SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1) - GENERAL

a) RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

b) SUMMARY

i) Extent of concrete work is shown on drawings. Concrete paving, walks, curbs and gutter, equipment foundations and other miscellaneous concrete shall comply with this section unless noted otherwise.

ii) Granular base or drainage fill course for support of slabs or grade is specified in this Section.

iii) Quality control testing during construction is as specified in Section 01 45 00 and here in Section 07 92 01.

iv) Sealing expansion and control joints in concrete is specified in Division 07.

v) Membrane vapor barriers are specified in Division 07.

c) SUBMITTALS

i) Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, finish materials, and (if requested by Architect) other products.

ii) Shop Drawings: Reinforcement: Submit original shop drawings prepared by for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures," showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement for openings through concrete structures. Show location of proposed construction joints. Locate all openings, sleeves, trenches, depressions, joints, inserts, and other items affecting the reinforcement and placing of concrete.

iii) Samples: Submit samples of materials as requested by Architect, including names, sources, and descriptions.

iv) Submit a complete description of proposed curing methods for all types of conditions.

v) Laboratory Test Results: Submit laboratory test reports for concrete materials and mix design test. Submit reinforcing steel products certificates of mill analysis.

d) QUALITY ASSURANCE

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

(1) ACI 301, "Specifications for Structural Concrete for Buildings."
(2) ACI 318-95, "Building Code Requirements Structural Concrete." The term "Building Official" used in this Standard shall also be interpreted to mean the Architect.
(3) ACI 304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete."
(4) ACI 305R, "Hot Weather Concreting."
(5) ACI 306R, "Cold Weather Concreting."
(6) ACI 309R, "Identification and Control of Consolidation Related Surface Defects in Formed Concrete."
(7) ACI 315, "Details and Detailing of Concrete Reinforcement."
(8) Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."
(9) ACI 305R, Guide for Measuring, Mixing, Transporting and Placing Concrete.
(10) Standard Building Code (Current Adopted Edition).
11. ANSI A117.1 Accessible and Usable Buildings and Facilities

ii) Concrete Design Testing Service: Engage a testing laboratory acceptable to Architect to design and test proposed concrete mixes.

iii) Quality Control Testing Service: A testing laboratory selected by the Architect shall perform quality control testing in accordance with Part 3. This service shall be employed by the Owner.

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

v) Exposed surfaces throughout the project shall have the same texture and color for like locations.

vi) Installer Qualifications: Provide at least one person thoroughly familiar with specification requirements, completely trained, qualified to perform the work, who shall be present at all times on the project site directing the work. Provide additional skilled personnel to ensure installation in strict accordance with design documents.

vii) Allowable tolerances for concrete placement:

(1) Variation from level or grades specified or indicated; unless otherwise noted:

(a) Slabs
(1) In any 10 foot length ¼ inch
(2) In any bay or in any 20 foot length and maximum for the entire length _ inch

(2) Variation of the linear building lines from established position in plan and related position of columns, walls and partitions:

(a) In any bay ¼ inch
(b) In any 20 foot length_ inch
(c) Maximum for the entire length ½ inch

(3) Variation in the sizes and location of sleeves, floor openings, and wall openings ¼ inch

(4) Variation in the thickness of slabs ¼ inch

(5) Footings, variations in:

(a) Dimensions in plan 1 inch
(b) Misplacement of eccentricity: 2 percent of the footing width in the direction of misplacement but not more than 2 inches
(c) Thickness:
(1) Decrease 5% or maximum 2 inches
(2) Increase No limit

(6) Steps, variations in:

(a) Each flight:
(1) Rise _ inch
(2) Run ¼ inch
(b) Consecutive steps:
(1) Riser 1/16 inch
(2) Tread _ inch

e) PROJECT CONDITIONS

i) Protection of Footings Against Freezing: Cover completed work at footing level with temporary or permanent cover to protect footings and adjacent subgrade against freezing; maintain cover for time period as necessary.

ii) Protect adjacent finish materials against spatter during concrete placement. Promptly remove any spatter and restore finishes.

PART 2) - PRODUCTS

a) FORM MATERIALS

i) Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete

Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

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

iii) Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

iv) Form Ties: Factory-fabricated, adjustable-length, removable or snap off metal form ties, designed to prevent form deflection and to prevent spilling concrete upon removal. Provide units which will leave no metal closer than 1½" to surface. Provide ties which, when removed, will leave holes not larger than 1" diameter in concrete surface.

v) Design and erection of formwork is the Contractor's responsibility.

b) REINFORCING MATERIALS

i) Reinforcing Bars: ASTM A615, Grade 60, deformed.

ii) Steel Wire: ASTM A82, plain, cold-drawn steel.

iii) Welded Wire Fabric: ASTM A185, welded steel wire fabric.

iv) Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2). Do not use wood, brick, driven rebars, whole or broken CMU, or other unspecified materials.

c) CONCRETE MATERIALS

i) Portland Cement: ASTM C150, Type I or II. Use one brand of cement.

ii) Normal Weight Aggregates: ASTM C33 and as herein specified. Provide aggregates from a single source for exposed concrete. Maximum size shall be 1" for slabs, 1½" for footings, and not more than 20% of the narrowest dimension between the sides of the forms or 75% of the minimum distance between parallel reinforcing, whichever is smaller.

iii) Lightweight Aggregates: ASTM C330.

iv) Water: Drinkable.

v) Air-Entraining Admixture: ASTM C260, certified by manufacturer to be compatible with other admixtures.

vi) Water-Reducing Admixture: ASTM C494, Type A, and containing not more than 0.1 percent chloride ions and compatible with other admixtures.
vii) All other materials not specifically described but required for a complete and proper installation shall be as selected by the Contractor subject to the Architect's approval.

viii) Prohibited Admixtures: Calcium chloride thyocyanates or admixtures containing more than 0.1 percent chloride ions are not permitted.

d) RELATED MATERIALS

i) Liquid Membrane-Forming Curing Compound: Liquid type membrane-forming curing compound complying with ASTM C309, Type I, Class A. Moisture loss not more than 0.055 gr./sq.cm. when applied at 200 sq.ft./gal.

