REQUIREMENTS

A. General: Manufacture and install manufactured roof specialties to resist thermally induced movement and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. FMG Listing: Manufacture and install copings that are listed in FMG's "Approval Guide" and approved for Windstorm Classification, Class 1-90. Identify materials with FMG markings.

C. Manufacture and install copings tested according to SPRI ES-1-98.

D. Thermal Movements: Provide manufactured roof specialties that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base engineering
calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F ambient; 180 deg F material surfaces.

E. Water Infiltration: Provide manufactured roof specialties that do not allow water infiltration to building interior.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show layouts of manufactured roof specialties, including plans and elevations. Identify factory- vs. field-assembled work. Include the following:

1. Details for fastening, joining, supporting, and anchoring manufactured roof specialties including fasteners, clips, cleats, and attachments to adjoining work.
2. Details for expansion and contraction.

C. Samples for Initial Selection: For each type of manufactured roof specialty indicated with factory-applied color finishes.

D. Fabrication Samples: For copings made from 12-inch lengths of full-size components including fasteners, cover joints, accessories, and attachments.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, verifying compliance of copings with performance requirements.

F. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.6 COORDINATION

A. Coordinate installation of manufactured roof specialties with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

1.7 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer’s standard form in which manufacturer agrees to repair finish or replace manufactured roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer 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 EXPOSED METALS

A. Aluminum Sheet and Extrusions: ASTM B 209 and ASTM B 221, respectively, alloy and temper recommended by manufacturer for use and finish indicated, finished as follows:

1. Surface: Smooth, flat finish.

2. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
a. Fluoropolymer 2-Coat System: Manufacturer’s standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; comply with AAMA 2604.

b. Color: As selected.

2.2 CONCEALED METALS
A. Aluminum Sheet and Extrusions: ASTM B 209 and ASTM B 221, respectively, alloy and temper recommended by manufacturer for use and structural performance indicated, mill finished.
B. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.

2.3 MISCELLANEOUS MATERIALS
A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.
B. Rough Carpentry Supports and Blocking: Preservative treated dimensional lumber as specified in Section 061000 – Rough Carpentry.
C. Fasteners: Manufacturer’s recommended fasteners, suitable for application and designed to withstand design loads.
D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
F. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
2.4 COPINGS AND TRIM

A. Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet, concealed anchorage, concealed splice plates with same finish as coping caps, mitered corner units, and end cap units.

1. Basis-of-Design Product: W.P. Hickman Permasnap Parapet Wall Coping or a comparable product by one of the following:
   a. Cheney Flashing Company.
   b. Metal-Era, Inc.
   c. Metal-Fab Manufacturing LLC.
   d. MM Systems Corporation.
   e. Perimeter Systems, a division of Southern Aluminum Finishing Co.
   f. Petersen Aluminum Corp.

B. Aluminum: 0.063 inch thick.

2. Coping Cap Color: As selected by Architect from manufacturer's full range.


4. Snap-on Coping Anchor Plates: Concealed, galvanized steel sheet, 12 inches wide, 16 ga. thick, with integral cleats.

5. Face Leg Cleats: Concealed, continuous galvanized steel sheet.

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 and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.

1. Examine walls and parapets for suitable conditions for manufactured roof specialties.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install manufactured roof specialties according to manufacturer's written instructions. Anchor manufactured roof specialties securely in place and capable of resisting forces specified in performance requirements. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.

1. Install manufactured roof specialties with provisions for thermal and structural movement.
2. Torch cutting of manufactured roof specialties is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum manufactured roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing exposed-to-view components of manufactured roof specialties directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.

C. Install manufactured roof specialties level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil-canning, buckling, or tool marks.
D. Install manufactured roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

E. Expansion Provisions: Provide for thermal expansion of exposed manufactured roof specialties. Space movement joints at a maximum of 12 feet with no unplanned joints within 18 inches of corners or intersections.

F. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 3/4 inch for wood screws.

G. Seal joints with elastomeric sealant as required by manufacturer of roofing specialties.

3.3 COPING INSTALLATION

A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor copings to resist uplift and outward forces according to performance requirements.

   1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's recommended spacing.

