MOORE PUBLIC SCHOOLS
KINGSGATE ELEMENTARY SCHOOL
EXTERIOR UPGRADES

INDEPENDENT DISTRICT NO. 2
CLEVELAND COUNTY, MOORE, OKLAHOMA

1400 KINGSGATE ROAD
OKLAHOMA CITY, OKLAHOMA 73159

PROJECT MANUAL

JANUARY 2025

AGP | the Abla Griffin Partnership

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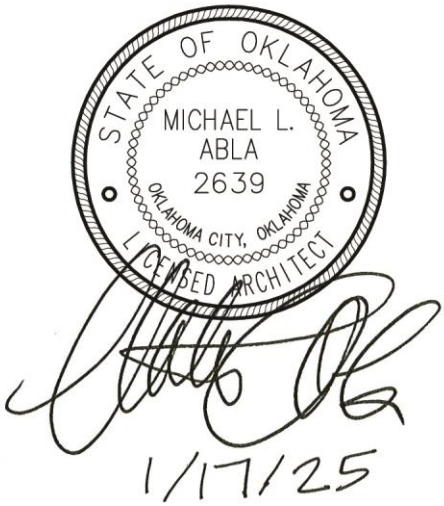

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SPECIAL CONDITIONS

TIME FOR COMPLETION AND LIQUIDATED DAMAGES:

A. Upon execution of the contract agreement between the Owner and the Contractor, it shall become an obligation of the contractor to complete all work to be performed under this agreement for the construction of the 2025 Exterior Upgrades of Kingsgate Elementary School to be located at 1400 Kingsgate Road, Moore, OK - **within 240 Calendar Days.**

B. Penalty for noncompliance by the above date shall be cessation of all further periodical payments until the work is completed, and can be fully used for the purpose intended.

PAYMENTS:

A. The Owner=s payment schedule indicating the payment dates established by Moore Public Schools shall be provided to the contractor to establish a monthly payment schedule.

B. **Certificates of payment shall be submitted to the Architect on or before 7 days prior to Owner's cut-off date.**

C. Until the Work is 50 percent complete, the Owner will pay 95 percent of the amount due the Contractor on account of progress payments. At the time the Work is 50 percent complete and thereafter, if the manner of completion of the Work and its progress are and remain satisfactory to the Architect, and in absence of other good and sufficient reasons, he shall on presentation by the Contractor of Consent of Surety for each application, authorize any **remaining** partial payments to be paid at 100% of amount due. The retainage held to that point shall be retained until the project is completed.

The full contract retainage may be reinstated if the manner of the completion of the Work and its progress do not remain satisfactory to the Architect, (or if the Surety withholds his consent), or for other good and sufficient reasons.

INSURANCE AND BONDS:

A. Insurance provided shall be with a company or companies licensed to do business in the state of Oklahoma.

B. Policies shall be provided in the following types and amounts:

1. a. Workmen's Compensation-Statutory

b. Employer's Liability-$500,000 each accident.

2. Comprehensive General Liability:
   a. Bodily Injury - $1,000,000 each occurrence.
   b. Personal Injury - $1,000,000
   c. Property Damage - $1,000,000 each occurrence

3. Automobile Liability:
   a. Bodily Injury - $500,000 each person/$1,000.000 each occurrence
   b. Such Comprehensive Automobile Liability Insurance shall include all owned and non-owned hired motor vehicles.

4. Owners Protective Liability - Same limits as above.

5. Products and Completed Operations - Same limits as above.

6. Contractual Liability - Same limits as above.

C. Furnish one copy of Certificates herein required for each copy of the Agreement; specifically set forth evidence of all coverage required by Subparagraphs 11.1 and 11.2. Furnish to the Owner copies of any endorsements that are subsequently issued amending coverage or limits.

D. T**he Contractor shall provide property insurance in the amount of the initial contract sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis without voluntary deductibles. This insurance coverage shall be the all-risk form for completed value.**

TEMPORARY SERVICES:

A. Sanitary Facilities: The Contractor shall provide and maintain necessary sanitary conveniences for the use of those employed on/or about the work. The sanitary facilities shall be properly secluded from public observation and shall be such locations as shall be approved by the Owner, and their use shall be strictly enforced.

SHOP DRAWINGS and SUBMITTALS:

A. Unless otherwise specified, the shop drawings and product data shall be submitted **electronically.** Physical samples of materials shall

be submitted to the Architect as required.

B. Contractor is responsible for obtaining and distributing required prints of shop drawings to his subcontractors and material suppliers after as well as before final approval.

C. Shop drawings and samples shall be dated and marked to show the names of the Project, Architect, Contractor, originating Sub-Contractor, manufacturer or supplier, and separate detailer if pertinent. Shop drawings shall completely identify Specifications section and locations at which materials or equipment are to be installed. Reproduction of Contract Drawings are acceptable as Shop Drawings only when specifically authorized in writing by the Architect.

D. If materials or specified items other than those specified in these Contract Documents are supplied - and approved by the Architect - it shall be the Contractor=s responsibility to provide ALL additional materials, accessories, substrates, utility connection, etc. for a complete and operational installation at NO additional cost to the Owner.

CHANGES IN THE WORK:

A. Cost shall be limited to the following: cost of materials, including sales tax and cost of delivery; cost of labor, including social security, old age and unemployment insurance, and fringe benefits under collective bargaining agreements; workmen's compensation insurance; bond premiums; and rental value of power tools and equipment. Overhead shall include the following; supervision, superintendence, wages of time keepers, watchmen and clerks, hand tools, incidentals, general office expense, and all other expenses not included in "cost".

B. Change Order markups shall be limited to 10% overhead and 10% profit. No other markups shall be allowed.

AS BUILT DRAWINGS:

A. Provide and maintain in proper order and in good, clean condition in the field office at the project site, one complete full-size set of all working drawings. On this set of drawing prints, in red ink, neatly and accurately inscribe any and all changes in the work.

B. Upon completion of work, the Contractor shall furnish one set of **as built** drawings. These drawings shall be contract drawings

corrected in **red ink** to show any differences between contract drawings and actual construction. All changes made during construction shall be noted. Each drawing showing changes in dimensions, details, or containing supplemental information shall be plainly marked **As Built** and shall contain the signature of both the Architect and the Contractor.

CLOSEOUT SUBMITTALS:

Prepare project data in the form of an instructional manual supplied electronically on media as requested by Owner (CD, DVD, flash drive, memory stick, etc.). The following information shall be included and arranged under a Table of Contents:

1. Directory listing names, addresses, and telephone numbers of the Architect/Engineer(s), General Contractor, Subcontractors, and major material/equipment suppliers.
2. Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and Suppliers. Include equipment, parts list for each, operating instructions, maintenance instructions for equipment, special finishes, etc.
3. Project documents and certificates, including shop drawings and product data, air and water balance reports, photocopies of warranties.
4. Record As-Built Drawings as described above.
5. Completed Non-Asbestos Affidavit.

DEBRIS DISPOSAL:

Waste disposal shall be the responsibility of the Contractor. The Contractor shall make arrangements with the local authorities having jurisdiction for accommodation of all waste disposal. If local facilities are not available the contractor shall be responsible for all other arrangements for waste disposal.

SUPPLEMENTARY CONDITIONS AND SPECIAL CONDITIONS:

In the following sections where the term "General Conditions" is used, it shall include the "Supplementary Conditions" and/or "Special Conditions bound in this project manual.

MISCELLANEOUS PROVISIONS:

A. TESTS AND INSPECTIONS

Add the following clarification: **Regardless of how it is described elsewhere in the drawings and specifications, the contractor shall engage all testing laboratories / subcontractors as approved by the Architect; and, pay for ALL testing as required by the drawings and**

specifications. The Contractor shall pay for any additional testing due to defective work. The Owner shall pay for any additional testing requested and found to be non-defective.

B. EQUAL OPPORTUNITY

The Contractor shall maintain policies of employment as follows:

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

C. COOPERATION WITH BUILDING OFFICIALS

Cooperate with applicable Federal, State, City or other governmental officials and inspectors at all times. If such officials or inspectors deems special inspection necessary, provide assistance and facilities that will expedite his inspection.

D. MEASUREMENTS

Before doing any work or ordering any materials, the Contractor shall verify all measurements of existing and new work, and shall be responsible for their correctness.

Any 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 measurements indicated on the working drawings.

E. MANUFACTURER'S SPECIFICATIONS AND INSTRUCTIONS

Install all manufactured items of materials or equipment in strict accordance with manufacturer's recommended specifications, except that the specifications herein, where more stringent, shall be complied with.

At the completion of the project and prior to final acceptance by the Owner, provide the Owner with three complete sets of operating and maintenance instructions, and demonstrate to him the procedures for proper operation and maintenance of all equipment.

F. JOB MAINTENANCE

During the course of their work, all crafts and trades shall protect all work which preceded theirs from damage, and they shall make repairs or replacements to any damage caused either directly or indirectly by them.

G. COMPLIANCE WITH STATE AND FEDERAL LAWS

Contractor assumes full responsibility for the payment of all contributions and payroll taxes (state and federal) as to all subcontractors and employees engaged in the performance of work pursuant hereto and further agrees to check and meet all requirements that might be specified under regulations of the administrative officials or board charged with the enforcement of any state or federal act on the subject referred to. Contractor agrees to furnish Owner, upon request, a certificate or other evidence of compliance therewith.

H. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (OSHA)

The Contractor shall comply with the latest edition and revision of The Federal Occupational Safety and Health Act of 1970 for construction.

I. GUARANTY BONDS

1. Prior to the Owner signing the contract agreement, he will require the Contractor to furnish performance and payment bonds covering the faithful performance of the entire construction contract agreement. The performance bond and the payment bond shall each be made out in one hundred percent (100%) of the contract sum and shall be in a company or companies against which the Owner has no reasonable objection.

2. Bonds shall be signed by an official of the bonding company, and shall be accompanied by the bonding agent's written power-of-attorney in order that one copy may be attached to each copy of the contract agreement.

3. The Contractor shall include in his proposal amount the total premiums for all required bonds.

4. The Contractor does hereby warrant and/or guarantee against defects in all workmanship and materials performed or furnished by him directly or by his subcontractors for a period of one (1) year from the date of completion, as evidenced by the date of the Final Certificate or final acceptance of the project. Said warranty and/or

guarantee shall be in the form of a good and sufficient bond in a sum equal to one hundred percent (100%) of the contract price.

End of Special Conditions

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01010-SUMMARY OF THE WORK

Part 1 - General

1.01 Work Included:

A. The General Conditions, Bidding Requirements, and Division I are hereby made a part of each of the technical sections that follow, and shall be understood to apply and shall apply in full to all individuals or corporations who contract or subcontract to perform any part or all of the project work.

B. Indications on the working drawings or in any section of the specifications of an article or material, operation, or method, requires that the Contractor shall provide each item or service or quality or is subject to qualifications noted; and, the Contractor shall perform each operation prescribed according to the conditions stated providing, therefore, all necessary labor, equipment, and incidentals to complete the project work.

C. The project:

1. Name: Kingsgate Elementary School Exterior Upgrades – Moore Public Schools.
2. Location: 1400 Kingsgate Road, Oklahoma City, Oklahoma.

1.02 Summary of Work:

A. **Base Bid:** Provide and pay for all materials, labor, services, equipment, licenses, taxes, permits, and other items necessary for the complete exterior upgrades to the existing school building (excluding additions constructed in 2018) including new thin brick, metal siding, flashing, and paint. Contractor shall maintain all barriers, guards, and other environmental items required at the site during construction.

B. Owner: Moore Public Schools

1. Owner's Representative:
   Jeff Horn, Assistant Superintendent, Operations
   Moore Public Schools
   1500 SE 4th Street
   Moore, OK 73160
   405-735-4221

C. Design Team:

1. Architect:
   AGP
   201 N. Broadway, Suite 210
   Moore, OK 73160
   405-735-3477

D. Project Manager:

1. Omni Construction
   1909 S. Eastern Avenue
   Moore, OK 73160
   405-735-3992

1.03 Work to be Provided and Installed By Others:

A. Not applicable.

1.04 Use of the Site:

A. Confine operations at the site to the areas permitted under the contract. Portions of the site beyond areas on which work is indicated are not to be disturbed.

B. Keep facility free from accumulation of waste material,

rubbish, or construction debris.

1.05 Safety of Persons and property:

A. Contractor shall at all times protect the building from damage from rainwater.

B. Contractor shall provide barricades and clearly mark work zone areas.

C. Refer to Special Conditions "Temporary Services" for additional information.

D. During the period of construction, the OSHA Standards shall be followed as applicable by law.

E. The Contractor shall post emergency telephone numbers.

1.06 Preconstruction Conference:

A. A preconstruction meeting will be held at a time and place designated by the Architect or Owner's Representative, for the purpose of identifying responsibilities of the Owner's and the Architect's personnel and explanation of administrative procedures.

B. The Contractor shall use this meeting for the following minimum agenda:

1. Construction Schedule/Project Phasing.
2. Use of areas of the site.
3. Delivery and storage.
4. Safety.
5. Security.
6. Cleaning up.
7. Subcontractor procedures relating to:
    a. Submittals.
    b. Change orders.
    c. Applications for payment.
    d. Record documents.

C. The attendees shall include:

1. The Owner's Representatives.
2. The Architect.
3. The Construction Manager and its superintendent.

1.07 Project Scheduling:

A. The Contractor is responsible for the scheduling of construction and must prepare a schedule and charting system described below. This schedule is to ensure adequate planning and execution of the work by the contractor and to assist the Architect in appraising the schedule and evaluating the progress of the work.

B. The project schedule shall be presented within ten (10) days after receipt of the Notice to Proceed. Three (3) copies of the schedule shall be submitted to the Architect for review and approval.

C. The schedule logic must be in the form of a "fenced" bar chart or Critical Path Method network indicating the planned start and completion dates of the activity, logical constraints between activities, and total float of each activity.

D. An updated project schedule shall be provided when requested by the Architect.

SECTION 01010-SUMMARY OF THE WORK

1.08 Environmental Controls:

A. Water Resources:

1. Oily substances: prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water.
2. Mosquito abatement: prevent ponding of stagnant water conducive to mosquito breeding habitat.

B. Land Resources:

1. Erodible soils: plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Clear areas in reasonably sized increments only as needed to use the areas developed. Immediately protect side slopes and back slopes upon completion of rough grading.

C. Air resources:

1. Prevent creation of dust, air pollution, and odors.
2. Use water sprinkling, temporary enclosures, and other appropriate methods to limit dust and dirt rising and scattering in air to locate practical level.
3. Store volatile liquids, including fuels and solvents, in closed containers.
4. Properly maintain equipment to reduce gaseous pollutant emissions.

D. Comply with all applicable environmental control guidelines as required by the City of Moore.

1.09 Temporary Utilities:

A. The Contractor shall provide and pay for all temporary utilities required for the complete construction of the project including, but not limited to, electricity, lighting, heating, cooling, ventilating, telephone, water, sanitary facilities, exterior and interior enclosures, access roads and parking areas, cleaning and waste removal, project identification and signs, etc.

1.10 Cleaning:

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

B. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer=s published instructions.

C. Complete cleaning operations prior to requesting a Final / Substantial Completion Inspection.

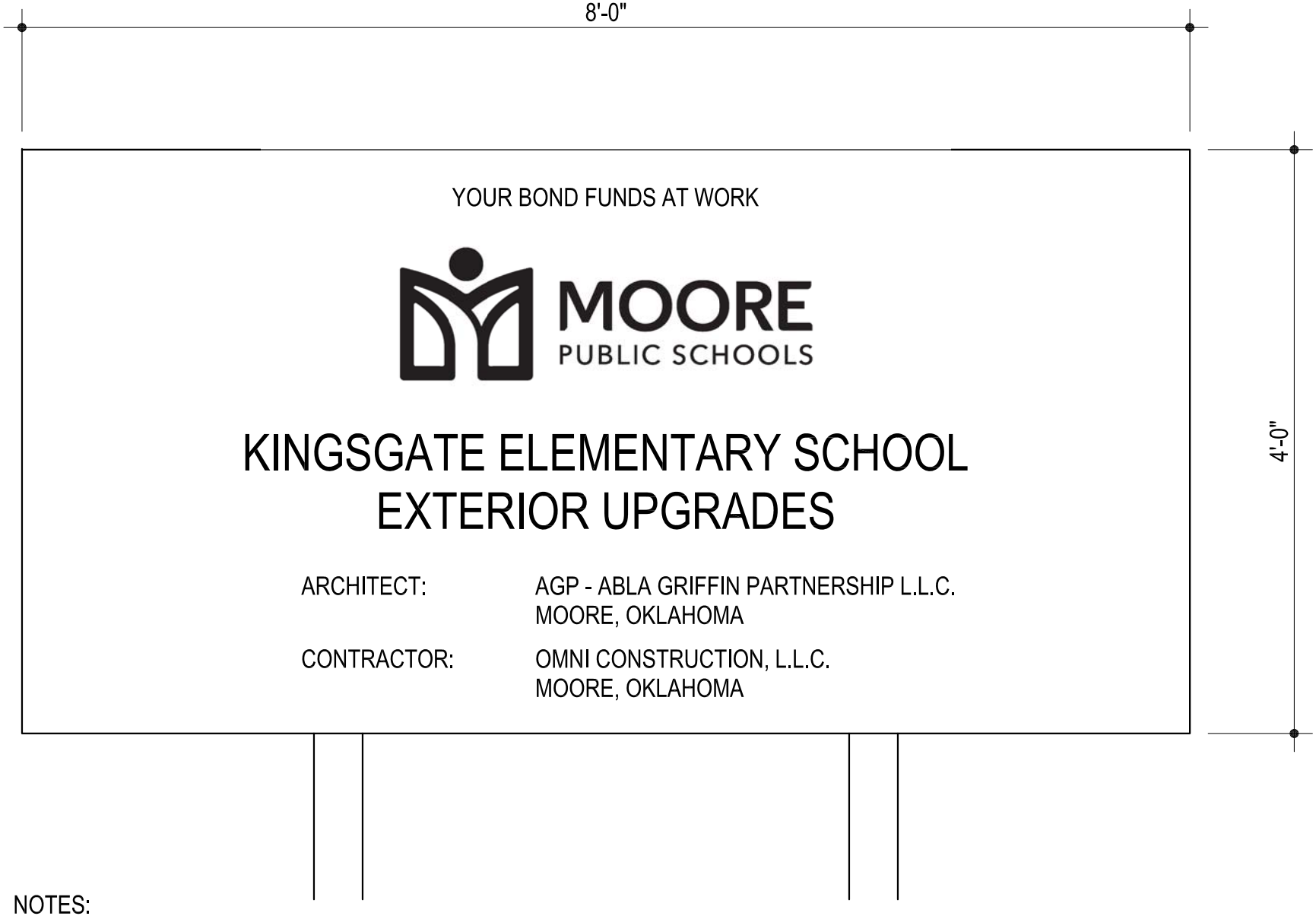
1.11 Project Sign:

A. Provide and install painted plywood project sign on wooden posts securely erected at the project site in a location approved by the Owner.