(1) Subject to compliance with requirements, provide products of one of the following:

Master Builders
Euclid Chemical Company
The Burke Company
Sonneborn-Rexnord
Upco Chemical/USM Corporation
L&M Construction Chemicals
Gifford-Hill & Company
Protex Industries, Inc.
W.R. Meadows Company

(2) Application:

(a) Exterior surfaces and final application and on interior slabs which will be left exposed: 30% solids water emulsion acrylic curing and sealing compound.
(b) Interior surfaces: 20% solids water emulsion acrylic curing and sealing compound.
(c) Surfaces to receive ceramic tile, pavers, quarry tile, painted coating, or other material not compatible with curing and sealing compound: Dissipating type water emulsion curing compound, compatible with subsequent surface finish.

ii) Sheet materials shall conform to ASTM C171.

iii) Burlap cloth made from jute or kenaf and weighing approximately 9 oz. per sq.yd. for moist curing. Provide two layers.

e) GRANULAR FILL

i) Provide 4" compacted thickness crusher run aggregate under all slabs on grade.

f) PROPORTIONING AND DESIGN OF MIXES

i) Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 318.

ii) Submit written reports (including all laboratory tests or historical test data, including calculations) to Architect and Structural Engineer for each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.

iii) Design mixes to provide normal weight concrete with the following properties as indicated.

General Concrete: **Normal weight, 3000 psi,** 28-day compressive strength. Minimum 5.3 bags or 498 lbs. cement, slump 3"-5" w/c ratio of 0.50 maximum. For pump mix add 47 lbs., 0.5 bag, of cement. Slump for pump mix not to exceed 6".

iv) Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

v) Admixtures:

Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F (10°C).

Use high-range water-reducing admixture in pumped concrete, concrete for industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water/cement ratios below 0.50.

Use air-entraining admixture in all concrete except footings. Add air- entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or-minus 1½ percent within following limits:

Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or subjected to hydraulic pressure: 5%

Other Concrete: 3%

Use admixtures in strict compliance with manufacturer's directions.

F. Fly Ash (Pozzolans) ASTM C618 may be partially substituted for cement not to exceed 25% of cement content. Adjust amount of fly ash depending on the weather conditions.

g) CONCRETE MIXING

Ready-Mix Concrete: Comply with requirements of ASTM C94, and as herein specified. During

hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required.

Water shall not be added to the mix at the job site except as directed by the laboratory that designed the mix. If water is added then an amount of cement shall be added to maintain the water/cement ratio. The mix shall then be turned 50 revolutions after adding water and cement. A slump test shall be taken of all concrete to which water was added. **All concrete in excess of slump shall not be used.**

PART 3) - EXECUTION

a) GENERAL

i) Coordinate the installation of joint materials, embedded items, and vapor retarders with placement of forms and reinforcing steel.

ii) Notify Architect at least 72 hours in advance of placing concrete to permit inspection of forms and reinforcing. All embedded items of whatever nature shall be in place at least 24 hours prior to scheduled concrete pour and prior to inspection.

b) FORMS

i) Design, erect, support, brace, and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347. The design and engineering shall be the sole responsibility of the Contractor.

ii) Design formwork to be readily removable without impact, shock, or damage to cast-in-place concrete surfaces and adjacent materials.

iii) Construct forms 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, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

iv) Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

v) Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

vi) Chamfer exposed corners and edges exposed to view, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

vii) 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.

viii) 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. Retightening forms and bracing after concrete placement to eliminate mortar leaks and maintain alignment.

c) VAPOR RETARDER INSTALLATION

Following leveling and tamping of subgrade base, place vapor retarder sheeting with longest dimension parallel with direction of pour.

d) PLACING REINFORCEMENT

i) Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.

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

iii) 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.

iv) Place reinforcement to obtain at least minimum coverages 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. Concrete coverage shall be as shown on the Project Drawings. Do not splice main reinforcing unless shown on the drawings. Continuous bars shall be lapped in accordance with ACI 318 Class B lap splices, unless noted otherwise, and corner bars shall be provided.

v) Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

e) JOINTS

i) Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Architect. **Permanent metal or plastic construction joints are not acceptable.** Dowel joints where indicated.

ii) Provide keyways at least 1½" deep in construction joints in walls, slabs, and footings.

iii) Water Stops: Provide water stops in construction joints as indicated. Install water stops to form continuous diaphragm in each joint. Make provisions to support and protect exposed water stops during progress of work. Fabricate field joints in water stops in accordance with manufacturer's printed instructions.

iv) Isolation Joints in Slabs on Grade: Provide isolation joints in slabs-on-grade at points of contact between slabs on grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.

v) Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs on grade to form panels of patterns as shown. Use saw cuts _" x _ slab depth. Form contraction joints in floor slabs by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate. If joint pattern is not shown, provide joints not exceeding 25' in either direction and located as acceptable to the Architect. Provide control joints in walks at 5'-0" o.c. and in curbs and gutters at 10'-0" o.c.

vi) Expansion Joints: Provide expansion joints as indicated in exterior slabs-on grade but not less than ¾" wide joints at 75'-0" maximum on center each way. Provide ½" expansion joints in sidewalks and curbs and gutters at 50'-0" on center. Provide ½" expansion joints where exterior slabs abut walls or columns. Expansion joints shall be sealed with traffic sealant as specified in Division 07.

f) INSTALLATION OF EMBEDDED ITEMS

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

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

iii) Conduit Work: Coordinate operations with Division 26, Electrical.

(1) Slab on Grade: Conduits shall be located below slabs on grade and shall maintain same cross sectional concrete area. Install conduits below vapor barrier in aggregate base or fill.

(2) Seal vapor barrier penetrated by conduit.

D. Detectable Warnings: Install detectable warning tile at all exterior ADA curb ramps unless another material is indicated. Pour and float concrete. Set tile by tamping into fresh concrete removing all entrapped air beneath.

g) PREPARATION OF FORM SURFACES

i) Clean re-used forms of concrete matrix residue, repair and patch to return forms to acceptable surface condition. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

ii) Thin form-coating compounds only with thinning agent of type, amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

iii) Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

h) CONCRETE PLACEMENT

i) Placement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used. Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.

ii) General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", 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. 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. **DO NOT PLACE CONCRETE THAT DOES NOT MEET SLUMP REQUIREMENTS** or that has become nonplastic, unworkable, does not meet the standards, or that has become contaminated by foreign materials. Place concrete in forms within 90 minutes of the time of initial batching.

iii) 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.

iv) 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 ACI 309.

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

vi) Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

vii) Maintain reinforcing in proper position during concrete placement.

viii) Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

When air temperature has fallen to or is expected to fall below 40°F (4°C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F (10°C), and not more than 80°F (27°C) at point of placement.

Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

ix) Hot Weather Placing: When hot weather conditions exist that could seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

Cool ingredients before mixing to maintain concrete temperature at time of placement below 90°F (32°C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.

Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.

Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

i) FINISH OF FORMED SURFACES

i) Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding ¼" in height rubbed down or chipped off.

ii) Smooth Form Finish (Rubbed Finish): For formed concrete surfaces exposed-to-view, or that are to be covered with a material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
Provide grout cleaned finish to concrete surfaces which have received smooth form finish treatment unless otherwise specified.