3.4 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films as manufactured roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
B. Replace manufactured roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100
SECTION 077200 – ROOF HATCH

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Roof hatch.
2. Safety railing system.

B. Alternating tread steel stair is specified in Section 055133.

1.3 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of product specified. Submit manufacturer's detailed technical product data, installation instructions and recommendations, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.

1.4 QUALITY ASSURANCE

A. Standards: Comply with the following:

1. SMACNA "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap-flashing to coordinate with type of roofing indicated.
2. NRCA "Roofing and Waterproofing Manual" details for installation of units.

B. PERFORMANCE REQUIREMENTS: General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

C. COORDINATION

a. Coordinate layout and installation of roof accessories with roofing system and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Commercial-Quality Galvanized Steel Sheet: ASTM A 526 with G90 coating complying with ASTM A 525.

B. Insulation: Manufacturer's standard rigid or semirigid glass-fiber board.

C. Wood Nailers: Softwood lumber, pressure treated with water-borne preservatives for above-ground use, complying with AWPA C2; not less than 1-1/2 inch thick.

D. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.

1. Where removal of exterior exposed fasteners affords access to building, provide nonremovable fastener heads.
E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.

F. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coating.

G. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

H. Elastomeric Sealant: Generic type recommended by unit manufacturer that is compatible with joint surfaces; ASTM C 920, Type S, Grade NS, Class 25, and Uses NT, G, and, A.

I. Roofing Cement: ASTM D 4586, nonasbestos, fibred asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.2 FINISHES

A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations on applying and designating finishes.

B. Baked Enamel Primer Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: chemical conversion coating, acid chromate-fluoride-phosphate pretreatment; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's specifications for cleaning, conversion coating, and painting.

2.3 ROOF HATCH

A. General: Fabricate units to withstand 40-lbf per sq. ft. external loading and 20-lbf per sq. ft. internal loading pressure. Frame with 9-inch-high, integral-curb, double-wall construction with 1-1/2 inch insulation, cant strips and cap flashing (roofing counter flashing), with welded or sealed mechanical corner joints. Provide double-wall cover (lid) construction with 1 inch insulation core. Provide gasketing and equip corrosion-resistant or hot-dip
galvanized hardware including pintle hinges, hold-open devices, interior padlock hasps, and both interior and exterior latch handles.

B. Type: Single-leaf personnel access.

1. For Stair Access: 30" x 54"
2. Bilco Type NB, or equal by Milcor, Dur-Red.

C. Material: Zinc-coated steel sheets, 14 ga., primed.

2.4 SAFETY RAILING SYSTEM: Meets requirements of OSHA 29 SFR 1910.23. Has self-closing and latching gate, non-penetrating attachment system, corrosion-resistant safety yellow finish with 25-year warranty.

A. Bilco Bil-Guard Hatch Rail System, RL-NB to fit ladder hatch, or equal by another manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck to ensure that hatch performs properly. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses, as well as inward and outward loading pressures.

1. Install roof accessory items according to construction details of NRCA "Roofing and Waterproofing Manual" and with details shown on drawings.

B. Isolation: Where metal surfaces of units are to be installed in contact with incompatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.
C. Flange Seals: Set flanges of accessory units in a thick bed of roofing cement to form a consistent seal.

D. Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counterflashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.

E. Install safety railing system at roof hatch.

F. Operational Units: Test operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.2 CLEANING AND PROTECTION

A. Clean exposed metal surfaces according to manufacturer's instructions. Touch up damaged metal coatings.

END OF SECTION 077200
SECTION 078413 - FIRESTOPPING

PART 1 - GENERAL

1.01 WORK SPECIFIED IN THIS SECTION

A. The extent of work is shown and shall include but not be limited to:

1. Firestop sealants.
2. Firestop mortar.
3. Firestop pillows.
5. Firestop silicone foam.
6. Firestop safing with elastomeric smoke seal.
7. Firestopping pads for electric boxes in fire rated walls.

B. Provide and install the required firestop materials at rated walls, soffits, ceilings, parapets, floors, roofs, etc.

1.02 DESCRIPTION

A. Work, in general, includes furnishing and installation of those fire and smoke penetration seals for openings in floors, walls and other elements of construction that are in accordance with ASTM E-814, E-119 and/or UL-1479, UL-263.