B. No other project signs or advertisement shall be allowed at the project site unless approved by the Owner.

C. Graphics and form of letter of the project sign shall be as indicated in the attached detail.

End of Section



NOTES:

1. WHITE LETTERS ON DARK BLUE BACKGROUND
2. 3/4" EXTERIOR PLYWOOD - PAINTED ALL SIDES
3. MOUNT ON 4" X 4" WOOD POST
4. CONTRACTOR TO HAVE LAYOUT APPROVED PRIOR TO INSTALLATION

DIVISION 2 - SITE WORK

SECTION 02050 - DEMOLITION

Part 1 - General

1.01 Work Included:

A. The General Conditions and applicable sections of Division 1 shall apply to this entire section.

B. All materials, labor, services and incidentals necessary for the completion of this section of the work.

C. Complete demolition of the existing paving and curbs; complete demolition of the existing curbs as necessary to construct new entry driveways; removal of existing trees; and all site materials as shown on the Drawings.

D. Removal of all materials, debris and rubbish from site. Refer to Part 3 for ownership of materials.

1.02 Submittals:

A. Scheduling of Alteration and Demolition Work:

1. Before commencing any alteration removal or demolition work the contractor shall prepare and submit for approval by the Architect, a schedule showing the commencement, the order, and the completion dates of the various parts of this work.

2. Before starting any work relating to existing utilities (electrical, heat, gas, etc.) that will temporarily discontinue or disrupt services to any existing building, the Contractor shall be required to give notice to the Architect and obtain his approval in writing before proceeding with this phase of work.

Part 2 - Materials (not applicable)

Part 3 - Execution

3.01 General Requirements:

A. Permits, Licenses, Ordinances and Regulations:
All work shall comply with local and other governing ordinance, codes and regulations, but this requirement does not relieve the Contractor of responsibility of complying with these specifications. Complying with requirements of state, county or local laws, ordinances and regulations regarding demolition work is the responsibility of the Contractor, who shall pay any and all fees, and give any notices necessary in connection therewith.

3.02 Demolition of Work To Be Modified:

A. Alterations and demolition shall be as indicated on the Drawings and in accordance with applicable technical sections of the specifications. The Contractor shall do all necessary demolition or removal of existing work as required in connection with this project, including shoring, bracing, etc. and removal of unwanted material and debris from the site. Demolish existing items only as necessary to tie on new construction as detailed. This work shall be done in a most careful manner, as the Contractor will be held responsible for any damage which

may be caused thereby to any part or parts of existing streets, neighboring buildings, and grounds.

B. When alterations occur, or new and old work join, the immediate adjacent surfaces or so much thereof as required by the involved conditions, shall be cut, removed, patched, repaired or refinished and left in as good a condition as existed prior to the commencing of the work, and matching the remainder of the existing paving, etc.

C. Conduit and piping found underground on the site, or other areas involved in demolition or alteration shall be removed, re-rerouted or protected as required by the Drawings. Where these items are found; but not covered in the drawings, the Contractor shall notify the Architect for disposition instructions.

D. Maintain existing utility services to remain and protect from damage during demolition operations.

E. The Contractor shall furnish and install adequate guards, barricades and other temporary protection to prevent injury to persons.

F. The Contractor shall make every effort to control the amount of dust and the noise level generated by demolition operations.

3.03 Ownership and Disposition of Materials:

A. Classification of removed materials (re: Drawings for applicable items):

1. **Reinstalled:** Items are those items which, after removal, are to be used, reinserted, remounted or otherwise built back into the work under this contract.
2. **Salvaged:** Items are those items which, after removal, are to be retained by the Owner and delivered for storage on the Owner=s premises.
3. **Scrapped:** Items are all other removed materials or equipment. This includes all items which are not noted or specified for reinstallation or salvage.

B. Disposition by Classification:

1. **Reinstalled:** Items of material or equipment shown on the work shall be jointly inspected by the Contractor and the Architect prior to dismantling or removal. An agreement shall be reached briefly setting forth the apparent condition of the material or equipment, and approved by the Architect. Simple operating test of operative equipment will be included with this joint inspection if feasible. Such items shall be reinstalled as specified in the applicable sections of the specifications covering new items of similar categories.
2. **Salvaged:** Materials and equipment noted on the Drawings or listed to be salvaged shall be carefully handled and protected and shall be delivered to storage areas, as designated by the Architect, on the Owner=s premises.
3. **Scrapped:** All removed materials and equipment not noted on the drawings specified to be reinstalled, shall be considered as scrap and shall be disposed of by the

Contractor off the Owner=s premises and credit for the value thereof, if any, shall have been reflected in the Contractor's bid price.

3.04 Clean-Up:

A. Disposition of all material, debris and rubbish shall be the responsibility of the Contractor. Leave site clean. Completely remove all materials, debris, and rubbish from site. Absolutely no burning of debris on the site will be allowed.

B. **The Contractor shall submit proposed refuse dumping sites to the Architect and shall receive written approval from the Architect concerning acceptable dumping sites prior to the disposition of any material, debris or rubbish generated by this project.**

End of Section

DIVISION 2 - SITE WORK

SECTION 02110 - TEMPORARY CONSTRUCTION FENCING

Part 1 - General

1.01 Summary

A. Section includes: Erection, maintenance and dismantling of temporary fencing around construction site and materials storage areas. This section does not apply where security fencing is required.

B. Refer to Drawings for temporary fencing layout and location of gates.

1.02 Submittals

A. Submit the following:

1. Shop drawing indicating layout of temporary fencing, location and size of gates, existing pavement and roads, access to fire hydrants and hose connections, and other site specific conditions. Prepare drawing after site observation and verification of existing conditions.

Part 2 - Products

2.01 Temporary Chain Link fencing:

A. Unless otherwise indicated, type of temporary chain link fencing shall be Contractor's option. Following types are acceptable:

1. New materials or previously used salvaged chain link fencing in good condition.
2. Posts: Galvanized steel pipe of diameter to provide rigidity. Post shall be suitable for setting in concrete footings, driving into ground, anchoring with base plates, or inserting in precast concrete blocks.
3. Fabric: Woven galvanized steel wire mesh. Provide in continuous lengths to be wire tied to fence posts or prefabricated into modular pipe-framed fence panels.
4. Height: Minimum Height shall be 8'-0".

B. Gates: Provide personnel and vehicle gates of the quantity and size indicated on the Drawings or required for functional access to site.

1. Fabricate of same material as used for fencing.
2. Vehicle gates:
   a. Minimum width: 20 feet to allow access for emergency vehicles.
   b. Capable of manual operation by one person.

Part 3 - Execution:

3.01 Layout:

A. Installation of temporary fencing shall not deter or hinder

access to existing and new hose connections and fire hydrants.
1. Maintain 3 feet diameter clear space around fire hydrants.
2. Where fire hydrant or hose connection is blocked by fencing, provide access gate.

B. Access: Provide gates for personnel, delivery of materials, and access by emergency vehicles.

3.02 Installation:

A. Chain link posts:
1. Space at 10'-0" maximum.
2. Drive posts, set in holes and backfill, or anchor in precast concrete blocks.
3. For soft and unstable ground conditions, cast concrete plug around post.
4. Posts over pavement: Use steel post plates or precast concrete blocks.
5. Gate posts: Use bracing or concrete footings to provide rigidity for accommodating size of gate.

B. Fabric: Securely attach to posts.

C. Gates: Install with required hardware.

D. Plastic mesh fencing: Space steel support posts to ensure mesh remains vertical and at proper height. Securely tie mesh to posts.

3.03 Maintenance and Removal:

A. Maintain fencing in good condition. If damaged, immediately repair.

B. Remove temporary fencing upon completion of Work or when no longer required for security or control. Backfill holes and compact. Holes in pavement shall be surfaced to match existing paving. Repair damage caused by installation of temporary fencing.

End of Section

SECTION 02110 - TEMPORARY CONSTRUCTION FENCING

DIVISION 2 - SITE WORK

SECTION 02500 - PAVING AND SURFACING

Part 1 - General

1.01 Work Included:
A. All materials, labor, services, and incidentals necessary to complete all Site Concrete Work as shown on the Drawings and specified herein.

1.02 Quality Assurance:
A. Standards:
1. American Society for Testing and Materials (ASTM).

1.05 Coordination:
A. Coordinate work and cooperate with any other trades whose work relates to paving in any way.

1.06 Personnel:
A. All work shall be directed by trained and experienced applicators, thoroughly adept at the procedures and equipment required by this section.

1.07 Weather Limitations:
A. Do not install paving when the subgrade is frozen or show any evidence of excessive moisture.
B. Do not install paving when the air temperature is less than 40 degrees Farenheit nor when temperature of the surface on which mixture is to be placed is below 40 degrees Farenheit unless directed otherwise by Architect.

Part 2 - Products

2.01 Material Applications:
A. Subgrade Preparation:
1. Remove all vegetation, excavate to elevation required, and compact subgrade.
B. Concrete Walks / Mow Strip:
1. Description: A 4,000 p.s.i. reinforced concrete slab on a compacted soil base. Provide expansion and saw cuts as shown on the Drawings.

2.02 Expansion Control:
A. Construction Joint Form: Tongue and groove keyway, premolded asphaltic or wood form, designed to provide 1 1/2" keyway.
B. Joint Filler: Resilient, non-extruding bituminous-impregnated fiberboard expansion joint material by thickness shown on the Drawings, ASTM D-1751.
C. Joint Sealers: Hot applied, non-tracking asphalt-rubber compound, ASTM D-1190.
D. Anchorage Inserts: Malleable cast iron adjustable wedge, or threaded, type with 3/4" bolt size unless indicated otherwise on the Drawings.
E. Embedded Items: Provide materials as sized and/or indicated

on the Drawings, or as required.

Part 3 - Execution

3.01 General:

A. Make careful inspection of excavated surface on which paving is to be placed, and check on bottom and top grades of paving throughout the area to be paved, prior to starting work under this section. Notify the Contractor of any unsatisfactory conditions. Do not begin paving work until such conditions have been corrected and area is ready to receive paving.

3.02 Workmanship:

A. Apply paving in true planes to eliminate depressions or "fat" spots. Carefully warp changes in slope. Carefully hand compact and roll around building projections so that texture and compaction matches machine compaction. Mask building before placing concrete primer to prevent staining exposed building surfaces.

B. Backfill shall be placed behind the sidewalks in a manner that will not cause displacement of the section nor damage to the exposed edges. All damaged sidewalks shall be replaced at the direction of the Architect at the Contractor’s expense.

C. Adjoining Paving: where new work adjoins existing, warp carefully to flush surface, with seal over joint.

D. Construction Joints: As noted on the Drawings or as directed by the Architect:

1. At joints, thoroughly clean surfaces and remove all laitance.
2. In addition, vertical surfaces shall be thoroughly wetted and coated with cement grout before placing new concrete.

E. Expansion Joints: As noted on the Drawings, or as directed by the Architect:

1. Provide 1/2" expansion joints where sidewalks join structural concrete.
2. Hold filler material down 1/2", fill top with sealant.

F. Control Joints: Provide scored lines and weak plane joints on exterior and interior concrete slabs as indicated on the Drawings, and as approved by the Architect. Fill with sealant.

G. Finishes:

1. Concrete Walks:
   a. Provide trowel and medium broom finish. Refer to drawings.
   b. Broom after concrete is hard enough to retain scoring, using a stiff fiber, or wire, broom. Broom perpendicular to direction of traffic.

H. Repair any damage to finished pavement surfaces that may result

from subsequent construction to a smooth, true, and uniform surface.

I. Clean-up: After completion of paving operations, remove all excess materials, equipment and debris (dispose of away from the site). Leave all work in clean condition.

J. Protection:
   1. Provide barricades and warning devices as required to protect pavement and the general public.
   2. Cover any openings of structures in area of paving until permanent coverings are installed.
   3. Prohibit all traffic on paving until it has reached atmospheric temperature.

End of Section

DIVISION 3 - CONCRETE

SECTION 03300 - CAST-IN-PLACE CONCRETE

Part 1 - General

1.01 Scope: Cast-in-place concrete as specified and as shown on the drawings.

1.02 Quality Assurance:

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

ACI 301	"Specifications for Structural Concrete for Buildings"
ACI 311.1R	"ACI Manual of Concrete Inspection"
ACI 318	"Building Code Requirements for Reinforced Concrete"
ACI 347R	"Guide to Formwork for Concrete"
ACI	"ACI Detailing Manual (SP-66)"
CRSI	"Manual of Standard Practice"
ACI 211.1	"Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete"
ACI 304	"Specifications for Structural Concrete for Buildings"
ACI 304R	"Guide for Measuring, Mixing, Transporting, and Placing Concrete"
ACI 305R	"Hot Weather Concreting"
ACI 306R	"Cold Weather Concreting"
ACI 309R	"Guide for Consolidation of Concrete"

B. Workmanship: The Contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances, and finishes. Correct deficient concrete as directed by the Architect-Engineer.

C. Concrete Testing Services:

1. Not required.

1.03 Submittals:

A. Manufacturer's Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including admixtures, patching compounds, joint system, curing compounds and other requested items.

B. Concrete Mix Design: Submit concrete mix designs for each class of concrete to be used. The concrete mix

designs shall conform to the requirements of Article 2.3. The concrete mix designs shall be submitted 15 days before starting concrete work. No concrete shall be produced or placed without reviewed and approved concrete mix designs. Submit supporting data and laboratory test reports for concrete mix designs, material reports or certificates for concrete material.

Part 2 - Products

2.01 Form Materials:

A. Forms for Exposed Finish Concrete: For formed concrete surfaces which will be exposed in finished structure, provide formwork of plywood, metal, metal framed plywood faced or other acceptable panel type materials to provide continuous, straight, smooth, exposed surfaces, unless otherwise shown or specified. For plywood, provide APA High Density Overlay Plyform conforming to US Product Standards PS-1 "B-B High Density Overlay Plyform," Class 1, or Structural 1, minimum ¾" thick. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.

2.02 Formwork Accessories:

A. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal or plastic ties, designed to prevent form deflection and prevent spalling of concrete upon removal. Provide ties that will leave no metal closer than 1-1/2" to surface. Use ties that will not leave holes larger than 1" diameter in concrete surface.

B. Form Release Agent: provide commercial formulation form release agent that will not bond with, stain or adversely affect concrete surfaces. Diesel fuel is not an acceptable form release agent.

C. Chamfer Strips: Wood, metal, PVC or rubber: ¾" by ¾" size unless otherwise detailed; maximum possible lengths; fabricated to produce uniform smooth lines and tight edge joints.

D. Void Form Boxes: Provide Carton Cardboard Void boxes of dimensions specified on the contract drawings.

E. Embedded Items: Plates, angles and other steel items embedded in concrete, which are exposed to view when forms are removed, shall be galvanized and shall be as specified in Section 05500.

2.03 Reinforcing Materials:

A. Reinforcing bars and welded fabrics and their support shall be as shown on structural drawings.

B. Reinforcing Bars: ASTM A 615, Grade 60, deformed, typically. ASTM A 706, grade 60, deformed for all conditions where welding of reinforcement is required.

C. Welded Wire Fabric: ASTM A 184, welded wire mat or A 185, welded steel wire fabric.

D. Smooth Dowel Bars: ASTM A675, Grade 80.

2.04 Reinforcing Accessories:

A. Tie Wire: ASTM A82, plain, cold drawn, steel.

B. Supports for Reinforcement: Provide supports for reinforcement including 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 recommendations. Wood will not be acceptable.

1. For slab-on-grade use supports with sand plates or horizontal runners.
2. Where legs of supports are in contact with forms, provide supports with legs which are plastic coated (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

2.05 Concrete Materials:

A. Portland Cement: ASTM C 150, Type 1, unless otherwise acceptable to Architect-Engineer. Type III may be used when approved by Architect-Engineer. Use only one brand of cement through the project.

B. Fly ash shall meet the requirements of ASTM C 618 for Class C or F fly ash. The amount of cement replaced by fly ash shall not exceed 20% of the total amount of cement required. Fly ash shall be from one source throughout the project.

C. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for all exposed concrete.

1. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps or other harmful substances.
2. Coarse Aggregate: Clean, uncoated, processed crushed stone aggregate containing no clay, mud, loam or foreign matter, processed from natural rock or stone. Maximum aggregate size shall be not larger than one fifth of the narrowest dimension between sides of forms, one-third of the depth of slabs, nor three-fourths of the minimum clear spacing between

individual reinforcing bars or bundles of bars.

D. Aggregate size shall not exceed:
   1. Slab-on-Grade, Grade Beams and Piers: #57 stone.
   2. Masonry Grout: #76 Stone
E. Water: Clean, fresh, drinkable.
F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other admixtures.
G. Water-Reducing Admixture: Conform to ASTM C 494, Type A, and containing no chloride ions. Acceptable products include:

   Eucon WR-75; Euclid Chemical
   Pozzolith Normal or Polyheed; Master Builders
   Plastocrete 161; Sika Chemical Corporation
   PSI N; Cormix

H. High Range Water-Reducing Admixture (Superplasticizer): Conform to ASTM C 494, Type F or G, and containing no chloride ions. Acceptable products include:

   Eucon 37; Euclid Chemical
   WRDA 19 or Daracem; W.R. Grace Co.
   Rehobuild; Master Builders
   Sikament 300; Sika Chemical Corporation

I. Prohibited Admixtures: Calcium Chloride, thiocyanates, or admixtures containing chloride ions are not permitted. Written conformance to above mentioned requirements and chloride ion content of admixture will be required from admixture manufacturer prior to mix design review by Architect-Engineer.

2.06 Related Materials:

A. Preformed Expansion Joint Fillers and Joint Sealing Compound: Refer Section 07900.
B. Curing Materials
   1. Absorptive cover: burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd., complying with AASHTO M 182, Class 2.
   2. Moisture-Retaining Cover: One of the following complying with ASTM C171.