Combine one part portland cement to 1½ parts fine sand by volume, and mix with water to consistency of thick paint. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.

Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Do not build up grout or leave a thin layer on the surface. Keep damp by fog spray for at least 36 hours after rubbing.

j) MONOLITHIC SLAB FINISHES

i) Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.

After placing slabs, plane surface to tolerances for floor flatness (F) of 15 and floor levelness (F) of 13. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms, or rakes.

ii) Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

After screening, consolidating, and leveling 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 plane to tolerances of F18 - F15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

iii) Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view,

and slab surfaces to be covered with resilient flooring, carpet, paint, or other thin film finish coating system. After floating, trowel finish 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 with surface leveled to tolerances of F 20 - F 17.

iv) Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.

v) Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

k) CONCRETE CURING AND PROTECTION

i) General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing.

Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

ii) Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.

(1) Provide moisture curing by following methods.

Keep concrete surface continuously wet by covering with water, or

Continuous water-fog spray, or

Covering concrete surface with moisture-retaining cover, thoroughly saturating with water and keeping continuously wet. Place cover to provide coverage of concrete surfaces and edges, with 4" laps.

(2) Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walks, and curbs. Apply curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

Do not use curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing

(ceramic or quarry tile, pavers), painting, and other coatings and finish materials, unless otherwise acceptable to Architect.

iii) Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing.

iv) Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method. Final cure concrete surfaces to receive finish flooring by use of curing and sealing compound, unless otherwise indicated.

v) Sealer and Dustproofer: Apply a second coat of curing and sealing compound to exposed concrete surfaces given a first coat immediately prior to substantial completion.

l) REMOVAL OF FORMS

i) Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F (10°C) 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.

ii) Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 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.

iii) Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

m) RE-USE OF FORMS

Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

When forms are re-used, 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 for exposed concrete surfaces, except as acceptable to Architect.

n) MISCELLANEOUS CONCRETE ITEMS

i) 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 to complete work.

ii) Curbs: Provide monolithic finish to curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

iii) Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings or specified. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

iv) Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

o) CONCRETE SURFACE REPAIRS

i) Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.

Cut out honeycomb, rock pockets, voids over ¼" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried to the extent specified by the manufacturer.

ii) For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

iii) Repair of Exposed Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. 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. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

iv) Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

v) Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and 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.

(1) Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width,

spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
(2) Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
(3) Correct low areas in unformed surfaces during or immediately after 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.

vi) 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 ¾" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

vii) Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2½ parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

viii) Perform structural repairs with prior approval of Architect or Structural Engineer for method and procedure, using approved epoxy adhesive and mortar.

ix) Repair methods not specified above may be used, subject to acceptance of Architect and demonstration of satisfactory results.

p) QUALITY CONTROL TESTING DURING CONSTRUCTION

i) Sampling Fresh Concrete: A testing laboratory shall perform tests and submit test reports. ASTM C172, except modified for slump to comply with ASTM C94. The technicians performing field sampling and tests shall be certified equivalent to ACI CP-2 Concrete Field Testing Technicians - Grade I. Sampling and testing for quality control during placement of concrete shall include the following:

(1) Slump: ASTM C143; one test at point of discharge for each set of compression test cylinders; additional tests when concrete consistency seems to have changed. Concrete not meeting slump limits shall not be placed without direction of the Architect. Remove and replace concrete not passing slump test placed without Architect's direction.

(2) Air Content: ASTM C173, volumetric method for lightweight or normal weight concrete; ASTM C231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

(3) Concrete Temperature: Test hourly when air temperature is 40°F (4°C) and below, and when 80°F (27°C) and above; and each time a set of compression test specimens made.

(4) Compression Test Specimen: ASTM C31; one set of four standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required. Numerically number cylinders.

(5) Compressive Strength Tests: ASTM C39; one set for each day's pour exceeding 5 cu.yd. plus additional sets for each 50 cu.yd. over and above the first 25 cu.yd. of each concrete class placed in any one day; one specimen tested at seven days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
When frequency of testing will provide less than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

When total quantity of a given class of concrete is less than 50 cu.yd., strength test may be waived by Architect if, in his judgment, adequate evidence of satisfactory strength is provided.

When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

ii) Test results shall be reported in writing to Architect, Structural Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the following:

(1) project identification name and number
(2) date of concrete placement
(3) name of concrete testing service
(4) concrete type and class
(5) location of concrete batch in structure
(6) design compressive strength at 28 days
(7) air content
(8) slump
(9) weather conditions (air temperature)
(10) temperature of concrete
(11) concrete mix proportions and materials
(12) compressive breaking strength and type of break for both 7-day tests and 28-day tests
(13) name of technician performing sampling

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

iv) The Contractor shall schedule testing labs work with minimum 24 hours notice. The Contractor shall provide testing cylinders and shall store cylinders at project site in a storage box for 24 hours after molding in accordance with ASTM requirements the Contractor shall maintain one complete set of concrete test reports available to the building inspector and Architect for review. The Contractor shall notify the testing lab of changes in schedules. If the Contractor fails to do so, he will be responsible for any additional cost.

v) Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed.

END OF SECTION 03 30 00

SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division l Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of each type of masonry work is indicated on drawings or schedule.

B. Types of masonry work required include:
Concrete masonry units (CMU)

1.3 QUALITY ASSURANCE

A. Fire Performance Characteristics: Where indicated, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E119 by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.

B. Single Source Responsibility: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted and mortar materials, from one manufacturer for each different product for each continuous surface or visually related surfaces.

C. Field Constructed Mock-Ups: Prior to installation of masonry work, erect sample wall panels to verify selections for color and textural characteristics, and to represent completed masonry work for qualities of appearance, materials and construction.

Locate mock-ups on site in locations as directed by Architect. Build mock-ups for the following types of masonry in sizes of approximately 6' long by 4, high by full thickness, including face and back-up wythes as well as accessories.

Typical exterior face brick wall with masonry backup, insulation and reinforcing, 6' long x 4' high.

Retain mock-ups during construction as standard for judging completed masonry work. When directed, demolish mock-ups and remove from site.

D. Industry Standards: Comply with the following:

1. International Building Code 2012 Edition, Chapter 16, 21
2. National Concrete Masonry Association (NCMA)
3. Brick Institute of America (BIA)

4. Concrete Masonry Handbook published by Portland Cement Association

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data for each type of masonry unit, grout, mortar, accessory, and other manufactured products including certifications that each type complies with specified requirements.