B. Firestopping (Firesafing): A seal and/or stuffing material or assembly placed in spaces between building materials to arrest the movement of smoke, heat, gases, or fire through walls and/or floor openings.
1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Coordination of the sections listed below with this section includes, but is not limited to:

   Section 072100 - Insulation.

   Section 092900 - Gypsum Drywall Assemblies.

   Divisions 21, 22, 23, and 26 – Fire Suppression, Mechanical, Plumbing and Electrical.

1.04 QUALITY ASSURANCE:

A. Applicator Qualifications: Minimum two years experience installing UL classified fire stopping or manufacturer certification.

B. Standards: All firestop systems shall have an F (flame) rating and T (temperature) rating equal to or greater than the assembly being penetrated.

C. Single Source Responsibility for Firestopping: Obtain firestopping materials from a single manufacturer for each different product required.

1.05 SUBMITTALS

A. Shop Drawings: Submit shop drawings, or manufacturer's detail sheets showing each condition that requires a penetration or joint seal. These details must be in accordance with the proposed approved system. Details must include materials to be used, anchorage, methods of installation and relationship to all adjacent construction.

B. Manufacturer's Data: Submit copies of all manufacturer's specification data, recommendations and installation instructions for each type of material required.

C. Material Certification: Provide certification that submitted material is free of asbestos.
1.06 DELIVERY, STORAGE AND HANDLING

A. General:

1. All materials shall be delivered and stored in original, unopened, and clearly labeled containers. Containers shall list the name of the manufacturer and bear proper UL label.

2. Materials shall be stored and protected from environmental conditions as required by manufacturer.

1.07 PROJECT CONDITIONS

A. Existing Conditions: Installer shall verify that existing conditions and substrate conform to manufacturer's requirements before starting work. Unsatisfactory conditions must be corrected before proceeding.
PART 2 – PRODUCTS

2.01 MATERIALS

   A. General: Provide firestop and accessory materials with fire-resistance rating indicated which are identical to those assemblies whose fire endurance has been determined by testing per ASTM E814, by Underwriters Laboratory, Inc., or other testing and inspecting agency acceptable to authorities having jurisdiction.

2.02 FIRESTOP SEALANTS

   A. General:

   1. All materials shall comply with ASTM E814 (UL-1479), and shall be manufactured of non-toxic, non-hazardous asbestos free materials.

   2. Primers: Conform to manufacturer's recommendations for primers required for various substrates and conditions.
3. Back-up materials: Back-up materials, supports and anchoring devices shall be provided as required by U.L. testing.

B. Silicone Sealant: One-part, low modulus, moisture curing silicone capable of withstanding movement of 100% in extension and 50% in compression in service, such as Fyre-Sil by Tremco or prior approved equal.

C. Ceramic Fiber Sealant: One-part, moisture curing, water-based ceramic fiber sealant with a melting point not less than 3000 degrees F, such as Fyre-Shield by Tremco or prior approved equal.

D. Intumescent Sealant: One-part, water-based intumescent sealant, manufactured with graphite and unaffected by moisture or frost, such as Tremstop WBM by Tremco, Inc. or prior approved equal.

E. Intumescent Wrap Strips: Solvent free, graphite based intumescent wrap strip unaffected by water, frost or UV, such as Tremstop WS by Tremco, Inc. or prior approved equal.

F. Intumescent Putty: Water-based, water-resistant intumescent putty such as, Tremstop FP by Tremco, Inc. or prior approved equal.

G. Fire Prevention Mortar: Hydraulic, fire-resistant, cementitious mortar, such as Tremstop M by Tremco, Inc. or prior approved equal.

H. Fire-Stop Pillows: Semi-intumescent, dust free fiberglass pillows impervious to water, humidity, frost and light, such as Tremstop PS by Tremco, Inc. or prior approved equal.