      Waterproof paper
      Polyethylene film
      Polyethylene-coated burlap

C. Non-Metallic, Non-Shrink Grout: Premixed, non-metallic,

non-corrosive, non-staining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with Corps of Engineers CRD-C-621, Type A and ASTM C 1107. Product shall develop a minimum 28 day compressive strength of 5,000 PSI when tested in accordance with ASTM C 109, Acceptable products include:

MasterFlow 713; Master Builders
Five Star Grout 100; Five Star Products, Inc.
Euco N-S; Euclid Chemical Co.
Crystex; L&M Construction Chemicals
Burke Multi-Purpose Grout; Burke Co.

D. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type. Acceptable products include:

J-40 Bonding Agent: Dayton Superior Corp.
Weldcrete; Larsen Products
Everbond; L&M Construction Chemicals
EucoWeld; Euclid Chemical Co.

E. 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. Acceptable products include:

Concresive Standard LVI; Master Builders
Epogrip; Sonneborn
Euco Epoxy 452 or 620; Euclid Chemical Corp.
Resi-Bond (J-58); Dayton Superior Corp.
Sikadur 32, Hi-Mod; Sika Chemical Corp.

2.07 Proportioning And Design Of Mixes:

A. Mix designs shall be proportioned in accordance with ACI 318, Section 5.3, "Proportioning on Basis of Field Experience and/or Trial Mixtures" and meet the requirements of this specification and ACI 211 and 301. If trial batches are used, mix design shall be prepared by an independent testing laboratory and achieve a compressive strength 1200 PSI higher than specified strength.
B. Design mix shall provide concrete with strength qualities indicated on drawings and schedules.
C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by the Contractor when characteristics of

materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to the Owner. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Architect-Engineer before using in the work.

D. Admixtures:
   1. High range water-reducing admixture (superplasticizer may be used in concrete for cast-in-place walls, pumped concrete, architectural concrete, and concrete with water-cement ratio below 0.50. Either water-reducing admixture or high range water-reducing admixture may be used in other concrete.
   2. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at the manufacturer's prescribed rate to result in concrete at the point of placement having 4% to 6% air content.
   3. Use admixtures for water-reducing and set-control in strict compliance with the manufacturer's directions. Use amounts of admixtures as recommended by the manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities and types of admixtures as required to maintain quality control.

E. Water-Cement Ratio: Concrete shall be proportioned using the following maximum water-cement ratios for each strength category:

   f'c = 3,000 psi - 0.58 (Floor Slab-on-Grade)
   f'c = 3,000 psi - 0.46 (Foundations)
   Concrete subjected to freezing/thawing shall have maximum water-cement ratio of 0.50.

F. Slump Limits: Proportion and design mixes to result in 4" maximum concrete slump at the point of placement. Concrete to receive addition of a superplasticizer shall have a slump range prior to adding the superplasticizer of 2" to 3". After addition of the superplasticizer, at the truck, the slump shall be 8" maximum.

2.08 Concrete Mixing:

A. Job-Site Mixing: Job-site mixing will not be allowed.

B. Ready-Mix Concrete: Comply with the requirements of ASTM C 94, and as herein specified. Delete the references for allowing additional water to be added to the batch for material with insufficient slump. During hot weather, or under conditions contributing to the rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required. When the air temperature is between

85 degrees F and 90 degrees F, reduce the mixing and delivery time from 1-1/2 hours to 75 minutes, and when the air temperature is above 90 degrees F, reduce the mixing and delivery time to 60 minutes.

C. Addition of water beyond requirement of approved design mix is not to be permitted. Redosage with specified high range water-reducing admixture may be permitted with approval of Architect-Engineer as to methods/procedures. Use specified water-reducing retarding admixture when required by placing or temperature conditions.

PART 3 - EXECUTION

3.01 Form Construction And Erection:

A. Erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by the concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

B. Construct formwork to be readily removable without impact, prying, shock or damage to cast-in-place concrete surfaces and adjacent materials.

C. Construct forms complying with ACI 347 to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, blocking, screeds, bulkheads, anchorages, inserts and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.

D. Construct form with joints, reveals, and tie holes level, plumb and in pattern indicated on approved shop drawings.

E. If earth forms are used, hand trim sides and bottom of earth form. Remove loose soil prior to placing concrete. Install void boxes beneath tilt-up wall panels and grade beams. Earth forms are permitted for grade beams.

F. Chamfer exposed corners and edges as shown using chamfer strips.

G. Coordinate the placement of forms with the installation of joint materials.

H. 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.

I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms after concrete placement if required to eliminate mortar leaks.

3.02 Preparation Of Form Surfaces: Coat the contact surfaces of forms with form release agent before reinforcement is placed. Thin form release agents only with thinning agent of type, in amount and under conditions in the manufacturer's recommendations. Do not allow excess release agent to accumulate in the forms, or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply release agent in compliance with manufacturer's recommendations. Coat steel forms with a non-staining, rust-preventive form oil or otherwise protect against rusting. Rust stained steel formwork is not acceptable.

3.03 Edge Forms And Screed Strips For Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain the required elevations and contours in the finished slab surface. Provide and secure units sufficiently strong to support the types of screed strips by the use of strike-off templates or accepted compacting type screeds.

3.04 Installation Of Embedded Items: Set and build into the work anchorage devices and 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 the items to be embedded or attached thereto. Tolerance for anchor bolts and other embedded items as follows:

A. 1/8" center to center of any two (2) bolts within anchor bolt group, where anchor bolt group is defined as "set" of anchor bolts, which receive single fabricated steel shipping piece.

B. 1/4" center to center of adjacent anchor bolt groups.

C. Maximum accumulation of 1" along established column line of multiple anchor bolt groups, where established column line is actual field line representative of centers of as-built anchor bolts along line of columns.

D. 1/4" from center of any bolt group to established column line through that group.

3.05 Removal Of Forms:

A. Formwork not supporting the weight of concrete, such as sides of beams, walls, and similar parts of the work, may be removed after cumulatively curing at not less than 50

degrees F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting the weight of concrete, such as beam soffits, slabs and other structural elements, may not be removed in less than14 days and until concrete has attained design minimum compressive strength at 28-days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

3.06 Reuse Of Forms: Clean and repair surfaces of forms to be reused in the work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact form surfaces as specified for new formwork. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms.

3.08 General:

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

B. Notify the Architect-Engineer at least 24 hours before placement of concrete that the reinforcing is in place and ready for review.

3.09 Preparation:

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

B. Give notice whenever pipes, conduits, sleeves, and other construction interferes with placement of reinforcement; obtain method or procedure to resolve interferences from the Architect-Engineer.

C. Torch cutting of reinforcing bars will not be allowed, unless approved by the Architect-Engineer in writing.

3.10 Placing Reinforcement:

A. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.

1. Coordinate the placement of reinforcing steel with the

installation of joint materials and moisture barriers.

B. Place reinforcement to obtain at least the minimum coverage 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. Do not place reinforcing bars more than 2" beyond the last leg of continuous bar support.

C. Dowel Positioning:
   1. Install dowels with an alignment tolerance in either the horizontal or vertical plane of 2% or 1/4 inch per foot.
   2. Install dowels in slabs on grade at locations and at right angles to joint being doweled. Dowels shall be accurately positioned and aligned to the finished concrete surface before concrete placement. Dowels shall be rigidly supported during concrete placement. One end of dowel shall be coated with a bond breaker at expansion joints.

D. Install welded wire fabric in longest lengths practicable. Secure WWF to resist transverse and lateral movement. Secure in the same manner specified for reinforcing steel. Lap adjoining pieces at least one (1) full mesh and lace splices with wire. Offset and laps in adjacent widths to prevent continuous laps in either direction.

3.11 Preparation

A. Preplacement Inspection: Before placing concrete, inspect the formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit the installation of their work; cooperate with other trades in setting such work, as required. Thoroughly wet wood forms immediately before placing concrete, as required where form coatings are not used.

B. Apply temporary protective covering to lower 2'-0" of walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement of concrete.

C. Joint Installation: Joint filler, sealant materials and installation shall be as shown in Drawings.
   1. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, and elsewhere as indicated.
   2. Contraction (Control) Joints: Construct contraction

joints in slabs-on-grade in locations indicated on the drawings. If joint pattern is not shown, provide joints so that any single area shall not exceed 900 SF (maximum 36 times slab thickness in any one direction). Resultant areas shall not have more than four sides.

a. Formed Contraction Joints: Form joints by inserting premolded plastic, hardboard of fiberboard strip, 1/4" wide by 1/4 of slab depth, into fresh concrete until top surface of strip is flush with slab surface. After concrete has cured, remove inserts and clean groove of loose debris.
b. Sawed Joints: Saw cuts shall be 1/8" wide by 1/4 of slab depth unless otherwise shown. Cutting shall be timed properly with set of the concrete. Cutting shall be started as soon as the concrete has hardened sufficiently to support weight of the saw and shall be completed before shrinkage stresses become sufficient to produce cracking.

3.12 Concrete Placement:

A. General: Comply with ACI 304, and as herein specified. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation due to rehandling or flowing.
B. The temperature of all concrete at the time of placement shall not be less than 50 degrees F nor more than 90 degrees F. The temperature at the surface of all concrete shall be maintained at 40 degrees F or above for a period of 72 hours from time of placement.
C. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
D. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with the recommended practices of ACI 309, to suit the type of concrete and project conditions.
E. Do not use vibrators to transport concrete inside of

forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate the placed layer of concrete and at least 6" into the preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit the duration of vibration to the time necessary to consolidate the concrete and complete embedment of reinforcement and other embedded items without causing segregation of the mix.

F. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

G. Maintain reinforcing in the proper position during concrete placement operations.

H. Placing Concrete Slabs.
   1. Deposit and consolidate concrete slabs in a continuous operation, within the limits of construction joints, until the placing of a panel or section is completed.
   2. Bring slab surfaces to the correct level with a straight edge and strike off. Use highway straight-edges, bull floats or darbies to smooth the surface, leaving it free of humps or hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.

I. Cold Weather Placing:
   1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306R and as herein specified. When air temperature has fallen to or is expected to fall below 40 degrees F, uniformly heat all water and aggregates before mixing as required to obtain a concrete mixture temperature of not less than 50 degrees F, and not more than 80 degrees F at point of placement.
   2. Do not use frozen materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

J. Hot Weather Placing:
   1. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305R and as herein specified.

2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing.
3. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
4. Wet forms thoroughly before placing concrete.
5. Do not use retarding admixtures unless otherwise accepted in mix designs.

3.13 Finish Of Formed Surfaces:

A. Form Finish: Provide for formed concrete surfaces not exposed to view in the finished work, unless otherwise indicated. Concrete surface shall have the texture imparted by the form facing materials used, with the holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

C. Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process. Locations to receive a rubbed finish are the exposed-to-view turned down slabs or stem-wall foundations.

3.14 Monolithic Slab Finishes:

A. Float Finish: Apply float finish to monolithic slab surfaces. After screeding and consolidating concrete slabs, do not work surface until ready for floating. Begin floating 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. Check and level surface planes to tolerances of 18 for flatness and 15 for levelness per ASTM E 1155. Cut down high spots and

fill low spots. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

B. Trowel Finish: 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 level surface planes to tolerances of 20 for flatness and 17 for levelness per ASTM E 1155. Grind smooth surface defects which would telegraph through applied floor covering system.

C. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete walks. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with the Architect-Engineer before application.

3.15 Concrete Curing And Protection:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures and maintain without drying at a relatively constant temperature for a period of time necessary for hydration of cement and proper hardening. Start curing as soon as free water has disappeared from concrete surface after placing and finishing.

B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, or by combinations thereof, as herein specified.

1. Moist Curing: Keep concrete surface continuously moist by continuous water-fog spray, or with absorptive cover, thoroughly saturating cover with water and keeping continuously moist. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers. Temperature permitting, keep continuously moist for not less than 7 days in accordance with ACI 301 procedures. During cold weather curing, comply with requirements of ACI 306R. Avoid rapid drying at end of curing period.

2. Moisture-Retaining Cover Curing: Keep concrete surface continuously moist by covering with moisture-retaining cover, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover

material and waterproof tape. Continue curing for at least 7 days. During cold weather curing, comply with requirements of ACI 306R. A void rapid drying at end of curing period.

3.16 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 herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete the work.

3.17 Concrete Surface Repairs:

A. Repair of Formed Surfaces:
   1. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning. Repair and patch defective areas immediately after removal of forms, but only when acceptable to Architect-Engineer.
   2. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and volts, down to solid concrete, but in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Before placing cement mortar or proprietary patching compound, thoroughly clean, dampen with water and brush-coat the area to be patched with neat cement grout, or proprietary bonding agent. Compact mortar in place and strike-off slightly higher than surrounding surface.
   3. Repair concealed formed surfaces, where possible, that contain defects that adversely affect the durability of the concrete.
   4. Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect-Engineer.

B. Repair of Unformed Surfaces:
   1. Test unformed surfaces for smoothness and to verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.
   2. Repair finished unformed surfaces that contain surface defects which adversely affect durability of concrete.

Surface defects include crazing, random cracks in excess of 0.01" wide, which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets and other objectionable conditions.

3. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
4. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect-Engineer.
5. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete, and brush with a neat cement grout coating or concrete bonding agent. Mix patching concrete of same materials to provide concrete of the same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
6. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Grove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and brush with neat cement grout or concrete bonding agent. Mix dry-pack, 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. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

C. Repair methods not specified above may be used, subject to prior approval of Architect-Engineer.

END OF SECTION

DIVISION 4 – MASONRY

SECTION 04812 – THIN BRICK VENEER

PART 1 - GENERAL

1.01 Related Documents:
- A. Drawings and general provisions of the Contract, including General, Supplementary, and Special Conditions Sections, apply to this Section.
- B. System Description:
  1. Thin brick veneer installed over concrete / concrete masonry walls using latex Portland cement mortar and latex Portland cement grout.

1.02 Summary
- A. Section Includes:
  1. Thin brick veneer.
  2. Installation products: adhesive, mortars, grouts, and sealants.
  3. Accessories.

1.03 Related Sections:
- A. Section 05500 - Metal Fabrications (if applicable): Loose steel lintels and fabricated steel items.
- B. Section 07600 – Sheet Metal Flashing and Trim: Through-wall masonry flashings.
- C. Section 07900 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.04 References:
- A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures; American Concrete Institute International; 2008.
- B. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; 2008.
- C. ASTM C 67 – Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
- D. ASTM C 91 – Standard Specification for Masonry Cement.
- E. ASTM C 1088 – Standard Specification for Thin Veneer Brick Units Made From Clay or Shale.
- F. ASTM A 82/A 82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2005a.
- G. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.
- H. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar; 2004.
- I. ASTM C 150 - Standard Specification for Portland Cement; 2005.
- J. ASTM C 270 – Standard Specification for Mortar for Unit

Masonry; 2007.

1.05 Submittals:

A. Product Data: Provide data for masonry units, mortar, and masonry accessories.

B. Samples: Submit 10 samples of each color of thin brick units to illustrate color, texture, and extremes of color range.

C. Submit manufacturer's installation instructions.

D. Submit proof of warranty.

E. Submit sample of installation system demonstrating compatibility / functional relationships between adhesives, mortars, grouts, and other components. Submit proof from brick manufacturer verifying suitability for the specific application and use including dimensional stability, water absorption, freeze / thaw resistance, resistance to thermal cycling, and other characteristics that the project may require.

1.06 Quality Assurance:

A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.

B. Obtain materials from one manufacturer to ensure compatibility.

C. Veneer Manufacturer shall be a company specializing in thin brick with a minimum of ten (10) years of experience.

D. Installer shall provide proof of a minimum of five (5) years of experience with related thin masonry installations.

E. Upon request, submit testing reports completed by an independent laboratory of each type of thin brick specified.

F. Mock-Up Panel: provide a mock-up of each type/style/finish/size/color of thin brick and trim unit along with respective installation adhesives, mortars, grouts, and other installation materials.

1. Do not start work until approval of sample panel has be received from the Architect.
2. Size: approximately 6'x6'.

1.07 Warranty:

A. Provide minimum Fifty (50) Year Warranty against manufacturing defects.

1.08 Pre-Installation Meeting:

A. Convene one week before starting work of this section.

1.09 Delivery, Storage, and Handling:

A. Deliver, handle, and store masonry materials by means that will prevent mechanical damage and contamination by other materials. Protect materials from dampness, freezing, or overheating in accordance with the manufacturer's instructions.

B. Store clear of the ground on non-staining pallets or planking.

C. Store mortar and other moisture-sensitive materials in protected enclosures.

1.10 Project Conditions:

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

B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602 or as required by manufacturer.

C. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602 or as required by manufacturer.

PART 2 - PRODUCTS

2.01 Thin Brick:

A. Type and Finish: custom cast or Acme ThinBRIK.

B. Quality: ASTM C-1088, Type TBS.

C. Size: Actual 1" thick x 2-1/4" high x 7-5/8" long or match existing.

D. Units shall be uniform in all dimensions and texture, straight and free from cracks, spalls, and other defects.

E. Color: **match existing colors at 2018 Storm Shelter Auditorium and 2019 Classroom Additions – Royal Oak as manufactured by Acme Brick Company**. Iron oxide pigment colors, ASTM C 979 (if applicable).

F. Trim Units: Provide matching thin brick.

G. Minimal Physical Properties: compressive strength shall

not be less than 2,000 psi per ASTM C 39.

H. Acceptable Manufacturers:
   1. Acme Brick Company, 3024 Acme Brick Plaza, Ft. Worth, TX 76109
   3. Or approved equal.

2.02 Mortar and Grout Mixes:

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds or other admixtures, unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Limit cementitious materials in mortar to portland cement and lime.

B. Mortar for Unit Masonry:
   1. Type S Masonry Cement, ASTM C 91.
   2. Masonry sand, ASTM C 144.
   3. Iron oxide pigment colors, ASTM C979.
   4. Clean, clear water, free from deleterious substances.
   5. Mortar colors at exterior thin brick locations to be selected by Architect to match existing brick/mortar installed at previous addition in 2019 (Spec Mix SM100 White – Contractor verify).

C. Mortar Mixing:
   1. All mortars shall be machine mixed in equipment that is free of dirt, oil or grease and which is thoroughly cleaned and rinsed after each day's use. Mix no more mortar than can be used before setting takes place.
   2. Mortars shall be mixed placing all dry ingredients in the mixer first and mixing until uniform in color. Then mixed for 3 to 5 minutes with the maximum amount of water to provide workable consistency.
   3. No add-mixtures shall be used at any time in the mortar on this project, unless approved in writing by the Architect.