B. Submit Unit Masonry Samples for each type of exposed masonry unit, with full range of exposed color and texture to be expected in completed work. Include size variation data verifying that actual range of sizes for brick falls within ASTM C216 dimension tolerances for brick where modular dimensioning is indicated. Do not submit samples of interior standard CMU.

1.5 DELIVERY. STORAGE. AND HANDLING

A. Deliver masonry materials to project in undamaged condition.

B. Store and handle masonry units and accessories to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.

C. Store cementitious materials off the ground, under cover and in dry location.

D. Store aggregates where grading and other required characteristics can be maintained.

1.6 PROJECT CONDITIONS

A. Protection of Work: During erection, cover top of walls with waterproof sheeting at the end of each day's work. Cover partially completed structures when work is not in progress. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

B. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.

Staining: Prevent grout or mortar or soil from staining the face of masonry or other surfaces to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface. Protect sills, ledges and projections from droppings of mortar.

C. Cold Weather Protection:

1. Do not lay masonry units which are frozen. **Do not lay wet CMU.**
2. Remove and replace masonry damaged by freezing or weather conditions.
3. For clay masonry units with initial rates of absorption (suction) which require them to be wetted before laying, comply with the following requirements:

For units with surface temperatures above 32°F (0°C), wet with water heated to above 70°F (21°C).

For units with surface temperatures below 32°F (0°C), wet with water heated to above 130°F (54°C).

4. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout, where temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10°F (6°C) and do not heat above 160°F (71°C).

   40°F (4°C) to 32°F (0°C): Mortar: Heat mixing water to produce mortar temperature between 40°F (4°C) and 120°F (49°C). Grout: Follow normal masonry procedures.

   32°F (0°C) to 25°F (-4°C): Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F (4°C) and 120°F (49°C); maintain temperature of mortar on boards above freezing. Grout: Heat grout materials to 90°F (32°C) to produce in-place grout temperature of 70°F (21°C) at end of work day.

   25°F (-4°C) and below: Mortar: Same as above. Masonry Units: Heat masonry units so that they are above 20°F (-7°C) at time of laying. Installation: Enclosure and auxiliary heat to maintain an air temperature of at least 40°F (4°C). Do not install masonry where not protected by enclosure.

5. Protect completed masonry for the following periods after laying. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry, temperature ranges apply to anticipated minimum night temperatures.

   40°F (4°C) to 32°F (0°C): Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.

   32°F (0°C) to 25°F (-4°C): Completely cover masonry with weather-resistive membrane for at least 24 hours.

   25°F (-4°C) and below: Except as otherwise indicated, maintain masonry temperature above 32°F (0°C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry, maintain heated enclosure to 40°F (4°C) for 48 hours.

PART 2 - PRODUCTS

2.1 BRICK MADE FROM CLAY OR SHALE

A. General: Comply with referenced standards and other requirements indicated below applicable to each form of brick required.

Size: Standard Modular: 2¼" x 3_" x 7_".

Provide special molded shapes for all arches and for other applications requiring brick of form, size and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing.

Specialty Shapes: Provide matching cove and splay shapes where shown.

For sills, caps, soldier course corners and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncored and unfrogged units with all exposed surfaces finished.

2.2 CONCRETE MASONRY UNITS

A. Hollow Loadbearing Block: ASTM C90 and Lightweight (105 PCF, max), grade N, Type II, non-moisture controlled units. Where exterior concrete masonry units are indicated, conform to ASTM C55, Grade N.

Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8" high (15-5/8" x 7_" actual) x thicknesses indicated.

Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.

Architectural CMU - Split faced in color selected including matching corner units, lintels and smooth faced units.

B. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.

C. Fire rated concrete masonry units shall be manufactured in accordance with UL Standard UL-618 "Standard for Concrete Masonry." Furnish certification that comply with U.L. requirements for fire rating indicated.

D. Texture and shape of all units and shapes shall be uniform.

2.3 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150, Type I, except Type III may be used for cold weather construction. Provide natural color or white cement to produce selected mortar color. Test Portland Cement for alkali content. Free alkali content shall be less than 0.1 percent.

B. Masonry Cement: ASTM C91.

For colored pigmented mortars, use premixed colored masonry cements of formulation to produce color indicated, or if not indicated, as selected from manufacturer's standard formulations.

For colored aggregate mortars, use masonry cement of natural color or white to produce mortar color selected.

C. Hydrated Lime: ASTM C207, Type 5.

D. Aggregate for Mortar: ASTM C144, except for joints less than ¼" use aggregate graded with 100% passing the No. 16 sieve. Sand shall be washed and free at alkali and other contaminates.

E. Aggregate for Grout: ASTM C404.

F. Water: Clean and potable.

G. Water repellent additive: Add water repellent additive at rate recommended by manufacturer.

2.4 JOINT REINFORCEMENT. TIES AND ANCHORING DEVICES

A. Materials: Comply with requirements indicated below for basic materials:

1. Zinc-Coated (galvanized) Steel Wire: ASTM A82 for uncoated wire and with ASTM A641 for zinc coating of Class 1 (0.40 oz. per sq.ft. of wire surface). Use for interior masonry not exposed to exterior or earth.

2. Hot-Dip Galvanized Steel Wire: ASTM A82 for uncoated wire and with ASTM A123, Class B-2 (1.5 oz. per sq.ft. of wire surface) for zinc coating applied after prefabrication into units. Use where indicated and for **all exterior walls,** including masonry used for back-up of other exterior finishes.

3. Zinc-Coated (galvanized) Steel Sheet: Carbon steel with zinc coating complying with ASTM A525, Coating Designation G90. Use for dovetail slots and where indicated.

B. Joint Reinforcement: Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10', with prefabricated corner and tee units. Fabricate in widths of approximately 2" less than nominal width of walls and partitions to provide mortar coverage of not less than _" on joint faces exposed to exterior and ½" elsewhere.

Wire Size for Rods: 0.1483" diameter unless otherwise shown.
For single-wythe masonry provide ladder design with single pair of side rods and welded continuous diagonal cross rods spaced not more than 16"o.c.

:

2.5 MISCELLANEOUS MASONRY ACCESSORIES

A. Reinforcing Bars: Deformed steel, ASTM A615, Grade 60 for bars No.3 to No.18.

B. Premolded Control Joint Strips: Material designed to tightly fit standard sash block and to maintain lateral stability in masonry wall:

Styrene-butadiene rubber compound complying with ASTM D2000, Designation 2AA-805
Polyvinyl chloride complying with ASTM D2287, General Purpose Grade, Designation PVC-63506

C. Grout Stop: ¼" screening manufactured from polypropylene in width to match nominal CMU thickness less 2".

2.6 MASONRY CLEANERS

A. Job-Mixed Detergent Solution: Solution of trisodium phosphate (½ cup dry measure) and laundry detergent (½ cup dry measure) dissolved in one gallon of water.