I. Fire-Resistive Joint Sealant and Safing: Ceramic fiber or mineral wool joint filler strips or blankets of sizes and shapes recommended by manufacturer, specifically for increasing fire resistance or endurance of joint systems, with elastomeric smoke seal consisting of a three-part chemically curing polyurethane meeting Federal Specification TT-S-00227E, Class A, Type II, and/or ASTM C-920, Class 25 and capable of withstanding movement of 25% in extension and compression in service,
such as Dymeric or THC-900/901 as manufactured by Tremco, Inc., or prior approved equal.


PART 3 - EXECUTION

3.01 EXAMINATION

A. General: Examine joints and openings indicated to receive fire-stop sealers, with installer present, for compliance with requirements for proper configuration, installation tolerances and other conditions affecting fire-stop performance. Do not proceed with installation of fire-stop sealers until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning of Openings: Clean out openings and joints immediately before installing fire-stop sealers to comply with recommendations of fire-stop manufacturer.

3.03 INSTALLATION

A. General:

1. Apply in strict accordance with manufacturer's recommendations to provide F and T rated seal as required.

2. Apply fire-stop with sufficient pressure to properly fill and seal openings, then tool or trowel exposed surfaces.

3. Any trade that penetrates the fire/smoke partition, or other partition that goes up to the underside of the deck, will be required to do the necessary repairs.
3.04 FIELD QUALITY CONTROL

A. All sealed areas should be inspected by an appointed code official, and the General Contractor to ensure proper installation. All sealed areas should remain accessible until inspection by applicable authorities has been completed.

3.05 CLEAN UP

A. General:

1. Clean adjacent surfaces immediately and leave work neat and clean.

2. Remove excess materials using recommended procedures, as work progresses.

3. Remove dams after initial set of fire-stops as required.

PART 4 - SYSTEMS AND APPLICATION SCHEDULE

4.01 SYSTEM TYPES

Use system listed below that best matches the wall and floor construction.

A. Single metal pipe or conduit penetrations:


ULC designations: SP-143, SP-144, SP-169, SP-173, SP-178, SP-236, SP-237, SP-254, SP-255, SP-256, SP-257.

Tremco Products: Fyre-Shield, Fyre-Sil, TREMstop WBM or prior approved equal.
B. Multiple metal pipe or conduit penetrations.

UL designations: C-AJ-1047, W-L-1020, W-J-1012.


Tremco Products: Fyre-Shield, Fyre-Sil, TREMstop WBM or prior approved equal.

C. Insulated metal pipe penetrations:


ULC designations: SP-145, SP-146, SP-179, SP-180, SP-236, SP-237.

Tremco Products: TREMstop WS, TREMstop WBM, Fyre-Shield, Fyre-Sil or prior approved equal.

D. Plastic pipe or conduit penetrations:


Tremco Products: Fyre-Sil, TREMstop WS, TREMstop D, TREMstop MCR, TREMstop M.

E. Cable penetrations:


ULC designations: SP-170, SP-171, SP-172, SP-207, SP-231, SP-232, SP-234, SP-235, SP-238, SP-254, SP-255.

Tremco Products: TREMstop PS, TREMstop WBM, Fyre-Shield, Fyre-Sil or prior approved equal.
F. Cable tray penetrations:

UL designations: C-AJ-4018, W-J-4005, C-AJ-4007.

Tremco Products: Fyre-Shield, TREMstop M, TREMstop FP, TREMstop PS, TREMstop WBM or prior approved equal.

G. Busways:

UL designations: C-AJ-4018, W-J-4005, C-AJ-4007.

Tremco Products: Fyre-Shield, TREMstop M, TREMstop FP, TREMstop PS, TREMstop WBM or prior approved equal.

H. Blank openings:

UL designations: C-AJ-0026, C-AJ-0011.

ULC designations: SP-147, JF-18, JF-19, JF-20, JF-21, JF-22.

Tremco Products: Fyre-Shield, Fyre-Sil, THC-900, Dymonic, Dymeric or prior approved equal.

I. Fire rated joints:

UL designations: U900A, U900B, U900C.


Tremco Products: Dymeric, Dymonic, THC-900, Cerablanket-FS, Fyre-Shield, Fyre-Sil, Fyre-Sil S/L or prior approved equal.