2.03 Flashings:

A. Metal Flashing Materials: Galvanized Steel or prefinished metal as specified in Section 07600.

B. Rubberized-Asphalt Flashing: composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film.

C. Elastomeric Thermoplastic Flashing: composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy.

D. Adhesives, Primers, and Seam Tapes for Flashings: as recommended by flashing manufacturer.

2.04 Accessories:

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.

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

C. Bond Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type 1 (No. 15 asphalt felt).

D. Weeps: Free-draining mesh made from polyethylene strands, impact resistant.

E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

F. Moisture Barrier: minimum 15 lb. asphalt-saturated felt paper.

G. Metal Lath: minimum 2.5 gauge galvanized expanded metal lath.

H. Fasteners: galvanized nails, concrete nails or screws, or corrosion-resistant self-tapping metal screws in accordance with manufacturer's instruction relative to project substrate materials.

I. Sealer: high-quality, breathable-type masonry sealer.

PART 3 - EXECUTION

3.01 Examination:

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

B. Verify that related items provided under other sections are properly sized and located.

C. Examine surfaces and adjacent areas in which work under this Section is to be performed. Report in writing to the Project Manager and/or Architect prevailing conditions that may adversely affect satisfactory execution of the work. Do not proceed with work until unsatisfactory conditions have been corrected.

D. Starting work constitutes acceptance of the existing conditions. The Contractor shall then be responsible for correcting all unsatisfactory and defective work encountered at Contractor's expense.

E. Ensure that no other work is performed on the walls being covered with Thin Brick for at least 48 hours following

installation.

F. Protect surrounding areas from possible damage during installation work.

3.02 Mortar Mix:

A. Type S masonry cement shall be used to attach thin brick to prepared substrate. Either Type S or Type N masonry cement may be used for grout work at Contractor's discretion **– as long as – color matches existing mortar as directed above.**

B. Mix materials in accordance with manufacturer's instructions. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C 270.

C. Do not use antifreeze compounds.

3.03 Installation:

A. Install thin brick in accordance with manufacturer's printed instructions.

B. Surface Preparation:

1. Clean surfaces thoroughly prior to installation. All surfaces must be free of water, snow, dirt, mud, oil, and other foreign materials prior to application.
2. Prepare surfaces using methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
3. Install weather barrier as per manufacturer's instructions. Overlap joints 4 inches minimum. Attach membrane with approved anchors at 6 inches o.c. maximum.
4. Install metal lath over weather barrier as per manufacturer's instructions. Overlap at corners 16 inches minimum. Trim lath edges as necessary with wire snips.
5. Apply a scratch coat of masonry mortar to the prepared work surface and allow to set overnight. Score the wet scratch coat with a scarifier or similar tool prior to setting.
6. In hot and/or dry work environments, dampen substrate scratch coat and the back of each stone unit with clean water prior to setting the unit.

C. Thin Brick Setting:

1. Plan work to minimize job site cutting of thin brick units. Perform necessary cutting with appropriate cutting tools utilizing a masonry diamond blade. Angle cuts to minimize the exposure of the aggregate within the brick unit. Orient cut brick units to

minimize the view of the exposed aggregate within the observer's visual field.

2. Apply 3/8 inch of mortar to the back of each brick unit.
3. Press the brick unit firmly into position. "Jiggle" each piece slightly to ensure firm bonding. This action should cause mortar to extrude slightly around the edges of the brick unit.
4. Remove excess mortar from the joint area.
5. Brush away excess mortar from the face of brick units just after the mortar has set. Do not allow mortar to remain on face of units beyond 4 hours of installation.
6. Install outside corner stone units with short and long legs alternated. Avoid using less than half-size units, particularly at corners and jambs.
7. Place units with uniform mortar joints not to exceed ¾ inch in width. Units shall be running bond with 3 horizontal courses and 3 mortar joints equaling 8 inches.
8. Select and mix units from several pallets or cubes as they are placed.
9. Fill the joints with mortar using a grout bag or other grouting tool to the desired depth. Joint shall be "concave".
10. Point and tool the joints before the mortar has completely set.
11. Verify that built-in items are in proper location and ready for roughing into masonry work.
12. No masonry shall be laid when the ambient temperature is below 40 degrees F. All units shall be laid plumb, true to line and level, with accurately spaced course. Level coursing shall be maintained.
13. The Subcontractor shall be responsible for furnishing all required labor, tools, and equipment as required to complete all areas of masonry work on this project. This shall be inclusive of all scaffolding, walk-boards, and bracing as required to support the work until fully completed.
14. The Subcontractor shall furnish all accessories necessary for the execution of the masonry work. These materials include the thin brick, mortar, reinforcing, ties, and other required accessories.

D. Cutting and Fitting:
   1. Cut and fit for pipes and conduit. Coordinate other items to provide correct size, shape, and location.

E. Cleaning and Sealing:
   1. Clean thin brick surfaces in accordance with manufacturer's instructions.
   2. Protect finished work from damage during remainder of construction period.
   3. Apply sealer in accordance with manufacturer's recommendations.
   4. The thin brick work shall be left in a state exhibiting properly and fully pointed joints and completely clean surfaces.

3.04 Inspection:

A. Color and Texture Appearance: equal to approved sample when viewed in daylight at 10 feet.

B. Repair and Imperfection Acceptance: not discernable when viewed in daylight at 20 feet.

End of Section

constructconnect™ spec-data®

SPEC MIX, Inc.

SPEC MIX®

1. Product Name

- SPEC MIX® Adhered Veneer Mortar
  URL: ~~Adhered Veneer Mortar~~
- SPEC MIX Polymer Modified Adhered Veneer Mortar (PMAVM)
  URL: **Polymer Modified Adhered Veneer Mortar**
- ~~SPEC MIX Colored Mortar~~
  URL: **Colored Mortar**
  Videos: **SPEC MIX Masonry Solutions**

2. Manufacturer

SPEC MIX, Inc.
1230 Eagan Industrial Road, Suite 160
Eagan, MN 55121
Phone: (888) 773-2649
(651) 994-7120
Fax: (651) 454-5315
E-mail: **info@specmix.com**
Web: **www.specmix.com**

3. Product Description

Basic Use

~~SPEC MIX Adhered Veneer Mortar~~

~~SPEC MIX Adhered Veneer Mortar is a preblended dry material specifically designed to bond thin masonry veneer units to solid base surfaces, such as masonry, concrete or galvanized, expanded metal lath. The final wall system will produce a non-load bearing, aesthetically pleasing exterior veneer or an interior finish ideal for concrete or masonry walls, stud walls or metal buildings. Good workmanship, coupled with proper detailing and design, ensures durable, functional, watertight construction.~~

SPEC MIX Polymer Modified Adhered Veneer Mortar (PMAVM)

SPEC MIX Polymer Modified Adhered Veneer Mortar (PMAVM) is a technically advanced mortar used to bond thin veneer masonry units to a substrate. It is an ideal solution for architects and contractors having projects with an immediate and ongoing need for mortar delivering high bond strength and sag resistance during installation. The non-sag formulation provides excellent workability, cohesion, high bond strength, water resistance, efflorescence minimization and durability. For applications in which mortar joints are not utilized, such as dry stack applications, SPEC MIX PMAVM can be used to gain extra bond strength and pop-out protection.

From custom homes to commercial projects, SPEC MIX Polymer Modified Adhered Veneer Mortar is the ultimate material when building with adhered stone veneer masonry.

SPEC MIX PMAVM meets the requirements of ASTM C270 for Type S and N mortar, including appropriate ANSI 118.4 and ACI 530 shear bond standards. It has been rigorously tested to reduce the probability of unit "pop-offs" and contractor callbacks to repair failures common with inferior mortars.

Composition & Materials

SPEC MIX Adhered Veneer Mortar and Polymer Modified Adhered Veneer Mortar (PMAVM) are dry, preblended proprietary mixes containing cementitious materials, aggregates and special admixtures engineered to promote adhesion, reduce shrinkage and maximize product durability. When specified, a pigment can be preblended with either product to ensure color consistency in each bag.

SPEC MIX products are manufactured locally across the United States and Canada by licensed manufacturers who use specialized blending equipment and follow strict quality control procedures to meet project specifications, contractor expectations and applicable ASTM standards.

Sizes

SPEC MIX Adhered Veneer Mortars are packaged in 80 pound (36.3 kg) bags and 3000 pound (1360.8 kg) bulk bags. They can be used with any SPEC MIX material delivery system for increased job site efficiency and safety.

Engineered for optimal workability, bond strength and durability, SPEC MIX Adhered Veneer Mortars are superior

Benefits

- High bond strength
- Non-sag performance and reduced cracking
- Reduced pop-offs, call-backs and repairs
- Resists water penetration and efflorescence
- Preblended with sand to minimize labor and waste
- Consistent quality control with every bag
- Excellent workability and board life
- State-of-the-art batching process and strict quality control procedures help ensure that the finished product complies with design and specification requirements
- Batch-to-batch consistency is maintained using dried sands to eliminate the bulking effect associated with varying moisture within the aggregate
- Portable SPEC MIX silos are available to permit construction in all climates
- Pallets and bulk bag containers are completely reusable and are retrieved whenever a new load of material is delivered to a site
- Helps eliminate sand shoveling, heavy lifting and inconsistencies normally associated with hand or field mixing limitations
- For best results, mortar type should be correlated with the specific masonry unit to be used
- Bond strength, workability and water retention should be given principal consideration when selecting mortar
- Retempering colored mortar is not recommended

4. Technical Data

Applicable Standards

American Concrete Institute (ACI)

- **ACI 530** Building Code Requirements for Masonry Structures

American National Standards Institute (ANSI)

- **ANSI 118.4** American National Standard Specifications for Latex-Portland Cement Mortar

American Society for Testing and Materials (ASTM)

- **ASTM C91** Standard Specification for Masonry Cement
- **ASTM C109/C109M** Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch [50 mm] Cube Specimens)
- **ASTM C144** Standard Specification for Aggregate for Masonry Mortar
- **ASTM C150** Standard Specification for Portland Cement
- **ASTM C207** Standard Specification for Hydrated Lime for Masonry Purposes
- **ASTM C270** Standard Specification for Mortar for Unit Masonry
- **ASTM C482** Standard Specification for Bond Strength of Ceramic tile to Portland Cement Paste
- **ASTM C595** Standard Specification for Blended Hydraulic Cements
- **ASTM C847** Standard Specification for Metal Lath
- **ASTM C897** Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters

Table 1—Polymer Modified Adhered Veneer Mortar

ANSI 118.4:	
Room temperature open time, 70–77 degrees F (21–25 degrees C)	>65 minutes
High temperature open time, 100–110 degrees F (38–43 degrees C)	>15 minutes
Room temperature adjustability, 70–77 degrees F (21–25 degrees C)	>35 minutes
High temperature adjustability, 100–110 degrees F (38–43 degrees C)	>15 minutes
Sag on vertical surfaces	0"
Initial set at 100 degrees F (38 degrees C)	1.5 hours
Final set at 100 degrees F (38 degrees C)	2.5 hours
Shear bond strength @ 28 days	428 psi
ACI 530:	
Shear bond strength @ 28 days	330 psi

Table 2—Mortar Powder to Water Ratio

SPEC MIX PMAVM	Required Mixing Water
80 lb. (36.3 Kg) Bag	5.5 Quarts (5.2 Liters)
3000 lb. (1360.8 Kg) Bulk Bag	Call your local Spec Mix representative

Note: Water addition rates can vary slightly based on climate, installation method, stone type and regional material differences.

- **ASTM C926** Standard Specification for Application of Portland Cement-Based Plaster
- **ASTM C979** Standard Specification for Pigments for Integrally Colored Concrete
- **ASTM C1329** Standard Specification for Mortar Cement
- **ASTM C1714** Standard Specification for Preblended Dry Mortar Mix for Unit Masonry

Uniform Building Code, (UBC)

- Standard No. 15-5 for Moisture Absorption

Other Approvals

- International Masonry All-Weather Council (IMIAC)—Recommended Practices and Guide Specification for Hot and Cold-Weather Masonry Construction
- Portland Cement Association, (PCA), Concrete Masonry Handbook for Architects, Engineers, Builders

Physical/Chemical Properties

See Table 1 for performance characteristics of SPEC MIX PMAVM.

Environmental Considerations

All SPEC MIX products are produced locally within 500 miles of the job site. Empty bags and wooden pallets are returned to the plant for reuse, reducing landfill impact. Use of SPEC MIX products can contribute points toward LEED® project certification.

5. Installation

Preparatory Work

Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact. SPEC MIX products are custom packaged to meet specification requirements. Handle and store product according to SPEC MIX recommendations. Keep dry, covered and protected from weather and other environmental hazards that could cause damage. When stored and protected as recommended, SPEC MIX products have a 9-month shelf life.

Verify that site conditions are acceptable for installation. Do not proceed with installation until unacceptable conditions are corrected.

Mortar type should correlate to the particular masonry unit to be used, as certain mortars are compatible with certain masonry units. The specifier should evaluate the interaction of the mortar type and masonry unit specified. Masonry units with a high initial rate of absorption will have greater compatibility with mortar of high water retention. The material properties that influence the structural performance of masonry are compressive strength, bond strength and elasticity. Since the compressive strength of masonry mortar is of less importance than bond strength, workability and water retentivity, the latter properties should be given priority in mortar selection.

Mortar selection should be based on design requirements and with due consideration given to the code and specification provisions affected by the mortar selected.

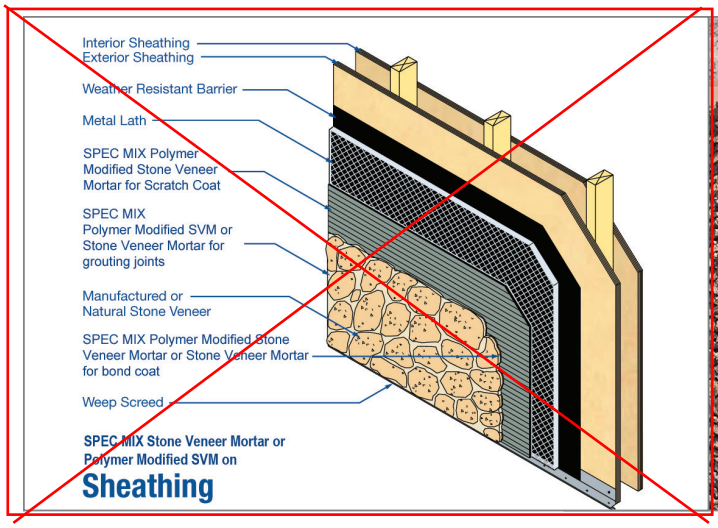
Mock-Ups

A sample of the proposed product will be provided by the manufacturer for onsite preparation of a sample panel for architectural approval and testing, if required. Preparation of this panel with all materials and systems that will be employed in the final project is imperative. Retain the mock-up or field sample through the completion of the project.

Methods

MIXING PMAVM: when mixing SPEC MIX PMAVM, use a mechanical batch mixer or an electric drill with a paddle to ensure homogeneity and good board life.

1. Add dry SPEC MIX PMAVM to clean potable water. Start with approximately 75 percent of the required water. (See Table 2 for details)



2. During 1–2 minutes of initial mixing, add remaining water as necessary, then let the mortar slake or set for approximately 5 minutes and then remix for 2 minutes.
3. Gauge the consistency of the mortar visually. A good workable mortar should have the consistency to be trowelable, but stiff enough to retain ridges and peaks when troweled on a horizontal or vertical surface area.
4. The workability of the mortar can be adjusted as necessary by adding either more water or more powder prior to final mixing. Mortar shall be used and placed in final position within one hour after initial mixing or discarded after that time period. Whenever possible, do not retemper colored SPEC MIX masonry mortars by adding additional water; retempering may affect color consistency. SPEC MIX products are custom packaged to the specification. They must be kept dry, covered and protected from weather and other damage.

Mixing Adhered Veneer Mortar:

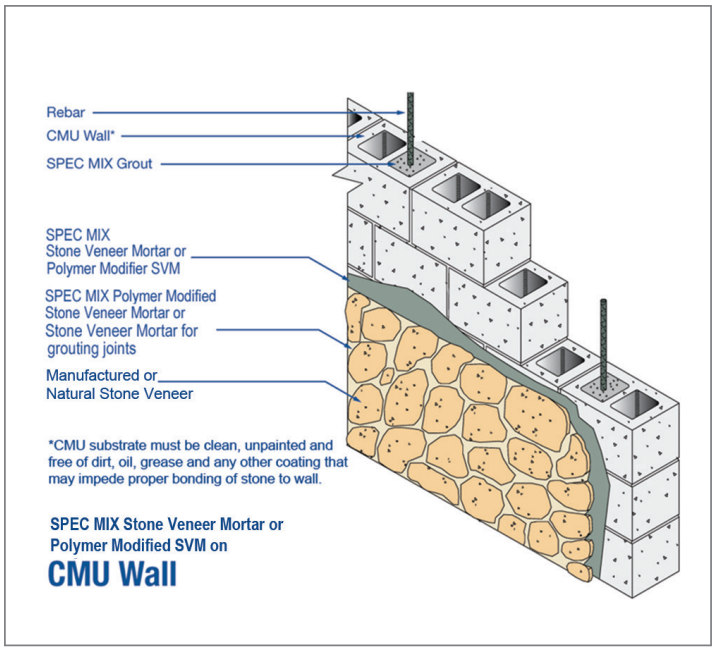
1. Use a mechanical batch mixer to ensure homogeneity, workability and good board life.
2. Add the minimum amount of clean, potable water for optimum workability
3. Mix for five minutes consistently from batch to batch.
4. Tool mortar joints when the surface is thumb-print hard. Keep tooling times consistent.
5. Hand mix mortar only with written approval by the specifier who should outline procedures.
6. Use mortar within 2½ hours after initial mixing.
7. Retemper mortar only when mixing water is lost due to evaporation.
8. Do not retemper colored mortar.