B. Acidic Cleaner: Manufacturer's standard strength general purpose cleaner designed for new masonry surfaces; composed of blended organic and inorganic acids combined with special wetting systems and inhibitors; expressly approved for intended use by manufacturer of masonry units being cleaned.

Products: Subject to compliance with requirements, provide the following:

"Sure Klean" No. 600 Detergent; ProSoCo, Inc.
Hallmark Chemical Corp.: DC-6

2.7 MORTAR AND GROUT MIXES

A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds or other admixtures, unless otherwise indicated. **Do not use calcium chloride in mortar or grout.**

B. Mixing: Combine and thoroughly mix cementitious, water and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.

Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification, for types of mortar, unless otherwise indicated.

Limit cementitious materials in mortar to Portland cement-lime.

Use Type M mortar for masonry below grade and in contact with earth, and where indicated.

Use Type S mortar for reinforced masonry and where indicated.

Use Type N mortar for exterior, above-grade loadbearing and nonloadbearing walls; for interior loadbearing walls; and for other applications where another type is not indicated.

C. Grout for Unit Masonry: Comply with ASTM C476 for proportioning and materials and ASTM C94 for mixing. Use grout of consistency at time of placement which will completely fill all spaces to receive grout. Proportion grout for a compressive strength of 2000 psi at 28 days. Use grouting-aid admixture for CMU grout. If grout in specified with a compressive strength in excess of 2000 psi test in accordance with ASTM C1019 unless otherwise indicated.

Use fine grout in grout spaces less than 2" in least direction.
Use coarse grout in grout spaces 2" or more in least horizontal dimension.

Slump: Grout shall have a slump of 8-11 inches.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. **Do not wet and do not use wet concrete masonry units.**

B. Cleaning Reinforcing: Before placing, remove loose rust, ice and other coatings from reinforcing.

C. Thickness: Build cavity and composite walls, floors and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units.

D. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.

E. Cut masonry units using motor-driven saws to provide clean, sharp, unchipped edges. Cut units to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible. Use dry cutting saws to cut concrete masonry units.

G. Masonry units shall be sound, dry, clean, and free from cracks when placed in the structure.

3.2 CONSTRUCTION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces of columns, and walls do not exceed ¼" in 10', or _" in a story height not to exceed 20', nor ½" in 40' or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed ¼" in any story or 20' maximum, nor ½" in 40' or more. For vertical alignment of head joints do not exceed plus or minus ¼" in 10', ½" maximum.

B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed ¼" in any bay or 20' maximum, nor ½" in 40' or more. For top surface of bearing walls do not exceed 1/8" between adjacent floor elements in 10' or 1/16" within width of a single unit.

C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed ½" in any bay or 20' maximum, nor ¾" in 40' or more.

D. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus ¼" nor plus ½".

E. Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/16", with a maximum thickness limited to 7/16". Do not exceed head joint thickness indicated by more than plus or minus _".

3.3 LAYING MASONRY WALLS

A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, control joints, returns and offsets. Avoid the use of less than half-size units at corners, jambs and at other locations.

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

C. Pattern Bond: Lay brick in running bond with vertical joint in each course centered on units in courses above and below. Lay CMU in running bond. Lay concealed masonry with all units in running bond. Do not use units with less that nominal 4" horizontal face dimensions at corners or jambs. Layout walls in advance to minimize cutting.

D. Stopping and Resuming Work: Rack back half-unit length in each course; do not tooth. Clean exposed surfaces of set masonry, and remove loose masonry units and mortar prior to laying fresh masonry.

E. Built-in Work: As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.

Fill hollow metal frames solidly with fine grout, unless otherwise indicated.

Where built-in items are to be embedded in cores of hollow masonry units, place a

layer of metal lath in the joint below and rod grout into core.

Fill cores in hollow concrete masonry units with grout 3 courses (24") under bearing plates, beams, lintels, posts and similar items, unless otherwise indicated.

F. Non-bearing Interior Partitions: Construct partitions to within 1" of the underside of floor or roof, unless shown to stop lower. Do not construct tight to bar joist, beams or other structural components. Allow 1" clearance at the bottom and 3/8" at each side. Where partitions are smoke or fire barriers seal openings with appropriate fire and smoke stopping. Where interior masonry partitions intersect provide continuous vertical control joints.

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

B. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with _" joints.

C. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated. Do not leave gaps in joints.

D. Tool exposed joints slightly concave using a jointer larger than joint thickness, unless otherwise indicated. Continuously tool horizontal joint after tooling vertical joints. Joints shall be uniform.

E. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units Point up open joints.

3.5 CAVITY WALLS AND AIR SPACES

A. Keen cavity or air space clean of mortar droppings and other materials during construction, Utilize wood strip or other device to catch mortar drippings. Strike joints facing cavity flush.

B. Tie exterior wythe to back-up with continuous adjustable horizontal joint reinforcing, installed in mortar joints at not more than 16" o.c. vertically.

C. Provide weep holes in exterior wythe of cavity wall located immediately above grade, ledges and flashing, spaced 2'-O" o.c., unless otherwise indicated. Locate weep holes in head joint immediately above flashing turn out. Install weep holes as work progresses.

3.6 HORIZONTAL JOINT REINFORCEMENT

A. General: Provide continuous horizontal joint reinforcement in all masonry walls. Install longitudinal side rods in mortar for their entire length with a minimum cover of _" on exterior side of walls, ½" elsewhere. Lap reinforcing a minimum of 6". **Wall without continuous and lapped reinforcing will be rejected.**

B. Cut or interrupt joint reinforcement at control and expansion joints.

C. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

D. Space continuous horizontal reinforcement as follows:

For walls, space reinforcement at 16" o.c. vertically
For parapets, space reinforcement at 8" o.c. vertically

E. Reinforce masonry openings greater than 1'-0" wide, with additional horizontal joint reinforcement placed in two horizontal joints, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints.

3.7 LINTELS

A. Provide masonry lintels where shown and wherever openings of more than l'-O" for brick size units and 2'-0" for block size units are shown without structural steel or other supporting lintels. Temporarily support formed-in-place lintels.

For hollow concrete masonry unit walls, use specially formed U-shaped lintel units with reinforcement bars placed as shown filled with coarse grout or provide matching scored and textured precast lintels.