END OF SECTION
SECTION 078900 - ARCHITECTURAL JOINT SYSTEMS -

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Types of joints for which architectural joint systems are specified include the following:

1. Exterior vertical wall joints.
2. Interior floor and wall joints.
3. Factory-made transitions for vertical-to-horizontal changes.
4. Horizontal roof joints.

B. Related Sections include the following:

1. Section 061000 – Rough Carpentry for pressure-treated wood roof curbs.
2. Section 079200 - Joint Sealers for elastomeric sealants.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide factory-fabricated architectural joint systems capable of withstanding the types of loads and of accommodating the kinds of movement, and the other functions for which they are designed including those specified below, without failure.


1.4 SUBMITTALS

A. Product Data: Include manufacturer's product specifications, construction details, material and finish descriptions, and dimensions of individual components and seals.

B. Shop Drawings: For each joint system specified, provide the following:
1. Placement Drawings: Include line diagrams showing entire route of each joint system, plans, elevations, sections, details, joints, splices, locations of joints and splices, and attachments to other Work. Where joint systems change planes, provide Isometric Drawings depicting how components interconnect to achieve continuity of joint covers and fillers.

C. Samples for Verification: Full-size units 6 inches long of each type of joint system indicated; in sets for each finish, color, texture, and pattern specified, showing the full range of variations expected in these characteristics.

D. Product Test Reports: From a qualified testing agency indicating architectural joint systems comply with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain architectural joint systems through one source from a single manufacturer. Coordinate compatibility with adjoining joint systems specified in other Sections.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Other manufacturers' systems complying with requirements may be considered. Refer to Division 1 Section "Product Requirements."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: The design for each architectural joint system specified in Part 2 "Architectural Joint Systems" Article below is based on the products named. Subject to compliance with requirements, provide either the named products or comparable products by one of the other manufacturers listed.

2.2 MATERIALS

A. Aluminum: ASTM B 221 (ASTM B 221M), alloy 6063-T5 for extrusions.
1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Steel: ASTM A 526/A 526M, with 0.20 percent copper, G90 galvanized, mill phosphatized where indicated for painting; 0.0359 inches thick (24 gauge), except as otherwise indicated. Where indicated as stainless steel, provide Type 304, mill finish.

C. Preformed Seals: Single or multicellular extruded elastomeric seals designed with or without continuous, longitudinal, internal baffles. Formed to be installed in frames or with anchored flanges, as selected by Architect from manufacturer's standard colors.

D. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, flexible moisture barrier and filler materials, drain tubes, lubricants, adhesives, and other accessories compatible with material in contact, as indicated or required for complete installations.

E. Lumber: Preservative treated in accordance with Section 061000 – Rough Carpentry.

2.3 ARCHITECTURAL JOINT SYSTEMS

A. General: Provide joint systems of design, basic profile, materials, and operation indicated. Provide units with the capability to accommodate joint widths indicated and variations in adjacent surfaces.

1. Furnish units in longest practicable lengths to minimize number of end joints. Provide hairline mitered corners where joint changes directions or abuts other materials.

2. Include closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.

3. Frames for Strip Seals: Designed with semiclosed cavity that provides a mechanical lock for seals of type indicated.

B. Architectural Joint System 3 – Exterior Vertical Wall: Aluminum cover plate supported by continuous aluminum back clip on one side and pressure seated on the other side. Backed by polyethylene vapor barrier. Suitable for 2" wide building joint.

2. Architectural Joint System 4 – Exterior Wall - Corner Condition: Similar to above, equal to ASMC-200X.

C. Architectural Joint System 5 – Horizontal Roof: EPDM sheet supported by closed cell foam, with 26 ga. galvanized steel flanges for curb mounting. Equal Johns Manville Expand-O-Flash Expansion Joint Cover, wall-to-parapet.

D. Architectural Joint System 1 – Horizontal Floor: Extruded aluminum plate, clear anodized, beveled at edges, fastened on one side to span 2" wide joint, 500 lb. loading. Equal of Construction Specialties PC-200.