Application Over Wood & Lath

- When installing over galvanized metal lath, tightly attach the lath to the substrate using nails every 6 inch (152 mm); to eliminate waves in the lath when attaching it to plaster board or painted surfaces, screw lath into studs every 8 inches (203 mm)
- Using a trowel, apply mortar ½ inch (12.7 mm) thick to prepare the surface so no lath is exposed; to avoid setting or excessive water loss due to evaporation, apply mortar only in a working area less than 10 ft^2 (0.93 m^2)
- Ensure that the lath is completely covered by the Polymer Modified Adhered Veneer Mortar or Adhered Veneer Mortar
- Before the mortar begins to harden, use a scratcher, scarifier or notched trowel to “scratch” the mortar surface
- After a 24-hour curing period, coat the back of each adhered masonry unit with sufficient mortar and press it firmly into place until the excess material spreads from the sides of the unit
- Once all units are in place, fill a grout bag with SPEC MIX Adhered Veneer Mortar; fill each joint by extruding the grout from the bag
- Tool, brush or rake joints

Application Over Masonry and Concrete

- Prepare painted, waterproofed or dirty surfaces for mortar application by sandblasting and cleaning, or by attaching a ASTM C847 compliant metal lath and applying a scratch coat of SPEC MIX Adhered Veneer Mortar or PMAVM
- Apply the mortar to the back of the masonry veneer unit surface at a minimum ½ inch (12.7 mm) thickness
- Apply the unit directly to the masonry, concrete substrate or scratch coat until the excess material spreads from the sides of the unit



- Once all the units are in place, fill a grout bag with SPEC MIX Adhered Veneer Mortar; fill each joint by extruding the grout from the bag
- Tool, brush or rake joints

Precautions

- Do not use PMAVM when temperatures are below 40 degrees F (4 degrees C)
- Allow mortar to cure for a minimum of 28 days
- Do not use mortar 1 hour or more after mixing
- Clean mortar only with potable water—do not use muriatic acid
- Tool mortar joints when the surface is thumbprint hard and keep tooling times consistent
- Do not strike joints too early or too late, as the color will not remain consistent with the mock-up panel
- Do not retemper colored Adhered Veneer Mortar or PMAVM by adding additional water as it will affect the final mortar color

Safety

WARNING

IMPORTANT! READ BEFORE USING. WEAR IMPERVIOUS GLOVES, such as nitrile.

WARNING: CAN CAUSE SERIOUS INJURY TO SKIN AND EYES. This product contains Portland cement. Contact with freshly mixed product can cause severe burns. Avoid direct contact with skin and eyes. If this product should contact eyes, immediately flush with water for at least 15 minutes and consult a physician. For skin exposure, wash promptly with plenty of soap and water. Remove soaked clothing promptly. If this product burns your skin, see a physician immediately.

This product may contain silica. Silica dust if inhaled may cause respiratory or other health problems. Prolonged inhalation may cause delayed lung injury, including silicosis and possibly cancer. A N95 approved dust mask, eye protection and rubber boots and gloves are recommended when using this product. Safety Data Sheets can be viewed online at www.specmix.com

KEEP OUT OF REACH OF CHILDREN WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Building Codes

SPEC MIX Polymer Modified Adhered Veneer Mortar and Adhered Veneer Mortar must be installed in accordance with the provisions of local building codes and in accordance with instructions and requirements provided by the precast stone or brick manufacturer.

6. Availability & Cost

Availability

SPEC MIX Products and SPEC MIX silo delivery systems are available through a network of nationally licensed manufacturers, with local distribution to major U.S. markets and to select regions of Canada. Contact SPEC MIX, Inc. for more information, or visit www.specmix.com/locator to locate a local manufacturer.

Cost

Market pricing and installed cost information may be obtained from a local SPEC MIX representative.

7. Warranty

Limited WARRANTY:

SPEC MIX, Inc. warrants this product to be of merchantable quality when used or applied in accordance with the instructions hereon. This product is not warranted as suitable for any purpose or use other than the general purpose for which it is intended. Liability under this warranty is LIMITED to the replacement of its product (as purchased) if found to be defective, or at the shipping company's option, to refund the purchase price. In the event of a claim under this warranty, notice must be given to SPEC MIX, Inc. in writing at: One Securities Centre, 3490 Piedmont Road, Suite 1300, Atlanta, GA 30305. THIS LIMITED WARRANTY IS ISSUED AND ACCEPTED IN LIEU OF ALL OTHER EXPRESS WARRANTIES AND EXPRESSLY EXCLUDES LIABILITY FOR CONSEQUENTIAL DAMAGES.

8. Maintenance

Properly mixed and installed masonry units and mortar require little maintenance. Depending on service

conditions, masonry walls may require periodic cleaning and tuckpointing. Clean masonry with potable water only. Do not use muriatic acid to clean colored mortar.

9. Technical Services

SPEC MIX products are produced locally across the United States and Canada by licensed manufacturers who use sophisticated blending equipment and follow strict quality control procedures to meet project specifications, contractor expectations and applicable ASTM standards.

SPEC MIX products are manufactured with strict standards and comprehensive quality control procedures in place for each batch. A digital printout displaying the proper proportions per batch is available upon request and may be kept as a permanent record. Only SPEC MIX offers this laboratory-controlled production system in preblended mortar.

SPEC MIX, Inc. will provide product samples for architectural approval and testing if requested, using all materials and systems that will be employed in the final project. Contact SPEC MIX, Inc. or a local SPEC MIX manufacturer, for technical service requests.

10. Filing Systems

- ConstructConnect
- Additional product information is available from the manufacturer upon request

DIVISION 5 – METALS

SECTION 05400 – COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. This Section includes the following:
   1. Exterior non-load-bearing wall framing.
   2. Soffit joist framing (if applicable).

B. Related Sections include the following:
   1. Division 5 Section "Metal Fabrications" for masonry shelf angles and connections.
   2. Division 9 Section "Gypsum Board Assemblies" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.03 Performance Requirements

A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads: Design loads shall be calculated components and cladding load per ASCE/SEI 7 edition indicated on the drawings.
   2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
      a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/600 of wall height at areas backing up brick veneer, and 1/240 of wall height at areas backing up other materials.
      b. Soffit Joist Framing: Vertical deflection of 1/240 of the span.
   3. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
      a. Upward and downward movement of 1 inch.

B. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."
   1. Headers: Design according to AISI's "Standard for Cold-Formed Steel Framing - Header Design."
   2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

SECTION 05400 – COLD-FORMED METAL FRAMING

1.04 Submittals

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

B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1. For cold-formed metal framing 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.

D. Research/Evaluation Reports: For cold-formed metal framing.

1.05 Quality Assurance

A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

D. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

1.06 Delivery, Storage, And Handling

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.01 Manufacturers

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:

1. Allied Studco.
2. AllSteel Products, Inc.
3. California Expanded Metal Products Company.
4. Clark Steel Framing.
5. Consolidated Fabricators Corp.; Building Products Division.
6. Craco Metals Manufacturing, LLC.
7. Custom Stud, Inc.
8. Dale/Incor.
9. Design Shapes in Steel.
10. Dietrich Metal Framing; a Worthington Industries Company.
11. Formetal Co. Inc. (The).
12. Innovative Steel Systems.
13. MarinoWare; a division of Ware Industries.
14. Quail Run Building Materials, Inc.
15. SCAFCO Corporation.
16. Southeastern Stud & Components, Inc.
17. Steel Construction Systems.
18. Steeler, Inc.
19. Super Stud Building Products, Inc.
20. United Metal Products, Inc.

2.02 Materials

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

1. Grade: ST33H (ST230H).
2. Coating: G60 (Z180).

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

1. Grade: 50 (340), Class 1 or 2.
2. Coating: G90 (Z275).

2.03 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 follows:

1. Minimum Base-Metal Thickness: 0.0428 inches (1.09 mm).
2. Flange Width: 1-5/8 inches (41 mm).

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0538 inches (1.37 mm)
   2. Flange Width: 1-1/2 inches.

C. Vertical Deflection Clip Option: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Dietrich Metal Framing; a Worthington Industries Company.
      b. MarinoWare, a division of Ware Industries.
      c. SCAFCO Corporation
      d. The Steel Network, Inc.

D. Single Deflection Track Option: 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 and lateral loads and transfer them to the primary structure, and as follows:
   1. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
   2. Flange Width: 1 inch (25 mm) plus the design gap for 1-story structures and 1 inch (25 mm) plus twice the design gap for other applications.

E. Double Deflection Track Option: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
   1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
      a. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
      b. Flange Width: 1 inch (25 mm) plus the design gap for 1-story structures and 1 inch (25 mm) plus twice the design gap for other applications.
   2. Inner Track: Of web depth indicated, and as follows:
      a. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
      b. Flange Width: Equal to sum of outer deflection track flange width plus 1 inch.

2.04 Soffit Joist Framing

A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depth indicated, unpunched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: As indicated on drawings.
   2. Flange Width: 1-5/8 inches (41 mm) minimum.

2.05 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.
   6. Foundation clips.
   7. Gusset plates.
   8. Stud kickers, knee braces, and girts.
   9. Joist hangers and end closures.
   10. Hole reinforcing plates.
   11. Backer plates.

2.06 Anchors, Clips, And Fasteners

A. Anchor Bolts: ASTM F 1554, Grade 55, threaded carbon-steel headless bolts, with encased end threaded, and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C or mechanically deposition according to ASTM B 695, Class 50.

B. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

D. 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.

E. Welding Electrodes: Comply with AWS standards.

2.07 Miscellaneous Materials

A. Galvanizing Repair Paint: ASTM A 780.

B. 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, with fluid consistency and 30-minute working time.

C. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

D. 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.

2.08 Fabrication

A. Fabricate cold-formed metal 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 metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
   a. Comply with AWS D1.3 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 not less than three exposed screw threads.
4. Fasten other materials to cold-formed metal framing by welding, bolting, 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 metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.01 Examination

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

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

3.02 Installation, General

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

B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" 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 (1.6 mm).

D. Install cold-formed metal 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 metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3 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 and control joints with cold-formed metal framing. Independently frame both sides of joints.

H. Install insulation, specified in Division 7 Section "Building 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 standard punched openings.

J. Erection Tolerances: Install cold-formed metal 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.

3.03 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 bottom track, unless otherwise indicated. Fast both flanges to top track if required by deflection option selected. Space studs as follows:

1. Stud Spacing: 16 inches (406 mm).

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.

1. Single Deflection Track Option: Install single-leg deflection tracks and anchor to building structure.
2. Double Deflection Track Option: Install double deep-leg deflection tracks and anchor outer track to building structure.
3. Deflection Clip Option: Connect vertical deflection clips to infill studs and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
   1. Top Bridging for Single Deflection Track Option: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
      a. Install solid blocking at maximum 96-inch (2440-mm) centers and as shown on approved Shop Drawings.
   2. Bridging Options:
      a. Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
      b. 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.
      c. Proprietary bridging bars installed according to manufacturer's written instructions.

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

3.04 Joist Installation

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.

B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
   1. Unless shown otherwise in drawings, install joists over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm).
   2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated on drawings.

C. Space joists not more than 2 inches (51 mm) from abutting walls, and as follows:
   1. Joist Spacing: As indicated.

D. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or another combination of connected joists if indicated.
E. Install bridging at intervals indicated. Fasten bridging at each joist intersection as follows:
   1. Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
F. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.05 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.

3.06 Repairs And Protection

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal 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 ensures the cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

DIVISION 5 – METALS

SECTION 05500 – METAL FABRICATIONS

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. This Section includes the following:
   1. Steel framing and supports for ceiling-hung toilet compartments.
   2. Steel framing and supports for mechanical and electrical equipment.
   3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
   4. Elevator machine and hoist beams.
   5. Steel shapes for supporting elevator door sills.
   6. Metal ladders.
   7. Metal bollards.
   8. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:
   1. Loose steel lintels.
   2. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

C. Related Sections include the following:
   1. Division 3 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, wedge-type inserts and other items indicated to be cast into concrete.
   2. Division 4 Section "Unit Masonry Assemblies" for installing loose lintels, anchor bolts, and other items indicated to be built into unit masonry.
   3. Division 5 Section "Structural Steel."
   4. Division 5 Section "Metal Stairs."

1.03 Submittals

A. 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.

B. Welding certificates.

1.04 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."

1.05 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.

1.06 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.

PART 2 - PRODUCTS

2.01 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.

2.02 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.

2.03 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. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6);

with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 55.
   1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

D. Eyebolts: ASTM A 489.

E. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).

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

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

H. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).

I. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).

J. 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.

K. 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.
   1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
   2. Material for Anchors in Exterior Locations: Alloy Group 1 (A1) stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M).

2.04 Miscellaneous Materials

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

B. Primer:
   1. Unexposed Interior Steel: The Society for Protective Coatings Specification 15-68T, Type 1 (red oxide) or a shop primer paint which meets the same minimum performance requirements.

2. Exposed or Exterior Steel: Series 90-97 “Tneme Zinc”, by the Tnemec Co., Inc. Refer to Section 9900.
3. Galvanizing Repair Paint: ASTM A 780.

C. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

E. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless otherwise indicated.

2.05 Fabrication, General

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

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

D. Form exposed work 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.

1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.06 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.

C. Galvanize miscellaneous framing and supports where indicated.

D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.07 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.

2.08 Loose Steel Lintels

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.

B. Galvanize loose steel lintels located in exterior walls.

2.09 Metal Ladders

A. General:

1. Comply with ANSI A14.3, unless otherwise indicated.
2. For elevator pit ladders, comply with ASME A17.1.
3. Space siderails 20 inches apart, unless otherwise indicated.
4. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted brackets, made from same metal as ladder.

B. Steel Ladders:

1. Siderails: Continuous, 3/8-by-2-1/2-inch (9.5-by-64-mm) steel flat bars, with eased edges.
2. Rungs: 1-inch- (25-mm-) diameter steel bars spaced at 12 inches on center.
3. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
4. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung by a proprietary process.
5. Galvanize exterior ladders, including brackets and fasteners.
6. Prime interior ladders, including brackets and fasteners, with zinc-rich primer.

2.10 Metal Bollards

A. Fabricate metal bollards from Schedule 40 steel pipe.

B. Fabricate bollards with 3/8-inch- (9.5-mm-) thick steel baseplates for bolting to concrete slab. Drill baseplates at all 4 corners for 3/4-inch (19-mm) anchor bolts.

1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

C. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch- (6.4-mm-) thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches (200 mm) deep and 3/4 inch (19 mm) larger than OD of bollard.

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.

C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.12 Steel And Iron Finishes

A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
   1. ASTM A 123/A 123M, for galvanizing steel and iron products.
   2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. 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) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

C. 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.

PART 3 - EXECUTION

3.01 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.

3.02 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.

3.03 Installing Metal Bollards

A. Anchor bollards to existing construction with expansion anchors. Provide four 3/4-inch (19-mm) bolts at each bollard, unless otherwise indicated.

B. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete or in formed or core-drilled holes not less than 8 inches (200 mm) deep and 3/4 inch (19 mm) larger than OD of bollard. Fill annular space around bollard solidly with nonshrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch (3 mm) toward bollard.

C. Fill bollards solidly with concrete, mounding top surface to shed water.

3.04 Adjusting And Cleaning

A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
2. Apply a compatible primer of same type and dry film thickness as shop primer used on adjacent surfaces.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

DIVISION 6 - WOOD & PLASTIC

SECTION 06100 - ROUGH CARPENTRY

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Wood Treatment - Section 06300

1.03 Quality Assurance:
- A. Grades specified shall conform to the most recent grading rules as established by the following bureaus and associations.
  1. PS 20 - American Softwood Lumber Standard.
  2. Western Wood Products Association
  3. Southern Pine Inspection Bureau
- B. Grade and trade mark each piece of lumber or bundle on bundled stock. Use only the recognized official marks of association under whose rules it is graded. Grade and trade marks will not be required if each shipment is accompanied by certificate of inspection issued by grading association.

1.04 Submittals:
- A. Product Data: for each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  1. Include data for wood preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer’s written instructions for handling, storing, installing and finishing treated material.
  2. As requested by authorities having jurisdiction include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply wit requirements. Include physical properties of treated materials both before and after exposure to elevated temperatures when tested according to ASTM D5516 and ASTM D 5664.
  3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

4. Research / evaluation reports – for the following, showing compliance with building code in effect for Project:
   a. Fire-retardant treated wood.
   b. Power-driven fasteners.
   c. Power-actuated fasteners.
   d. Expansion anchors.
   e. Metal framing anchors.

1.05 Delivery, Storage and Handling:

A. Stack lumber, plywood, sheathing, and other materials: provide spacers between each bundle to provide air circulation around bundled material. Provide proper air circulation between stacks and under coverings.

Part 2 - Products

2.01 General:

A. Provide best quality of respective grades and kinds. Lumber and plywood shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship". Factory mark each piece of lumber with grade stamp of grading agency.

B. Maximum moisture content of lumber 19%.

C. Provide dressed lumber (S4S) unless otherwise indicated.

D. Where nominal sizes are indicated, provide actual sized required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

2.02 Grades and Applications of Lumber:

A. Framing lumber for the following shall be "Standard" grade Douglas Fir (WCLIB or WWPA).
   1. Concealed blocking/nailers, cants, grounds, and miscellaneous wood items used in conjunction with the roofing work and as indicated on the Drawings.
   2. Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the Grading Agency indicated.

2.03 Fire-retardant Treated Materials:

A. General – where fire-retardant treated materials are required by authorities having jurisdiction, provide materials that comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant treated wood with appropriate classification

marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

2.04 Panel Products:

A. Miscellaneous Concealed Plywood: shear wall sheathing, span rating to suit framing in each location, and thickness indicated. Refer to Structural Drawings.

B. Telephone and Electrical Equipment Backing Panels: DOC PS 1, C-D Plugged, fire-retardant treated, in thickness indicated, or if not indicated, not less than ½ inch thick.

2.05 Fasteners:

A. All nails, spikes, bolts, connectors and other fasteners used in connections with this work shall be galvanized.

1. Nails, wire, brads and staples – FS-FF-N-105.
2. Power-driven Fasteners – CABO NER-272.
3. Wood screws – ASME B18.6.1.
4. Screws for fastening to cold formed metal framing: ASTM C954 length as recommended by screw manufacturer for material to be fastened.
5. Lag bolts – ASME B18.2.1.
6. Bolts – steel bolts complying with ASTM A 307, Grade A with ASTM C563 hex nuts and, where indicated, flat washers.
7. Expansion anchors – anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   a. Material for interior applications: carbon steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
   b. Material for exterior applications: stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, alloy group 1 or 2.

2.06 Metal Framing Anchors:

A. General: provide galvanized steel framing anchors of structural capacity, type, and size indicated and acceptable to authorities having jurisdiction.

B. Galvanized Steel Sheet: hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

Part 3 - Execution

3.01 Sizes and Applications (General Framing):

A. Members shall be accurately cut and fitted, true to line and level, avoiding shims and wedges as much as possible. Discard material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Where applicable, apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

C. At wood ground, blocking and nailer installation: install where indicated and required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

D. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless noted otherwise.