3.8 GROUTING

A. Place grout as work progresses but in lifts no more than 5' deep. Consolidate grout by rodding and vibrating to ensure encasing all reinforcing and to fill all voids. Comply with NCMA TEK 3-2 requirements for low-lift grouting. For all lifts except the final leave 1½"-2" below the top bed joint to form a shear key for the next pour.

B. Reinforcing shall extend above the grout lift a sufficient distance to provide the required minimum lap splice.

3.9 REPAIR, POINTING AND CLEANING

A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement. Patch minor chips with mortar or grout with smooth even surface.

B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints to provide a neat, uniform appearance.

C. Final Cleaning: After mortar is thoroughly set and cured, clean masonry as follows:

Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.

Test cleaning methods on sample wall panel; leave ½ panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film or waterproof masking tape.

Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.

Clean concrete unit masonry to comply with masonry manufacturer's directions and applicable NCMA "Tek" bulletins.

D. Protection: Provide protection and maintain to ensure masonry work being without damage and deterioration at time of substantial completion.

3.13 SAMPLING AND TESTING OF GROUT

A. ASTM C1019 for sampling and testing grout. Preform a minimum of one test for each lift for grout over 2,000 PSI strength.

END OF SECTION 04 20 00

SECTION 04 73 00 - MANUFACTURED STONE VENEERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Manufactured stone veneers.

B. Mortar.

C. Metal lath, and lath accessories.

D. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division l Specification sections, apply to work of this section.

1.2 RELATED SECTIONS

A. Division 05, Cold Formed Metal Framing: Frame support for substrate.

B. Division 06, Rough Carpentry: Wall framing and sheathing.

C. Division 07, Joint Sealers: Perimeter sealing at openings.

D. Division 10, Manufactured Fireplaces.

1.3 REFERENCES

A. ASTM C91: Specification for masonry cement.

B. ASTM C150: Specification for portland cement.

C. ASTM C177-71: Test method for thermal conductivity by means of the guarded hot plate.

D. ASTM C207: Specification for hydrated lime for masonry purposes.

E. ASTM C270: Specification for mortar for unit masonry.

F. UL723: Test for surface burning characteristics of building materials.

G. Uniform Building Code (UBC) Standard No. 14-1: Kraft waterproof building paper.

H. UBC Standard No. 26-10, Parts I and IV: Test method for compressive strength of cylindrical concrete specimens.

1.4 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00

B. Submit samples for selection under provisions of Section 01 33 00.

C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.5 QUALITY ASSURANCE

A. Applicator: Company experienced in installation of manufactured stone veneers of the type specified, with three years experience.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site under provisions of Section 01 60 00.

B. Store and protect products under provisions of Section 01 60 00.

C. Store mortar and other moisture-sensitive materials in protected enclosures; handle by methods which avoid exposure to moisture.

1.7 PROJECT CONDITIONS

A. Maintain materials and surrounding air temperature to minimum 40°F prior to, during, and for 48 hours after completion of work.

B. Protect materials from rain, moisture, and freezing temperatures prior to, during, and for 48 hours after completion of work.

C. Allow no construction activity on opposite side of wall during installation, and for 48 hours after completion of work.

1.8 WARRANTY

A. Provide manufacturer's warranty under provisions of Section 01 78 30.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Cultured Stone Corporation.

B. Coronado Stone Products.

C. Artistic Stone Products.

D. Native Custom Stone LLC

2.2 MATERIALS

A. Provide products acceptable to the Architect, matching the following cultured stone products, texture, and type as manufactured by Stone Products Corporation:

Southern Ledgestone in color as selected

B. Trim Products, Cultured Stone: Provide applicable trim, lintel, hearth and cap stone in color as selected.
C. Mortar:

1. Portland cement, ASTM C150, Type I, or masonry cement (Type N), ASTM C91.
2. Masonry sand.
3. Lime: ASTM C207.
4. Iron oxide pigments.

D. Masonry Sealer: Breather type (non-film forming) sealer.

E. Weather-resistant barrier (see Division 7).

F. Metal Lath: 18 gage galvanized woven wire mesh, 2.5 lb. or 3.4 lb. flat rib galvanized.

2.3 MANUFACTURED UNITS

A. Cultured stone units shall meet the following:

1. Shipping weight of manufactured units: 8 to 12 lb./sq.ft.
2. Compressive strength: Tested in accordance with UBC Standard No. 26-10, Parts I and IV.
3. Shear (adhesion) strength: Tested in accordance with ASTM C482 using a unit thickness approximately the same as the stone unit.
4. Thermal resistance: K factor 2.82 in accordance with ASTM C177. R factor is .355 per 1" of thickness.
5. Fire hazard test on 1-7/8" thick sample: Flame spread of 0, smoke development of 0 in accordance with UL723.

PART 3 - EXECUTION

3.1 PREPARATION

A. Sheathed Surfaces: Install one layer of weather-resistant barrier with lap joints 4" shingle fashion. Apply code-approved metal lath, attach with galvanized nails or staples which penetrate OSB sheathing a minimum of 1". Apply 6" o.c. vertically and 16" o.c. horizontally. Wrap weather-resistant barrier and metal lath a minimum of 16" around all outside and inside corners.

3.2 MORTAR MIXING

A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270, Type N.

B. Do not use antifreeze compounds to lower the freezing point of mortar.

3.3 APPLICATION

A. Apply in accordance with manufacturer's installation instructions.

B. Apply ½" to ¾" of mortar to lath, covering a maximum of 10 sq.ft. at one time. Press the units firmly into position in soft mortar bed, jiggle and apply slight pressure to unit to ensure firm bonding causing mortar to extrude slightly around edges of units.
C. Install hearth pieces in a full ½" to ¾" deep mortar setting bed.

D. Place units with uniform mortar joints. Stone joints should not be over ½" in width. Install outside corners return units with short and long lengths alternated.

E. Plan work to minimize jot site cutting. Perform necessary cutting with proper tools to provide uniform edges; take care to prevent breaking unit corners or edges.

F. Remove excess mortar; do not allow mortar to set up on face of units. Point, rake, and tool joints before mortar has set. Clean and finish joints in accordance with manufacturer's instructions.

G. Protect complete installation from damage. Repair or replace damage to restore units to their original, undamaged condition.

END OF SECTION 04 73 00

SECTION 06 08 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

Types of work in this section include rough carpentry for:

Wood framing, grounds, nailers, blocking, furring and sheathing.

1.3 PRODUCT HANDLING

Delivery and Storage: Keep materials under cover and dry. Stack lumber, plywood, and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

1.5 QUALITY ASSURANCE

A. Comply with requirements of 2006 International Building Code for wood construction including grading, identification, installation, fasteners and design.