2.4 FINISHES, GENERAL

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. Aluminum finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

D. Typical Aluminum unless otherwise noted: Mill Finish: AA-M10 (Mechanical Finish: as fabricated; no other applied finish unless buffing is required to remove scratches, welding, or grinding produced in fabrication process.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to architectural joint system manufacturer's written instructions.

B. Coordinate and furnish anchorages, Placement Drawings, and instructions for installing joint systems to be embedded in or anchored to concrete or to have recesses formed into edges of concrete slab for later placement and grouting-in of frames.

C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary to secure joint systems to in-place construction, including threaded fasteners with drilled-in expansion shields for masonry and concrete
where anchoring members are not embedded in concrete. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for handling and installing architectural joint assemblies and materials, unless more stringent requirements are indicated.

B. Coordinate installation of architectural joint assembly materials and associated work so complete assemblies comply with assembly performance requirements.

C. Terminate exposed ends of exterior architectural joint assemblies with factory-fabricated termination devices to maintain waterproof system.

D. Install factory-fabricated transitions between building expansion-joint cover assemblies and roof expansion-joint assemblies to provide continuous, uninterrupted, watertight construction.

E. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required to install joint systems.

1. Install joint cover assemblies in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
2. Allow adequate free movement for thermal expansion and contraction of metal to avoid buckling.
3. Set covers in horizontal surfaces at elevations that place exposed surfaces flush with adjoining finishes.
4. Securely attach in place with required accessories.
5. Locate anchors at interval recommended by manufacturer.

F. Continuity: Maintain continuity of joint systems with a minimum number of end joints and align metal members. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames. Adhere flexible filler materials, if any, to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

G. Joint Systems with Seals: Seal end joints within continuous runs and joints at transitions according to manufacturer's written instructions to provide a watertight installation.
3.3 CLEANING AND PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect gaskets for dirt and damage. Replace torn or damaged gaskets.

END OF SECTION 078900
SECTION 079200 - JOINT SEALERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preparing substrate surfaces.
B. Sealant and joint backing.

1.02 RELATED SECTIONS

A. Section 072413 – Polymer Based Exterior Insulation and Finish System (EIFS).
B. Section 081113 - Hollow Metal Doors and Frames.
C. Section 088000 - Glazing.
D. Section 084413 – Aluminum Storefront Framing and Doors
E. Section 092900 – Gypsum Drywall Systems.
F. Section 099000 - Painting.
G. Section 102800 - Toilet and Bath Accessories.

1.03 REFERENCES

A. ASTM C804 - Use of Solvent-Release Type Sealants.
B. ASTM C919 - Use of Sealants in Acoustical Applications.
C. ASTM C920 - Elastomeric Joint Sealants.
D. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.

F. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.04 SUBMITTALS

A. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, color, and adjacent surfaces to be caulked.

B. Samples: Submit 2 samples illustrating sealant colors for selection.

C. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, perimeter conditions requiring special attention.

D. LEED Submittal: For interior sealants (only) submit compliance with IE 4.1, including printed statement of VOC content.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Maintain one copy of each document on site.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years experience.

B. Applicator: Company specializing in performing the work of this section with minimum five years experience.

1.07 ENVIRONMENTAL REQUIREMENTS: Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

JOINT SEALERS

079200 -2
1.08 COORDINATION: Coordinate the work with all sections referencing this section.

1.9 WARRANTY

A. Provide five year warranty under provisions of Div. 1.

B. Warranty: Include coverage for installed sealants and accessories which fail to achieve water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.01 SEALANT MATERIALS

A. VOC Content of Interior Sealants and Sealant Primers: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: Not more than 250 g/L.
2. Sealant Primers for Non-porous Substrates: Not more than 250 g/l.
3. Sealant Primers for Porous Substrates: Not more than 775 g/l.

B. Exterior: One-part, non-sag, moisture-cure, high-performance polyurethane sealant:

Product: Equal of BASF Sonolastic NP 1 ASTM C 920, Type S, Grade NS, Class 35, Use NT, MA, and I.