3.02 Rough Hardware:

A. Provide all sufficient nails, screws, etc. to insure rigidity and structural soundness. Provide hot-dipped galvanized fasteners at all weather exposed locations.

B. Spiking and nailing shall be done using largest size spikes and nails practicable and as indicated on the drawings. Securely attach carpentry according to applicable codes and recognized standards.

C. Bolt nailers and blocking to steel or concrete members with bolts of proportionate strength of members attached, length required, spaced 4'-0" o.c. maximum and 4" from each end, except as otherwise indicated. Countersink fastener heads on exposed carpentry work and fill holes with wood fiber.

D. Predrill members when necessary to avoid splitting of wood.

3.03 Panel Product Installation:

A. Wood structural panels: comply with applicable recommendations contained in APA Form No. E30K, “APA Design/Construction Guide: Residential and Commercial”, for types of structural-use panels and applications indicated. Comply with “Code Plus” provisions in above referenced guide.

End of Section

DIVISION 6 - WOOD & PLASTIC

SECTION 06200 - FINISH CARPENTRY

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.
- B. The erection of wall and partition wood finish materials, installation of door and hardware, and shelving incidentals necessary to finish the carpentry.

1.02 Quality Assurance:
- A. Standards:
  1. Architectural Woodwork Institute:
     a. Architectural Woodwork Quality Standards.
  2. National Electrical Manufacturers Association:
     a. NEMA Publication LD-1.
  3. Western Wood Products Association:
     a. Standard Grading Rules for Western Lumber.
  4. American Plywood Association:

1.03 Product Delivery, Storage and Handling:
- A. All finish materials, trim, etc. shall be inspected to insure that no sub-grade, defective, or machine-marked pieces are installed.

Part 2 - Products

2.01 General:
- A. Grades specified shall conform to the most recent grading rules of the association or bureau under whose rules the lumber is produced.
- B. Quality standards specified shall conform to the latest edition of the Architectural Woodwork Institute's "Quality Standards".
- C. Lumber shall be kiln-dried to 10% to 12% moisture content which shall be maintained during the fabrication of millwork and cabinetry.

Part 3 - Execution

3.01 Miscellaneous Trim and Frames:
- A. Install all trim in longest possible lengths. Stagger joints in adjacent member. Cope at returns and miter at corners. Attach securely in place with fine finishing nails where exposed; set for filling.

B. Immediately prior to final inspection of building, the contractor shall repair or replace all millwork or cabinetry items which have been damaged in any way.

End of Section

SECTION 06300 - WOOD TREATMENT

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
- A. Standards:
  1. American Wood Preservers Association:
     - a. AWPA Standard P-5 (Preservative)
     - b. AWPA Standard Commodity Standards (Treating Process).
  2. Federal Specifications:
     - a. TT-W-550 (Preservative).
     - b. TT-W-571 (Treating Process).
- B. All lumber and plywood receiving wood treatment shall bear the trademark of the process used.
- C. Submit certificate and guarantee of the lumber treated.

Part 2 - Products

2.01 Materials:
- A. Description: Waterborne chemical salts intended for pressure impregnation as a wood preservative. Preservatives with a petroleum vehicle are not permitted.

Part 3 - Execution

3.01 Installation:
- A. Location of treated lumber:
  1. All blocking, plates, nailers and curbs used in conjunction with gravel guards, roof edges and all other wood components used in the roofing project.
- B. Materials shall be pressure treated in accordance with the standards of the American Wood Preservers Institute and the chemical manufacturer's specifications.
- C. Treated material shall conform to AWPB LD-2 and treated to a maximum retention of 0.23 pound of oxide per cubic foot.
- D. Moisture content of finish products shall not exceed 19%.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07200 – INSULATION

Part 1 - General

1.01 Work Included:
- A. All materials, labor and services and incidentals necessary for the completion of this section of work.

1.02 Quality Assurance:
- A. Standards:
  - 1. Federal Specifications:
    - a. HH-I-524C, Type IV, Class C, Rigid Insulation.
    - b. ASTM C 665-84, Type 1, Insulation Blankets.
    - c. ASTM D1621, Compressive Strength.
    - d. ASTM E84, Flame Spread and Smoke Developed.
- B. Submittals:
  - 1. Provide submittals in the form of samples, and documentation, to the Architect for review.

1.03 Product Delivery, Storage and Handling:
- A. Rigid insulation board is combustible. During storage and insulation, observe good fire safety practice, including job site housekeeping.

1.04 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Fibrous Insulation: ASTM C 665-84, Type 1
  - 1. Type:
    - a. 6" thick (approx.) mineral wool or fiberglass fire resistant insulating blanket or batt, with kraft paper facing. Thermal resistance R-19. Refer to Drawings for locations.

Part 3 - Execution

3.01 Installation:
- A. Install insulation vertically to in-fill between exterior steel studs as shown on the Drawings.
- B. Cut insulation by means of a saw, knife, or other sharp tool to fit around obstructions across the wall, such as vents, louvers, pipes and conduit.

C. If mastic adhesive is used to supplement holding the insulation in place, observe label directions.

End of Section

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07410 - WALL PANEL SYSTEMS

Part 1 - General

1.01 Work Included:
- A. Single-skin, concealed fastener, prefinished metal wall panels.
- B. Metal trim, accessories, fasteners, and sealants related to the wall panel system.
- C. Provide prefinished wall panels at backside of parapet walls as indicated on the drawings.

1.02 Quality Assurance:
- A. Manufacturer shall demonstrate a minimum of ten (10) years of experience in the specified products and applications.
- B. American Architectural Manufacturer=s Association (AAMA):
  1. AAMA 620
  2. AAMA 621
- C. American Society of Civil Engineers (ASCE):
  1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- D. ASTM International (ASTM):
  1. ASTM A653/A653M
  2. ASTM A755/A755M
  3. ASTM B209
  4. ASTM 920
  5. ASTM C1007
  6. ASTM E283

1.03 Panel Performance Requirements:
- A. Structural designs shall have been established from tests per ASTM E72 chamber method. Ultimate loads shall be established without the use of exposed or back-side fastening.
- B. Air Infiltration: maximum 0.06 cfm/s.f. per ASTM E283 at a static-air-pressure difference of 1.57 lbf/s.f., using minimum 10x10 foot test panel that includes side joints.
- C. Water Penetration, Static Pressure: no uncontrolled water penetration per ASTM E331 at a minimum static differential pressure of 6.24 lbf/s.f., using a minimum 10x10 foot test panel that includes side joints.
- D. Structural Performance: provide metal wall panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, per ASTM E72.
  1. Maximum allowable deflection limited to L/180 deflection of panel perimeter normal to plane of wall with no evidence of failure.
- E. Provide metal wall panels and panel accessories from a single manufacturer.

SECTION 07410 - WALL PANEL SYSTEMS

1.04 Submittals:

A. Product data, including certified independent test data indicating compliance with requirements.

B. Shop Drawings including full elevations showing openings and penetrations. Include details of each condition of installation and attachment.

1. Indicate points of supporting structure that must coordinate with metal wall panel assembly installation.
2. Indicate details of fastening, including clip spacing.

C. Load span tables including evaluation of panel clip and panel side joint interaction.

D. Samples of each component.

E. Installer Project References: minimum of 5 installations not less than 5 years old, with Owner and Architect contact information.

1.05 Warranty:

A. Manufacturer shall warrant for a period of two (2) years that the panels, trim and accessories furnished by the manufacturer will be free from defects in materials and factory workmanship.

1. Provide Special Panel Finish Warranty: Manufacturer shall agree to repair or replace metal wall panels that evidence deterioration of finish for the period of twenty (20) years from date of substantial completion.

1.06 Delivery, Storage, and Handling:

A. Protect metal wall panel products during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage.

1.07 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Panel Design

A. Panel units shall consist of Metallic-Coated Steel Face Sheet:

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 (Class Z275), structural steel quality.
2. Aluminum-zinc alloy-coated Steel Sheet: ASTM A792/A792M, Class AZ50 Grade 50 (Class ASM150, Grade 275), structural steel quality.
3. Face Sheet: minimum 22 gage nominal uncoated thickness.

B. Panel edges shall have an overlapping design with factory applied vapor sealant in side laps. Structural fasteners and clips shall be concealed.

C. Panel unit shall be equal to L-Panel, as manufactured by Berridge Manufacturing Company.

2.02 Metal Wall Panel Finish:

A. Prefinished Kynar 500.

2.03 Fabrication

A. Steel trim shall be the same finish and gage as the exterior and/or interior of the panels.

B. Panels and trim bundles shall be protected with water resistant paper and provided with wood collars to permit handling and stacking in the field.

2.04 Secondary Metal Subgirt Framing:

A. Miscellaneous framing components, general: cold-formed metallic-coated steel sheet, ASTM A653/A653M, G90 (Z180).

1. Hat Channels: 0.053 inch / 16 ga. minimum.
2. Sill Channels: 0.053 inch / 16 ga. minimum.

2.05 Base Metal and Finish: match metal wall panel base metal and finish.

Part 3 - Execution

3.01 Inspection:

A. Building tolerances on the panel support steel shall not exceed those defined by the panel manufacturer.

1. 1/4 inch in any 20 foot length vertically or horizontally.
2. 1/2 inch in any building elevation.

B. Alignment of the panel support system should be checked and defects corrected prior to installing panels.

C. Verify that window, door, and other penetrations match layout on shop drawings.

3.02 Secondary Framing Installation:

A. Install secondary metal framing components to tolerances indicated, as shown on approved shop drawings. Install secondary metal framing and other metal panel supports per ASTM C1007 and metal wall panel manufacturer=s recommendations.

3.03 Installation:

A. Install metal wall panels in accordance with approved shop drawings and manufacturer=s recommendations. Install metal wall panels in orientation, sizes, and locations indicated. Anchor metal wall panels and other components securely in place. Provide for thermal and structural movement.

B. Trim, accessories, and sealants shall be installed in accordance with approved shop drawings to insure a functional and weather tight installation.

1. Install clips to supports with self-tapping fasteners. Fasteners shall be stainless steel.
2. Provide weatherproof escutcheons for pipe and conduit

penetrating exterior walls.

3. Dissimilar Materials: where elements of metal wall panel system come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

C. Dry wipe-down of the exterior surface should be done as the panels are installed.

D. Joint Sealers: install joint sealants where indicated on approved shop drawings.

3.04 Cleaning and Protection:

A. Remove protective films. Clean finished surfaces as recommended by metal wall panel manufacturer. Clear weep holes and drainage channels of obstructions, dirt and sealant. Maintain in a clean condition during construction.

B. Replace damaged panels and accessories that cannot be repaired by finish touch-up or minor repair.

3.04 Closeout Submittal:

A. Provide maintenance data.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07415 – PREFINISHED METAL SOFFIT PANELS

Part 1 - General

1.01 Work Included:
- A. The General Conditions and applicable sections of Division 1 shall apply to this entire section.
- B. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Metal Fabrications - Section 05500
- B. Modified Bitumen Membrane Roofing System - Section 07550
- C. Flashing and Sheet metal - Section 07600

1.03 Quality Assurance:
- A. Qualifications of Installer: Competent and skilled sheet metal applicator familiar with this type installation with successful completion of projects of familiar scope. Applicator shall have at least two years of experience in prefinished sheet metal applications.

1.04 Shop Drawings:
- 1.1 Submit complete shop drawings on all prefinished metal applications, showing layouts of seams, joints, details, and installation methods. Show details of weatherproofing at edges, terminations and penetrations in metal work.

1.05 Applicator and Guarantee:
- C. All work shall be done by one contractor with 5 years minimum experience in this type of metal work.
- B. Provide ten (10) years guarantee written on contractor's letterhead for work of this Section.

1.06 Warranty:
- A. Provide a 20-year manufacturer's warranty covering color fade, chalk and film integrity at no charge.

1.07 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only.**

Part 2 - Products

2.01 Acceptable Manufacturers:
- A. Quality of Manufacturers: The products, colors and finishes herein are of Berridge Manufacturing Company products to establish standards of quality and appearance. The products of other manufacturers are acceptable subject to meeting or exceeding the requirements of these specifications, and the approval of the contracting officer.

2.02 Materials -
- A. Prefinished Metal Soffits:
  - 1. Flush Panel, L-panel, 24 gauge steel with embossed finish.

2. Color: match existing / as selected by Architect.
3. Flashings, Closures, and Trim shall be fabricated from same material, gauge, and finish as panels.
4. Finish: Kynar 500.

Part 3 - Execution

3.01 Installation:

A. Fabricate and install prefinished metal facings in accordance with drawings and recognized sheet metal practices using conventional hand or power tools. Keep cut edges sharp, clean, properly dressed and closely aligned. Exercise care during fabrication and erection to avoid damage.

B. Structural framing members and fasteners shall be sized and located as recommended by the panel manufacturer. The applicator shall insure that the correct fastener has been chosen for size and length necessary for loading requirements. Special care shall be exercised installing fasteners so as not to overdrive or misdirect fasteners which could cause damage to panels or trim. Use colored pop rivets on trim items and where exposed fasteners are necessary. Keep exposed fasteners to very minimum.

C. Only minor scratches and abrasions will be allowed to be touched up. Any other damaged material shall be replaced.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07600 - FLASHING AND SHEET METAL

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Sealants - Section 07900

1.03 Quality Assurance:
- A. Standards:
  - 1. American Society of Testing and Materials
    - a. ASTM A-526, Steel Sheet, Zinc-Coated (Galvanized), Commercial Quality.
    - b. ASTM B-32, Solder Metal
  - 2. Federal Specifications:
    - a. SS-C-153B, Cement, Bituminous, Plastics
  - 3. Sheet Metal and Air Conditioning Contractors National Association:
    - a. Architectural Sheet Metal Manual

1.04 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Prefinished Sheet Metal Overflow Scuppers, Gutters, Downspouts, Conductor Heads, and Prefinished Metal Coping:
  - 1. Galvanized iron, prefinished one side.
  - 2. Gauge: 24 gauge, of design and width as detailed.
  - 3. Acceptable manufacturer: Color Berridge Manufacturing Company.
  - 4. Finish: Kynar 500 - Refer Color Schedule.
- B. Sheet Metal:
  - 1. Galvanized Sheet Steel: ASTM A-526, Commercial Quality.
  - 2. Gauge: 22 Gauge minimum or as required by Drawings or Specifications.
- C. Fasteners: Nails, screws, and other fasteners used in conjunction with this work shall be galvanized or cadmium plated.
- D. Solder: ASTM B-32, alloy grade 58, 50% tin, 50% lead.
- E. Flux: Muriatic acid with zinc.
- F. Sealants: Rubber based compound - refer to Section 07900.
- G. Bituminous Plastic Cement: FS SS-C-153B.
- H. Accessories: Provide accessories as recommended by

manufacturer or as indicated on Drawings.

Part 3 - Execution

3.01 Fabrication:

A. Shape and install sheet metal as indicated on Drawings. Comply with recommendations of SMACNA "Architectural Sheet Metal Manual."

B. Form exposed faces flat and free of buckles, excessive wave and tool marks. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

C. Hem all exposed edges.

D. Make waterproof corner joints by soldering solidly. Joints shall be full-lapped.

E. Soldering: Shall be done slowly with well heated coppers to thoroughly heat the sheet and completely sweat the solder through the full width of the seam. Ample solder shall be used and the seam shall show a least one full inch of evenly flowed solder. Soldering coppers: Shall be heavy and blunt design, properly tinned before using. Neutralize all excess flux.

F. Provide for thermal expansion of running trim, flashing and other items exposed for more than 15'-0" continuous length. Locate expansion seams at 10'-0" intervals and 2'-0" each side of corners and intersections.

G. Angle bottom edges of exposed vertical surfaces to form drips.

3.02 Installation and Application:

A. General:

1. Furnish those items to be installed by other trades to proper grade for installation.
2. Cooperate with and coordinate installation of sheet metal with roofing work as specified under Membrane Roofing - Section 07550.
3. Install work watertight, without waves, warps, buckles, fastening stresses or distortion, allowing for expansion and contraction.
4. Embed all flashing in plastic cement. Coat dissimilar metals from contact with bituminous coating.

B. Metal Coping:

1. Material: 24 gauge, prefinished sheet metal.
2. Fabricate and install in accordance with drawings, and recognized sheet metal practices.
3. Secure coping bedded in plastic cement to blocking.
4. At joints, bed coping in plastic cement and secure on side to backing strip by soldering solid. Do not use screws or nails in exposed face to coping.

5. Lower edge of coping to be securely hooked to hook strip. Secure to wood blocking with No. 8 x 1" galvanized sheet metal screws at 8 o.c.

C. Edge Flashing:
   1. Material: 24 gauge, prefinished sheet metal.
   2. Fabricate and install in accordance with drawings, recognized sheet metal practices, and as described above.

D. Gutters, Conductor Heads, and Downspouts:
   1. Material: 24 gauge, prefinished sheet metal.
   2. Fabricate and install in accordance with drawings, recognized sheet metal practices, and as described above. Provide where indicated on the drawings.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07900 - SEALANTS

Part 1 - General

1.01 Work Included:
A. All materials, labor services, and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
A. Standards:
1. TT-S-00230C, Sealing Compound, One Component.
2. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.03 Submittals:
A. Submit manufacturer's specifications and color chart for each type of sealant.
B. Samples: For each kind and color of joint sealant required.
C. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.
D. Product test reports.
E. Preconstruction compatibility and adhesion test reports.
F. Preconstruction field-adhesion test reports.
G. Field-adhesion test reports.

1.04 Warranty:
A. All work done under this section of the work shall be guaranteed for a period of two years from date of final acceptance of the building. Guarantee shall include materials and workmanship required to repair any leaks or the repairs thereof.
B. Special Warranty: Manufacturer’s standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section for a period of 10 years from date of final acceptance.

1.05 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
A. Building Sealant: One part high performance polyurethane waterproofing sealant, FS-TT-S-00230C.
1. Acceptable Manufacturer: Sonneborn NP1 Building Sealant.
2. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall

comply with the following limits for VOC content when calculated according to 40 CPR 59, Subpart D (EPA Method 24):

a Architectural Sealants: 250 gIL.

b. Sealant Primers for Nonporous Substrates: 250 gIL.

c. Sealant Primers for Porous Substrates: 775 gIL.

3. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

a. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

4. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

5. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CPR 177.2600.