B. Comply with standards and recommendations of referenced Industry Agencies.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

A. Lumber Standards: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Industry Agencies: Industry agencies and the abbreviations used to reference with lumber grades and species include the following:

AWPA- American Wood Preservers Association
EWA - Engineered Wood Association
SFPA - Southern Forest Products Association
WCLIB - West Coast Lumber Inspection Bureau
WWPA - Western Wood Products Association
ALSC - American Lumber Standards Committee

C. Grade Stamps: Factory mark each piece of lumber, sheathing, or engineered product with grade stamp of inspection agency, evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill. For exposed lumber, apply grade stamps to ends or back of each piece, or omit grade stamps entirely and issue certificate of grade compliance from inspection agency in lieu of grade stamp.

Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as

required by PS 20, for moisture content specified for each use.

Provide dressed lumber, S4S, unless otherwise indicated.

Provide seasoned lumber with 19% maximum moisture content at time of dressing and shipment for sizes 2" or less in nominal thickness unless otherwise indicated.

2.2 DIMENSION LUMBER

A. For light framing, provide "stud" or "standard" grade lumber for stud framing (2" to 4" thick, 2" to 6" wide, 10' and shorter) and "standard" grade for other light framing (2" to 4" thick, 2" to 4" wide), any spruce-pine-fir graded under NLGA or any species graded under WWPA or WCLIB rules.

B. For structural light framing (2" to 4" thick, 2" to 4" wide), provide the following grade and species:

No. 2 grade
Same species as indicated for structural framing grade below

C. For structural framing (2" to 4" thick, 5" and wider), provide the following grade and species:

No. 1 grade
Douglas fir or Douglas fir-larch graded, respectively, under WCLIB or WWPA rules
Southern pine graded under SPIB rules

2.3 MISCELLANEOUS LUMBER

Provide wood for support or attachment of other work including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows:

Grade: Standard grade light framing size lumber of any species or board size lumber as required. No. 3 Common or Standard grade boards per WCLIB or WWPA rules or No. 3 boards per SPIB rules.

2.4 CONSTRUCTION PANELS

A. Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood panels and, for products not manufactured under PS 1 provisions, with American Plywood Association (APA) "Performance Standard and Policies for Structural-Use Panels," Form No. E445. Factory mark each construction panel with APA trademark evidencing compliance with grade requirements.

B. Roof Sheathing: APA rated sheathing. OSB

Exposure Durability Classification: Exposure 1
Span Rating: 32/16
Edges: Square
Thickness: _" unless otherwise indicated

2.5 ACCESSORY MATERIALS

A. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers, and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails. Where rough carpentry work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A153) 304 or 316 stainless steel or propietary anti-corrosive systems proven to be effective do not use standard carbon steel or aluminum products in conjunction with treated wood.

B. Building Paper: ASTM D4869 Type I, minimum weight of 8 pounds per 100 sq.ft.; asphalt saturated felt, non-perforated, 15 lb. type.

D. Fabricated wood connectors shall be as manufactured by Simpson Strong Tie Co., Inc. Provide hot dipped galvanized for exterior components and G90 galvanized for interior products.

2.7 WOOD TREATMENT BY PRESSURE PROCESS

A. Preservative Treatment: Where lumber or plywood is indicated as "PT" or "Treated," or is specified herein to be treated, comply with applicable requirements of AWPA Standards U1 Standards listed below. Mark each treated item with the Quality Mark Requirements.

B. Pressure treat items with dispersed copper azole, micronized copper azole or micronized copper quaternary or disodium octaborate tetrahydrate (DOT) preservatives to comply with AWPA standards. After treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19% and 18%. Treat indicated items and as scheduled (except items which require fire retardant treatment).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Conform with AF & PA's WCD1 detail for conventional wood framed construction.

B. Discard units of material with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.

C. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.

D. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards.

E. Use common wire nails, except as otherwise indicated. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

F. Coordinate work of this section with other trades. Provide cutting, blocking, and carpenter assistance required for other trades.

G. Separate treated products from contact with aluminum by use of a minimum 10 mil polyethylene barrier

3.2 WOOD GROUNDS, NAILERS, BLOCKING AND SLEEPERS

A. Provide for screening or attachment of other work. Form to shapes as shown or necessary and cut for true line and level of work to be attached. Coordinate location with other work involved.
B. Attach to substrates to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work.

3.4 INSTALLATION OF CONSTRUCTION PANELS

A. General: Comply with applicable recommendations contained in Form No. E30F, APA Design/Construction Guide - Residential & Commercial," for types of construction panels and applications indicated. Offset and stagger joints.

B. Fastening Methods

1. Wood Framing: 8d nails at 6" o.c. at edges and 12" at intermediate supports for roofs greater than 25' above grade overhangs and open structure space.

3.5 WOOD TREATMENT SCHEDULE

Unless noted otherwise provide wood treatment in accordance with the following schedulein accordance with AWPA U1 standards:

A. No Treatment: No preservative treatment unless specifically noted. Service conditions would include interior wood not in contact with the ground or foundations and not exposed to dampness.

Typical Applications:

1. Interior construction
2. Naturally decay resistant wood

B. Borate Treatment @ 0.25 PCF DOT Retention. Service conditions would include interior above grade weather protected applications (AWPA use Category 2).

Typical Applications:

1. Interior sill plates in contact with foundations.
2. Rim boards supporting exterior decks.
3. Interior wall framing in contact with masonry or concrete.
4. Joist and framing above a crawlspace.

C. Preservative Treated (PT) copper suspension based formulas either dispersed copper azole, micronized copper azole or micronized copper quaternary 0.25 PCF Retention. Service conditions would include exterior above ground general use.

Typical Applications:

1. Decking
2. Fencing (except post)
3. Deck joist
4. Railings
5. Arbors and Pergolas (except post)

D. Preservative Treated (PT) copper suspension based formulas either dispersed copper azole, micronized copper azole or micronized copper quarternary 0.40 PCF Retention. Service conditions would include exterior wood in contact with the ground or critical structural support.

   Typical Applications:

   1. Post
   2. Wood in contact with the ground
   3. Guardrail post
   4. Structural girders and beams

E. Fire Protection (FRT). Where indicated or scheduled provide fire retardant treated wood suitable for protected or wet conditions as applicable.

END OF SECTION 06 08 00

SECTION 06 17 53 - PREFABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division l Specification sections, apply to work of this section.

1.2 SUMMARY

A. Extent and configuration of prefabricated wood trusses is indicated on drawings.

B. Sheathing is specified in Division 06 section "Rough Carpentry."

1.3 DEFINITIONS

Prefabricated wood trusses include planar structural units consisting of metal plate connected members which are fabricated from dimension lumber and which have been cut and assembled prior to delivery to the project.