Performance Requirements:
1. Durometer Hardness, ASTM C-661, Shore A: 25-30
2. Ultimate Tensile Strength, ASTM D-412: 350 psi
3. Ultimate Elongation, ASTM D-412: 800 percent elongation
4. Movement Capability, ASTM C-719: +/-35% sustained through weathering
5. Peel Strength, ASTM C-794: 30 ppi
6. Staining, ASTM C-1248: Passes with no staining indicated for granite, limestone, brick or concrete

D. Sanitary Sealant: Equal GE SCS1700.

2.02 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: ASTM D1056 D1565; round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

JOINT SEALERS
C. Perform preparation in accordance with manufacturer's instructions.

D. Protect elements surrounding the work of this section from damage or disfiguration.

3.03 INSTALLATION

A. Install sealant in accordance with manufacturer's instructions.

B. Install sealant to be straight and non-waving in joints.

C. Install bond breaker where joint backing is not used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Tool joints concave, dense and consistent.

3.3 CLEANING

A. Clean adjacent soiled surfaces and remove all sealant from adjacent surfaces.

3.4 PROTECTION OF FINISHED WORK: Protect sealants until cured.

END OF SECTION
SECTION 081113 - STEEL (HOLLOW METAL) DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following products manufactured in accordance with SDI Recommended Standards:
   1. Doors: Standard steel doors for interior and exterior locations.
   2. Frames: Hollow metal frames for interior and exterior openings.
      a. Welded unit type.
   3. Provide factory primed doors and frames to be field painted.

B. Joint sealers are specified in Section 079200.

C. Interior aluminum frames are specified in Section 081210. (These are used at most interior frames.)

D. Wood doors are specified in Section 081416.

E. Exterior aluminum frames are specified in Section 084413 – Aluminum Storefront and Doors.

F. Door hardware is specified in Section 087100.

G. Glazing is specified in Section 088000.
1.3 SUBMITTALS

A. Product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, profiles, and finishes.

B. Shop drawings showing fabrication and installation of standard steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

2. Indicate coordinate of glazing frames and stops with glass and glazing requirements.

1.4 QUALITY ASSURANCE: Provide doors and frames complying with Steel Door Institute "Recommended Specifications Standard Steel Doors and Frames" ANSI/SDI-100 and as herein specified.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4-inches high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.
PART 2 - PRODUCTS

2.1 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.

b. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.2 MATERIALS

A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.

1. Exterior Doors and Frames: Provide with metallic coating conforming to ASTM A924 for hot dip galvanization.

C. Supports and Anchors: Fabricate of not less than 18-gage sheet steel. For anchorage to steel stud partitions provide anchors welded to frame.

D. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize in compliance with ASTM A 153, Class C or D as applicable.

E. Shop Applied Paint: Apply after fabrication.

1. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints complying with ANSI A224.1, "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames."
2.3 DOORS

A. Provide metal doors of SDI grades and models specified below:

1. ANSI/SDI-100

   a. Exterior Doors: Grade III, extra heavy-duty, minimum 16-gage cold-rolled sheet steel faces. Provide seamless faces with edge seams welded and ground. Exterior doors shall have polyurethane foam infill and shall be additionally reinforced for all applied hardware. Minimum 7" top rail with seamless top channel caps.

   b. Interior Doors: Grade II, heavy duty, minimum 18 ga. steel faces, seamless faces with edges seams welded and ground. Infill of resin-impregnated honeycomb.

   c. Reinforce vertical edges with minimum 16 ga. x 1.75" channels with 1" returns.

      1) Glass stops shall be 20 ga. steel channels, factory installed and through-fastened with countersunk flathead machine screws.

   d. Provide inverted bottom closure channel.

   e. Lock and hinge stiles shall be accurately mortised and reinforced to receive scheduled hardware. Reinforcement shall be not less than 3/16" thick steel drilled and tapped to receive hinges and locks. From the top edge of all doors and located 3" from the top, install a 16" x 14 ga. channel to separate the faces of the door, and two reinforcing plates 22" x 4.5" x 12 ga. to suit closers. Install spreaders for panic hardware which requires through-bolts. Reinforce for push plates, escutcheons, and similar items with 14 ga. sheet.

2.4 FRAMES

A. Provide metal frames for wood and steel doors, sidelights, borrowed lights, interior windows, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated.

   1. Fabricate frames with mitered or coped corners, welded construction for all applications.