B. Silicone Joint Sealants:

1. Mildew-Resistant Neutral-Curing Silicone Joint Sealant: ASTM C 920.

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. BASF Building Systems.
2. Dow Corning Corporation.
3. GE Advanced Materials - Silicones.
4. Pecora Corporation.
5. Sika Corporation; Construction Products Division.
6. Tremco Incorporated.

C. Urethane Joint Sealants: Urethane Joint Sealant: ASTM C 920.

1. 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:
a. BASF Building Systems.
b. Bostik, Inc.
c. Lymtal, International, Inc.
d. Pecora Corporation.
e. Sika Corporation; Construction Products Division.
f. Tremco Incorporated.

D. Latex Joint Sealants: Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, GradeNF.
1. 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:
a. BASF Building Systems.
b. Bostik, Inc.
c. Pecora Corporation.
d. Tremco Incorporated.

E. Preformed Joint Sealants: Preformed Foam Joint Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant manufactured from urethane foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.
1. 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:
a. Dayton Superior Specialty Chemicals.
b. EM SEAL Joint Systems, Ltd.
c. Sandell Manufacturing Co.
d. Schul International, Inc.
e. Willseal USA, LLC.

F. Acoustical Joint Sealants: Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Pecora Corporation.

b. USG Corporation.

G. Joint Sealant Backing: cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type 0 (open-cell material) or any of the preceding types, as approved in writing by joint sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
   1. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

H. Miscellaneous Materials: as recommended by sealant manufacturer.
   1. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
   2. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
   3. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
   4. Joint Cleaner
   5. Joint Primer/Sealer
   6. Bond Breaker Tape
   7. Joint Backer-Rod: Closed-cell compressible rod stock, size and shape as required by application.

I. Caulking compound: Watertight, gun consistency, conforming to FS-TT-C-598, Type 1.

J. Accessories: As recommended by sealant manufacturer.

K. Color: to be selected from manufacturer’s standard colors.

Part 3 - Execution

3.01 Preparation:

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
   1. Remove laitance and form-release agents from concrete.
   2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant

manufacturer's written instructions. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

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

3.02 Installation: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

A. Do not leave gaps between ends of sealant backings.

B. Do not stretch, twist, puncture, or tear sealant backings.

C. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

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

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

G. Acoustical Sealant Installation: Comply with ASTM C 919 and with manufacturer's written recommendations.

H. Clean off excess sealant or sealant smears adjacent to

joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.03 Joint Sealant Schedule:

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal non traffic surfaces.

E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal non-traffic surfaces.

F. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal non traffic surfaces.

3.04 Additional Information:

A. Application: All sight exposed caulking, and all exterior applications.

B. Comply with sealant manufacturer's printed instructions.

C. Any surfaces requiring priming, shall be prepared according to manufacturer's recommendations.

D. Install sealants to depths as shown or as recommended by sealant manufacturer. Smooth uneven surfaces.

F. Do not disturb compound by touching, washing, or otherwise until it has cured tack free.

G. Excess compound shall be removed from surfaces after curing.

H. Follow manufacturer's recommendations for painting over sealant.

End of Section

DIVISION 8 - DOORS & WINDOWS

SECTION 08100 - METAL DOORS AND FRAMES

Part 1 - General

1.01 Work Included:
- A. All material labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Hardware and Specialties - Section 08700

1.03 Quality Assurance:
- A. Standards:
  1. American Society for Testing and Materials
     - a. ASTM A-366, Steel Sheets, Carbon, Cold-Rolled, Commercial Quality.
     - b. ASTM A-569, Steel, Carbon, Hot-rolled Sheet and strip, commercial quality.
  2. Underwriters' Laboratories, Inc.
  3. Steel Door Institute (SDI): Recommended specifications for Steel Doors and Frames.
- B. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- C. Source Limitations: Obtain standard steel doors and frames through one source from a single manufacturer.
- D. Fire-Rated Door Frame Assemblies: Assemblies complying with IBC 2009 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire protection ratings indicated.
  1. Test Pressure: Test according to NFPA 252. After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches (1000 mm) or less above the sill.
  2. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.
  3. Smoke-Control Door Assemblies: Comply with NFPA 105.

1.04 Submittals:
- A. Shop Drawings: Product Data: Include construction details, material descriptions, core descriptions, label compliance, and finishes for each type of steel door and frame specified.
  1. Submit shop Drawings showing details for each frame and door type, elevations and details of construction. Provide a schedule of doors and frames referenced to detail and openings as shown on the Drawings.
     - a. Elevations of each door design.
     - b. Details of doors, including vertical and horizontal edge details.
     - c. Frame details for each frame type, including dimensioned profiles.
     - d. Details and locations of reinforcement and

preparations for hardware.
e. Details of each different wall opening condition.
f. Details of anchorages, accessories, joints, and connections.
g. Details of glazing frames and stops showing glazing.
h. Details of conduit and preparations for electrified door hardware and controls.

2. It is the manufacturer's responsibility to obtain templates of finish hardware. The shop Drawings must indicate all hardware applications to the doors and frames.
3. Begin fabrication only after receiving approved shop Drawings.
4. Qualification Data: For Installer.

1.05 Product Delivery, Storage and Handling:

A. All materials shall be protected for shipping so that they may arrive at the job site without undue damage or damage from storage at the job.
B. Deliver doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
C. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
D. Store doors and frames under cover at Project site. Place units in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber.
1. If wrappers on doors become wet, remove cartons immediately. Provide minimum 114-inch space between each stacked door to permit air circulation.

1.06 Project Conditions:

A. Field Measurements: Verify openings 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 opening dimensions and proceed with fabricating standard steel frames without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.07 Coordination:

A. Coordinate installation of anchorages for standard steel frames. 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 masonry. Deliver such items to Project site in time for installation.

1.08 Warranty: Provide manufacturer's standard warranty.

Part 2 - Products

2.01 Acceptable Manufacturers:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CURRIES Company; an ASSA ABLOY Group Company.
2. Steelkraft; and Ingersoll-Rand Company.
3. Or Approved Equal.

2.02 Materials:

A. Cold-Rolled Steel Sheet: ASTM A 100S/A 100SM, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 10111A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy (galvannealed) coating designation.

D. Electrolytic Zinc-Coated Steel Sheet: ASTM A 5911A 59 1M, Commercial Steel (CS), Class B coating; mill phosphatized.

E. Supports and Anchors: After fabricating, galvanize units to be built into exterior walls according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Provide items to be built into exterior walls, hot-dip galvanized according to ASTM A 153/A 153M.

G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E 136 for combustion characteristics.

H. Glazing: Comply with requirements in Division S Section "Glazing."

I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for I5-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

J. Grout: In masonry construction use grout for masonry as specified in Division 4. In stud walls use cementitious sprayed fire-resistive material manufactured by the following:

1. Monokote Type MK-6; W.R. Grace Construction Products.
2. Cafco 300; Isolatek International Corp.

2.03 Requirements: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces, unless otherwise indicated. Comply with ANSI A250.8.

A. Doors – Flush Panel: (SDI Door Type III, Style 2, Seamless):
   1. Door, as indicated on the Drawings shall be constructed of 16 gauge cold-rolled, stretcher leveled sheet steel. Doors shall be insulated with foamed urethane, full length and width of doors. Construct doors with smooth, flush surfaces without visible joints or seams on exposed face or vertical edges. Doors shall be 1-3/4” thick unless noted otherwise.
   2. Close top and bottom edges with a recessed channel end closure or a flush end closure treatment.
   3. Vertical Edges for Single-Acting Doors: Square edge unless beveled edge is indicated.
      a. Beveled Edge: 1/8 inch in 2 inches.
   4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.
   5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
   6. Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

B. Frames:
   1. Hollow metal frames shall be of 16 gauge cold-rolled, pickled steel, except that all frames for single doors over 3'-0" wide, frames for pairs of doors over 4'-0" wide and frames for doors over 9'-0" high shall be of 14 gauge steel. Frames shall be neatly mitered and continuously welded and ground smooth for invisible joints.
   2. Furnish anchors as shown on Drawings or as recommended by manufacturer, to secure frames to adjacent construction, formed of not less than 18 gauge galvanized steel. Install anchors at a maximum of 24' centers of jamb height.
   3. Frames against masonry or concrete are to be slush filled.
   4. Knock-down frames are not permitted.
   5. Frames against masonry or concrete are to be slush filled.
   6. Jamb Anchors:
      a. Masonry Type: Adjustable strap-and-stirrup or T - shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated

straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

b. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

c. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

d. Ceiling Struts: Minimum 3/8-inch-thick by 2-inch-wide steel.

e. Plaster Guards: Formed from same material as frames, not less than 0.016-inch thick.

7. Sidelight Frames: Provide closed tubular members with no visible face seams or joints; fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

C. Hardware Reinforcement:

1. Reinforcements for locks shall be 3/16" for fronts, with 14 gauge for roses and escutcheons. Hinge reinforcements shall be at least 10 gauge x 1 2" x 9". Provide steel strike and hinge reinforcement cover for frames.

D. Jamb Anchors: Provide number and spacing of anchors as follows:

1. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

a. Two anchors per jamb up to 60 inches in height.

b. Three anchors per jamb from 60 to 90 inches in height.

c. Four anchors per jamb from 90 to 120 inches in height.

d. Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 120 inches in height.

2. Stud-Wall Type: Locate anchors not more than 18 inches

from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

a. Three anchors per jamb up to 60 inches in height.
b. Four anchors per jamb from 60 to 90 inches in height.
c. Five anchors per jamb from 90 to 96 inches in height.
d. Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 96 inches in height.
e. Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.

E. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction.
1. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
2. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

F. Stops and Moldings:
1. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.
2. Fixed Frame Moldings: Formed integral with standard steel frames, minimum 5/8 inch high, unless otherwise indicated.
3. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

G. Labeled Doors and Frames:
1. Where doors and frames are called for on Drawings as labeled, their construction shall conform to all requirements and bear the appropriate U.L. label.

H. Steel Finishes
1. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
a. Finish standard steel door and frames after assembly.
2. Metallic-Coated Steel Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

a. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

3. Steel Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel; comply with SSPC-SP 3, "Power Tool Cleaning," or SSPC-SP *6/NACE* No.3, "Commercial Blast Cleaning."

4. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mils.

a. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

Part 3 - Execution

3.01 Fabrication:

A. All doors, and frames shall be cleaned of rust, grease and other impurities, and all welds ground and filled smooth, Metallic filler to conceal defects is not acceptable.

B. Doors and frames shall be mortised, reinforced, drilled, and tapped for all mortise hardware in accordance with Hardware schedule and templates furnished by the hardware supplier, except that drilling and tapping for surface door closers, door closer brackets, surface panic devices and/or other surface applied hardware shall be done in the field. Frames shall be accurate and done in a neat, workmanlike manner.

3.02 Installation:

A. Standard Steel Frames: Install standard steel frames for doors sidelights borrowed lights and other openings, of size and profile indicated. Comply with SDI 105.

1. Bituminous coating and grout: Any material lost, removed or damaged during transportation or installation shall be replaced.

2. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary

braces, leaving surfaces smooth and undamaged.

a. At fire-protection-rated openings, install frames according to NFP A 80.
b. Install frames with removable glazing stops located on secure side of opening.
c. Install door silencers in frames before grouting.
d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
e. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed expansion anchors.
   a. Floor anchors may be set with powder-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.
4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar as specified in Division 4 Section "Unit Masonry Assemblies."
6. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.
7. Installation Tolerances: Adjust standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

B. Standard Steel Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Standard Steel Doors:
      a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
      b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
      c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
      d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum ¾ inch.
   2. Fire-Rated Doors: Install doors with clearances according to NFP A 80.
   3. Smoke-Control Doors: Install doors according to NFPA 105.

C. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with standard steel door and frame manufacturer's written instructions.

3.03 Adjusting and Cleaning:

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

B. Clean grout and other bonding material off standard steel doors and frames immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

D. Galvannealed Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions. Do not use abrasive, caustic or acid cleaning agents.

E. Protect doors and frames from damage until final acceptance by Architect. Replace/repair any damaged items as directed above.

End of Section

DIVISION 8 - DOORS AND WINDOWS

SECTION 08400 - ENTRANCES AND STOREFRONTS

PART 1 - General

1.01 Work Included:
- A. All materials, labor, services, and incidentals necessary for the completion of all work as shown on the Drawings and specified herein.
- B. All necessary anchors and accessories required for the complete installation of the Storefront units.
- C. Perimeter Sealant.

1.02 Related Work Specified Elsewhere:
- A. Sealants - Section 07900.

1.03 Performance And Testing Requirements:
- A. Provision for Thermal Movements:
  1. Storefront framing systems shall be designed to provide for thermal movement of all component materials resulting from a cycling temperature range of 180 degrees F. without causing buckling, stresses on glass, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or other detrimental effects.
- B. Test Procedures and Performance:
  1. Air Infiltration Test, Fixed Unit:
     a. Test Fixed Unit in accordance with ASTM E 283 at static air pressure difference of 6.24 psf.
     b. Air infiltration shall not exceed .06 cfm per square foot of fixed wall area.
  2. Water Resistance Test:
     a. Test unit in accordance with ASTM E 331.
     b. There shall be no uncontrollable water leakage at a static test pressure of 6.24 psf. (12.00 psf at doors)
  3. Uniform Load Deflection Test:
     a. Test in accordance with ASTM E 330.
     b. Design and size members to withstand dead laods and live loads caused by pressure and suction of wind as calculated in accordance with 2015 International Building Code.
     c. Deflection under design load shall not exceed L/175 of the clear span.
  4. Uniform Load Structural Test:
     a. Test in accordance with ASTM 330 at a pressure 1.5 times the design wind pressure in 1.03.3.b.
     b. At conclusion of the test, there shall be no glass breakage, permanent damage to fasteners, storefront parts, or any other damage which would

cause the storefront to be defective.

6. Condensation Resistance Test (CRF):
   a. Test unit in accordance with ASTM 1502.7.
   b. Condensation Resistance Factor (CRF) shall be not less than 70.
7. Thermal Transmittance Test (Conductive U Value):
   a. Test in accordance with ASTM 1503.1.
   b. Conductive thermal transmittance (U Value) shall be not more than .44 BTU/HR/degree F/sf. Unless otherwise specified, units tested for condensation resistance and thermal transmittance shall be glazed with no more than two lites of clear, uncoated, annealed glass. Sealed insulating glass shall be of standard construction.

1.04 Quality Assurance:

A. Provide test reports from AAMA accredited laboratories certifying the performance as specified in 1.05.

B. Test reports shall be accompanied by the storefront manufacturer=s letter of certification stating that the tested storefront meets or exceeds the referenced criteria for the appropriate storefront type.

1.05 Submittals:

A. Contractor shall submit shop drawings to the Architect for his approval. Drawings shall show scale elevations and sections. Full size sections shall be shown only when needed for clarity. Drawings shall show construction of all parts of the work, including metal and glass thickness, methods of joining, details of all field connections and anchorage, fastening and sealing methods, metal finishes and all pertinent information. Relationship to other work should be clearly indicated. No work shall be fabricated until shop drawings for that work have been finally approved for fabrication.

1.06 Delivery, Storage And Handling:

A. Deliver, handle, store and protect system components in accordance with manufacturer's instructions.

B. After erection, the Contractor shall adequately protect all exposed portions of the grid framing metal work from damage by grinding and polishing machines, plaster, lime, acid, cement, or other harmful compounds.

C. Immediately prior to final acceptance of building, inspect all aluminum framing for weather tightness and make all necessary repairs and adjustment.

1.07 Warranties:

A. Total Storefront System -

1. The responsible contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total storefront installation. This includes the framing, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc. as it relates to air, water and structural adequacy as called for in the specifications and approved shop drawings. A manufacturer's material warranty shall be provided for a minimum of 5 years from substantial completion.
2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor during the warranty period.

1.08 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

PART 2 - PRODUCTS

2.01 Entrance and Storefront System:
- A. EFCO Corporation S-403 Wall Thermal Storefront System.
- B. Kynar 500 – color to be selected by Architect from manufacturer's standard colors.

2.02 Material:
- A. Aluminum:
  1. Extruded aluminum shall be 6063-T5 or T6 alloy and temper.
- B. Glass:
  1. 1" Nominal Thickness Insulating Tempered Glass - 1/4" tinted glass @ exterior side and 1/4" 100 Low E glass @ interior side of **2"** air space - **both sides tempered.** Low Emissivity coating on 3rd glass surface from building exterior.
     a. Type Example: Versalux Green 2000 Insulated with Low-E, Visteon (Ford). **Note: Color will be a factor in approval.**
- C. Thermal Barrier:
  1. The thermal barrier shall be internally connected and locked celcon insulator clips.
- D. Dissimilar Metals:
  1. All dissimilar metals must be properly insulated to prevent galvanic action.
- E. Fasteners:
  1. All exposed fasteners shall be aluminum or stainless

steel.

2.03 Fabrication - Fixed Units:

A. General:

1. All aluminum frame extrusions shall have a minimum wall thickness of .180 inches.
2. All exposed work shall be carefully matched to produce continuity of line and design with all joints. System design shall be such that raw edges will not be visible at joints.

B. Frames - for 1" glazing (refer to Drawings for actual dimensions):

1. Depth of frame shall not be less than 4 inches.
2. Face dimension shall not be less than 2 inches
3. Covers shall connect to frame back members with internally connected and locked celcon insulator clips.
4. Frame components shall be screw spline construction.

C. Glazing

1. All units shall be ”dry” glazed with E.P.D.M. gasket on both exterior and interior.

PART 3 EXECUTION

3.01 Inspection:

A. Job Conditions:

1. All openings shall be prepared to the proper size and shall be plumb, level and in the proper location and alignment as shown on the Drawings.

3.02 Installation:

A. Use only skilled tradesmen with work done in accordance with approved shop drawings and specifications.

B. Storefront system shall be erected plumb and true, in proper alignment and relation to established lines and grades.

C. Furnish and apply sealing materials to provide a weather tight installation at all joints and intersections and at opening perimeters.

D. Sealing materials specified shall be used in strict accordance with the manufacturer’s printed instructions and shall be applied only by mechanics specially trained of experienced in their use. All surfaces must be clean and free of foreign matter before applying sealing materials. Sealing compounds shall be tooled to fill the joint and provide a smooth finished surface.

3.03 Anchorage:

A. Adequately anchor to maintain positions permanently when

subjected to normal thermal movement, specified building movement, and specified wind loads.

3.04 Protection and Cleaning:

A. The general contractor shall protect the aluminum materials and finish against damage from construction activities and harmful substances. The contractor shall remove any protective coatings as directed by the Architect and shall clean the aluminum surfaces as recommended for the type of finish applied.

End of Section

SECTION 08700 - FINISH HARDWARE

Part 1 - General

1.01 Work Included:

A. All materials, labor services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:

A. Metal Doors and Frames - Section 08100

1.03 Quality Assurance:

A. This material shall be procured from a source of supply approved by the Architect as having a member of their firm registered by the American Society of Contracting Architectural Hardware Consultants, and with a proven record of several years of satisfactory experience in contract builder's hardware, both in furnishing material and properly servicing jobs. The supplier also must be an established contract builder's hardware firm who meets all the above requirements, and who maintains and operates an office, display room and stock.

1.04 Submittals:

A. Prepare a complete schedule including all items processed for each opening and other miscellaneous items, and submit four copies to the Architect for approval within 30 days submitted within that time, the supplier shall furnish the hardware specified by catalog number.

B. Indicate on schedule name of manufacturer after each item.

C. Upon receiving the approved schedule, the hardware supplier shall immediately forward a copy to the metal frame suppliers, where applicable; and as soon as they receive approved shop drawings, they will immediately forward a complete set to the hardware supplier who can then check the applications and make any necessary minor revisions. If revisions are necessary, notify Architect immediately.

D. Mark each item of hardware for opening on which it is to be used and deliver a complete schedule to the contractor when hardware is delivered.

1.05 Schedule:

A. This specification describes the quality, character and function that is required of items of hardware; however, it is not intended to mention each particular item.

B. It is the responsibility of the supplier to thoroughly detail the entire project to assure that the items specified will properly function in the indicated locations.

C. Quantities shall be determined by the bidder. Part 2, following, indicates the type and function of material applicable to the typical opening. Should an unlisted opening require different type of function of hardware than that specified, for similar opening, notify the Architect, and provide hardware for unlisted openings within the bid.

SECTION 08700 - FINISH HARDWARE

Part 2 - Products

2.01 Finish Hardware:

A. Standards of Quality:

1. Codes, specifications and published recommendations, latest editions of the following are hereby made part of this section of the specifications in so far as they apply to the material or work called for.
   a. National Builders Hardware Association (NBHA)
   b. American Society for Testing Materials (ASTM)
   c. Underwriters Laboratories (UL)
   d. National Fire Protection Association (NFPA)
   e. Code of Ethics of ASAHC & NBHA
   f. Federal Emergency Management Agency (FEMA)
2. Federal Specification, (ANSI Specifications):
   a. Hinges: FF-H-116C (ANSI A156.1)
   b. Locks and Door Trim: FF-H-106A (ANSI A 156.2)
   c. Auxiliary Locks: FF-H-106A (ANSI A 156.5)
   d. Exit Devices: FF-H-106A, FF-H-111B, FF-L486 (ANSI A156.3).
   e. Door Closers: FF-H-121C (ANSI A 156.4)
   f. Shelf and Miscellaneous Hardware: FF-H-00116 (ANSI A156.6).
   g. All Door hardware: Comply with ADAAG where applicable.

B. General:

1. All hardware relating to hollow metal doors and frames shall be to standard templates of each respective hardware manufacturer for items furnished.
   a. The related suppliers such as hollow metal doors and frames and such others as may be required will furnish the hardware supplier one copy of each of their approved shop drawings for proper coordination of their work and the finish hardware.

C. Manufacturers and Requirements:

1. Hardware manufacturers and brand names are for a guide as to type and standard required and all such hardware furnished must meet these standards as far as quality, weight, finish and design.

D. Keying:

1. All locks and cylinders to be masterkeyed as directed by the Architect/Owner.
2. Keys: Furnish the following keys:
   a. 2 change keys each lock or cylinder
   b. 6 masterkeys
   c. all EXTERIOR locks and cylinders shall be Primus Schlage Key System and keyed to Owner's Primus Master Key system.

2.02 Hardware Sets:

Hardware Group No. 001: Provide each PR door(s) with the following:

Quantity		Description	Model Number	Finish	Mfr
2	EA	CONTINUOUS HINGE	224HD HEIGHT AS REQ	628	IVE
1	EA	MULLION	KR4954 HEIGHT AS REQ	689	VON
1	EA	PANIC HARDWARE	CD99EO LENGTH AS REQUIRED	626	VON
1	EA	PANIC HARDWARE	CD99NL-OP LENGTH AS REQUIRED	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
3	EA	MORTISE CYLINDER	20-061 ICX	626	SCH
4	EA	PRIMUS CORE ONLY	20-740	626	SCH
2	EA	SURFACE CLOSER	4040XP SHCUSH MTG BKTS, SPCRS & PLATES AS REQ	689	LCN
2	EA	OFFSET DOOR PULL	8190-0-O	630	IVE
2	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	SEALS	700SA H & J (INSTALL PRIOR TO OTHER HARDWARE)	AL	NGP
2	EA	DOOR SWEEP	C627A LENGTH AS REQ	AL	NGP
1	EA	THRESHOLD	896V LENGTH AS REQ	AL	NGP

PROVIDE CONNECTIONS, ETC. FOR ACCESS, CARD READER, ETC. AS REQUIRED BY DISTRICT HARDWARE PERSONNEL.

The following list of products and manufactures are acceptable for this project.

Product	Manufacture and Approved Equals
1. Hinges	A. Ives B. Hager C. Bommer
2. Continuous Hinges	A. Pemko B. Roton C. Select
3. Key System	A. **Schlage (No substitutions)**
4. Lock/Latch	A. **Schlage (No substitutions)**
5. Closers	A. **LCN (No substitutions)**
6. Exit Devices	A. **Von Duprin (No substitutions)**
7. Push/Pull/Plates	A. Ives B. Rockwood C. Trimco

8. Misc. Stop, Bolts, etc.	A. Ives B. Glynn-Johnson C. Rockwood
9. Door Seal/Thresholds	A. National Guard B. Pemko C. Reese

Each Product, by category, shall be the product of one manufacture. Complete lockset, including keyed lock cylinder, shall be the product of one manufacturer unless noted otherwise.

Part 3 - Execution

3.01 Installation:

A. Install all finish hardware in strict accordance with the manufacturer's recommendations and printed instructions. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, reinstall each item. Do not install surface mounted items until finishes have been completed on the substrate.

B. All hardware relating to hollow metal and aluminum doors and frames shall be to standard templates of each respective hardware manufacturer for items furnished.

C. Mounting Heights: Mount Hardware units at heights recommended by the National Builders Hardware Association, except as specifically indicated or required to comply with governing regulations, or as may be otherwise directed by the Architect.

3.02 Prior to the Final Inspection:

A. The supplier shall check all closers for proper operation after they have been installed and adjusted by the Contractor. He shall verify the keying to ensure proper location of locksets and shall assist the Contractor in correcting faulty operation of any locks.

B. Within 30 days after the acceptance of the entire project, the Contractor shall be responsible for this supplier meeting with the maintenance custodian at the job site for the purpose of instructing him thoroughly in the proper repair and adjustment of all finish hardware items, and items, and shall present to the custodian a full complement of tools to be used.

End of Section

DIVISION 8 - DOORS AND WINDOWS

SECTION 08800 - GLAZING

Part 1 - General

1.01 Work Included:
- A. The General Conditions and applicable sections of Division 1 shall apply to this entire section.
- B. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
- A. Standards:
  1. Federal Specifications
     a. DD-G-451d, Glass, Plate, Sheet (for glazing and other uses).
  2. Flat Glass Jobber Association: Glazing Manual.
- B. Comply with UBC 2406, and ANSI 97.1 with testing requirements of 16 CFR 1201, Cat II.

1.03 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Glass Types and Examples:
  1. 1" Nominal Thickness Insulating Tempered Glass - 1/4" tinted glass @ exterior side and 1/4" 100 Low E glass @ interior side of **2"** air space - **both sides tempered.** Low Emissivity coating on 3rd glass surface from building exterior.
     a. Type Example: Versalux Green 2000 Insulated with Low-E, Visteon (Ford). **Note: Color will be a factor in approval.**
- B. Glazing Compounds and Preformed Glaze Sealants: Suitable type as approved for the installation, in accordance with Glazing Materials section of the FGJA Glazing Manual.
- C. Glazing Accessories: Provide miscellaneous materials such as cleaners, primers, setting blocks, spacers, filler rods, beads, etc., as required for complete installation.

SECTION 08800 - GLAZING

Part 3 - Execution

3.01 Installation:

A. Glazing-General:

1. Items to be glazed may be field-or shop-glazed, using glass of the quality and thickness specified or indicated. Preparation of surrounds and glazing, unless otherwise specified, shall be in conformance with the details and general conditions governing glazing in the FGMA Glazing Manual, beads or stops which are furnished with the items to be glazed shall be used to secure the glass in place.
2. All glass shall be set with the waves parallel to the sill. Glass that has been misordered, i.e. with the width and height dimensions not properly correlated with the Drawing process in manufacturing, resulting in pronounced waviness at right angles to the sill, will be rejected.
3. Install plastic glass edging strips where indicated. Joints shall be as tight and imperceptible as possible.

B. Breakage: Replace all glass broken during or after setting. Breakage due to accident or carelessness or other will be charged to trade at fault.

C. Inspection: Prior to final acceptance of project, inspect all work done under this section and make all necessary adjustments, repairs or replacements of defective work, and clean all glass surfaces.

D. Clean-up: Remove all glass cuttings, scraps, packaging and rubbish upon completion of the work.

End of Section

DIVISION 9 - FINISHES

SECTION 09250 - GYPSUM WALLBOARD

Part 1 - General

1.01 Work Included:
A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
A. Standards:
1. American Society for Testing and Materials:
a. ASTM C-36, Gypsum Wallboard
b. ASTM C-475, Joint Treatment for Gypsum Wallboard Construction.
B. Federal Specifications:
1. FS-SS-L-30D, Type III, Grade X, Class 1, Gypsum Wallboard.

1.03 Submittals:
A. Provide submittals in the form of samples, and documentation, to the Architect for review.

1.04 Product Delivery, Storage and Handling:
A. All materials shall be delivered to the job site with manufacturer's labels intact and stored in an enclosed shelter providing protection from damage and exposure to the elements.

Part 2 - Products

2.01 Gypsum Wallboard:
A. Type: **Fire-rated**, ASTM C-36.
B. Size: 5/8" thick x 48" wide x 96" or as required.
C. Edges: Tapered.
D. Location: All gypsum board.

2.02 Fasteners:
A. Screws: Self-drilling, self-tapping, bugle head, Type S.
B. Nails: Annular ring: GWB-54.

2.03 Joint Treatment Materials:
A. Joint Tape: Perforated Tape, ASTM C-475.
B. Joint Compound: ASTM C-475.

2.04 Accessories:
A. Metal Edge: Similar to United States Gypsum Trim No. 402.

Part 3 - Execution

3.01 Installation:
A. Apply gypsum board to horizontal surfaces first, then to vertical.
B. Install gypsum board parallel to studs at vertical surfaces.
C. To minimize joints, use panels of maximum practical lengths.
D. Position all ends and edges of gypsum board over nailing or fastening members. Fit ends and edges closely; do not force

together. Stagger end joints.

E. Cut ends, edges, scribe or make cutouts within field of panel in a workmanlike manner.

F. Install trim at all intersections of gypsum board and other surfaces. Provide corner bead at all vertical or horizontal corners.

G. Fasteners:

1. Drive fasteners in field of panel first, work toward ends and edges.
2. Perimeter fasteners shall be a least 3/8" from ends and edges.
3. Attach panels to wood framing members with specified nails spaced out 8" for ceiling, and 8" o.c. at ends and 12" o.c. at each support.
4. Drive nail head slightly below surface of panel in a uniform dimple without breaking face paper.
5. Screw fasteners shall be spaced 12" o.c. at each support in the field of the board and 8" o.c. at all edges and ends.
6. Screws shall be power-driven with an electric screwdriver and screw heads shall provide a slight depression below surface of panel without breaking face paper.

3.02 Joint Treatment:

A. Treat all exposed joints and trim with a three-coat approved system applied in strict accordance with manufacturer's recommendations.

3.03 Clean-Up:

A. Use all necessary care during execution of the Work of this Section to prevent undue scattering of drywall scraps and dust and to prevent tracking of joint and finishing compounds onto floor surfaces. On completion of each installation segment in a room or space, promptly pick up and remove from the working area all scraps, debris and surplus material.

End of Section

DIVISION 9 - FINISHES

SECTION 09900 - PAINTING

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this entire section of the work.
- B. Consult Drawings, finish schedules, details and specification section.

1.02 Quality Assurance:
- A. All painted surfaces shall be uniform in color, texture and finish to the satisfaction of the Architect.

1.03 Submittals:
- A. Submit manufacturer's specifications, including paint label analysis and application instructions for each material specified.
- B. Submit color samples for review of color and texture.
- C. Provide samples of all natural and stained wood finishes.
- D. Final samples: Prepare samples of finishes on the job to the satisfaction of the Architect. If required, a 4' x 8' portion of wall surface finished as final sample.

1.04 Product Deliver, Storage and Handling:
- A. Materials shall be delivered to the project site in strong, undamaged, waterproof containers with manufacturer's label intact. Materials in previously opened or unsealed containers, are not acceptable.
- B. Include on label of container: Manufacturer's name, type of paint, number and application instructions.
- C. Immediately upon delivery to the project site, all painter materials shall be stored and locked in a watertight shed with floor well off the ground. The shed shall remain locked at all times except for adding or removing materials.
- D. No materials of any manufacturer will be allowed on the project site any time during construction except those of the manufacturers specified or approved by the Architect.

1.05 Job Conditions:
- A. Comply with manufacturer's recommendations as to environmental conditions under which coating and coating systems can be applied.
- B. Do not apply finishes in areas where dust is being generated or where work in progress may affect finish quality.
- C. Protect finished work of other trades, and all surfaces not being painted concurrently, or not to be painted.

Part 2 - Products

2.01 General:
- A. The following specifications for finishes is not intended to mention every particular item which will receive painter finish, but is intended to establish type and quality of finish which shall be required on various materials.
- B. **Products of Sherwin-Williams are specified herein to simplify descriptions of types and qualities of finishes required only.**

SECTION 09900 - PAINTING

Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.

C. Wherever the abbreviation "SW" appears in the following detailed specification, it shall be understood to mean Sherwin-Williams.

D. Primers shall be as specified by manufacturers of finish paint used and as approved by the Architect.

2.02 Acceptable Manufacturers:

A. Sherwin-Williams.

B. PPG Industries.

C. Cook Paint and Varnish Co.

D. Pratt and Lambert.

E Kelly-Moore.

2.02 Exterior Finishes:

A. Enamel on Ferrous Metals:

1. One coat SW Kem Kromik Primer, (Alkyd primer).
2. Two coats SW Industrial Enamel, (Alkyd gloss enamel).

B. Enamel on Exterior Door Frames and Doors:

1. Prepare existing painted surfaces to remain.
2. Two coats SW Industrial Enamel, (Alkyd gloss enamel).

C. Enamel on Galvanized Metal:

1. Prepare existing painted surfaces to remain and One Coat SW Galvite primer.
2. Two Coats SW Industrial Enamel, (Alkyd gloss enamel).

D. Enamel on existing Exterior Concrete Block, Split Faced Veneer, Cast-In-Place Concrete:

1. Prepare existing painted surfaces to remain as noted above – spot primer to be Pro Industrial Heavy Duty Block Filler.
2. Two coats SW A-100 Semi-Gloss Latex Enamel with M-1 Advanced Mildew Treatment as part of final topcoat.

2.03 Interior Finishes:

A. Enamel on Metal: All miscellaneous and ornamental metal items which are left exposed, hollow metal doors and frames.

1. Shop coat by others - touch up as required.
2. Two coats SW Promar 200 Semi-Gloss. Enamel, (Alkyd semi-gloss enamel).

B. Enamel on Concrete Block:

1. One coat SW Promar 200 Block Filler (vinyl acrylic latex).
2. Two coats SW Promar 200 Semi-Gloss Enamel.

C. Enamel on Gypsum Board Ceilings/Facias/Walls

1. One coat SW Promar 200 Wall Primer with Medium Texture. (Vinyl Acrylic Latex Wall Primer.)
2. Two coats SW Promar 200 Semi-Gloss Latex Enamel.

D. Enamel on Wood Trim:

1. One coat SW Promar 200 Alkyd Enamel Primer/Undercoat.
2. Two coats SW Promar 200 Semi-Gloss Latex Enamel.

E. Enamel on Exposed Metal Piping:

1. One coat SW Galvite primer.
2. Two coats SW Promar 200 Semi-Gloss Latex Enamel.

SECTION 09900 - PAINTING

Part 3 - Execution

3.01 Inspection:

A. Notify Contractor of any surface not in proper condition to be finished before proceeding with the work. Starting work will constitute the painter's acceptance of preceding work, and conditions under which finish will be applied and his assumption of responsibility for results to be obtained.

3.02 Preparation of Surfaces:

A. Split Faced Concrete Block and Concrete Panels:
   1. Repair cracks and irregularities to provide uniform surface texture.
   2. Apply solution of bleach and water to kill existing mold and mildew.
   3. Pressure wash the entire split faced CMU and concrete surfaces to remove bleach as well as loose paint.
   4. Spot prime the bare CMU and concrete where necessary.

B. Ferrous Metal Surfaces:
   1. Remove rust and scale, clean grease or oil surfaces with turpentine or benzine before painting.

3.03 Application:

A. Number of coats and quality of finish shall be in accordance with these specifications, which requires the use of material which will product first quality finish if properly applied.

B. Apply coats of material in strict accordance with manufacturer's currently published specifications, except where requirements of these specifications are in excess or manufacturer's requirements.

C. Except as otherwise approved by the Architect or advised by the manufacturer, the first two coats of painter's finish shall be applied by roller or brush application. Finish coats may be applied by spray application.

D. Comply with recommendation of product manufacturer for drying time between succeeding coats allow additional as required until finish is dry.

E. All work where a coat of material has been applied must be inspected and approved before application of succeeding coat, otherwise, no credit for the coat well be given. Notify Architect when a particular coat has been completed for inspection and approval.

F. First Coat of all finishes shall be white.

G. Remove all hardware, accessories, machined surfaces, and similar items in place and not to be finish-painted or provide surface-applied protection prior to surface preparation and painting operations.

3.04 Clean-up:

A. Clean and paint spots from work and touch-up or otherwise repair any defective or damaged work.

B. Remove all surplus materials and equipment after work is completed.

C. Leave entire job clean and acceptable to the Architect.

End of Section