1.4 SUBMITTALS

A. Product Data: Submit fabricator's technical data covering lumber, metal plates, hardware, fabrication process, treatment (if any), fire assembly, handling, and erection.

B. Shop Drawings: Submit shop drawings showing species, sizes and stress grades of lumber to be used; pitch, span, camber, dimension, configuration and spacing for each type of truss; type, size, material, finish, design values, location of metal connector plates; and bearing and anchorage details.

Submit design analysis and test reports indicating loading, section modules, assumed allowable stress, stress diagrams and calculations, and similar information needed for analysis and to ensure that trusses comply with requirements.

Provide shop drawings which have been signed and stamped by a Structural Engineer licensed to practice in the jurisdiction where trusses will be installed.

1.5 QUALITY ASSURANCE

A. TPI Standards: Comply with applicable requirements and recommendations of the following Truss Plate Institute (TPI) publications:

1. "Design Specification for Metal Plate Connected Wood Trusses"
2. "Design Specification for Metal Plate Connected Parallel Chord Wood Trusses"
3. "Commentary and Recommendations for Handling and Erecting Wood Trusses"
4. "Commentary and Recommendations for Bracing Wood Trusses"
5. "Quality Standard for Metal Plate Connected Wood Trusses"

B. Wood Structural Design Standard: Comply with applicable requirements of "National Design Specification for Wood Construction" published by NFPA.

C. Design by Manufacturer: Trusses shall be designed by connector plate manufacturer to support all superimposed dead and live loads, with design approved and certified by a structural engineer licensed to practice in the jurisdiction where trusses will be installed.

D. Connector Plate Manufacturer's Qualifications: Provide truss connector plates manufactured by a firm which is a member of TPI and which complies with TPI quality control procedures for manufacture of connector plates published in TPI "Quality Standard for Metal Plate Connected Wood Trusses"

E. Fabricator's Qualifications: Provide trusses by a firm which has a record of successfully fabricating similar trusses and which practices a quality control program which complies with, or is comparable to, one published in TPI "Quality Standard for Metal Plate Connected Wood Trusses" and which involves inspection by an independent inspection and testing agency acceptable to Architect and authorities having jurisdiction.

1.6 DELIVERY. STORAGE AND HANDLING

A. Handle and store trusses with care, and in accordance with manufacturer's instructions and TPI recommendations to avoid damage from bending, overturning, or other cause for which truss is not designed to resist or endure.

B. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying work of other trades whose work must follow erection of trusses.

1.7 COORDINATION

A. Coordinate location and openings in trusses with location, spacing, and size requirements for recessed lighting and HVAC ductwork.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers shall have minimum of 3 years experience in design and manufacturing of type of trusses they are providing.

2.2 LUMBER

A. Factory mark each piece of lumber with type, grade, mill and grading agency.

B. Lumber Standard: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

C. Inspection Agencies: Inspection agencies and the abbreviations used to reference them to lumber grades and species include the following:

NLGA - National Lumber Grades Authority (Canadian)
SPIB - Southern Pine Inspection Bureau
WCLIB - West Coast Lumber Inspection Bureau
WWPA - Western Wood Products Association

D. Provide lumber manufactured to actual sizes required by PS 20 to comply with requirements indicated below:

Dressed, S4S, unless otherwise indicated.

Moisture Content: Seasoned, with 19% maximum moisture content at time of dressing and shipment for sizes 2" or less in nominal thickness, unless otherwise indicated.

Grade: As determined by design

Species: Provide any species and grade which has been stress-rated and certified, at indicated moisture content, to comply with requirements for minimum design values of single members used in the design of the trusses.

2.3 METAL CONNECTOR PLATES. FASTENERS AND ANCHORAGES

A. Connector Plates: Fabricate connector plates from metal complying with any of the following requirements as acceptable for exposure and treatment.

1. Hot-Dip Galvanized Steel Sheet: Structural (physical) quality steel sheet complying with ASTM A446, Grade A; zinc coated by hot-dip process to comply with ASTM A525, Designation G60; minimum coated metal thickness of not less than 0.036".

2. Electrolytic Zinc-Coated Steel Sheet: Structural (physical) quality steel sheet complying with ASTM A591, Coating Class C, and, with ASTM A446, Grade A; zinc-coated by electro-deposition; with minimum coated metal thickness of not less than 0.047".

3. Aluminum-Zinc Alloy-Coated Steel Sheet: Structural (physical) quality steel sheet complying with ASTM A792, Coating Designation AZ 50, and, with ASTM A446, Grade A; aluminum-zinc alloy-coated by hot-dip process; with minimum coated metal thickness of not less than 0.036".

B. Fasteners and Anchorages: Provide size, type, material and finish required for nails, screws, bolts, nuts, washers, and other anchoring devices.

2.4 SCHEDULE OF WOOD TRUSSES

A. Roof Trusses:

1. Parallel cord, plate connected with members oriented vertically.
2. Bearing: Bottom
3. Deflection: L/360
4. Live Load:
   a. Top cord - 20 PSF

b. Bottom cord - 10 PSF

2.5 FABRICATION

A. Cut truss members to accurate lengths, angles and sizes to produce close fitting joints with wood-to-wood bearing in assembled units. Provide a minimum of 1½" bearing surface for plywood decks. Design trusses to accommodate ducts, access and other clearances indicated.

B. Fabricate metal connector plates to size, configuration, thickness and anchorage details required.

C. Assemble truss members using jigs or other means to ensure uniformity and accuracy of assembly with close fitting joints. Position members to produce camber.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Erect and brace trusses to comply with recommendations of manufacturer and the Truss Plate Institute.

B. Erect trusses with plane of truss webs vertical (plumb) and parallel to each other, located accurately. Hoist units in place by means of lifting equipment suited to sizes and types of trusses, applied at designated lift points as recommended by fabricator, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

C. Provide temporary bracing to maintain trusses plumb, parallel and in location, until permanent bracing is installed.

D. Anchor trusses securely at all bearing points using metal connectors. **Toe nailing is not acceptable.** Install permanent bracing and related components to enable trusses to maintain spacing, withstand live and dead loads including lateral loads, and to comply with other requirements.

E. Do not cut or remove truss members, plates or bracing.

END OF SECTION 06 17 53

SECTION 06 18 00 - GLUED LAMINATED UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Glued laminated (Glulam) timber is defined to include wood members fabricated from 1 inch or 2 inch nominal thickness lumber, glued face-to-face to a depth of four or more laminations.

B. The types of structural glued laminated units specified in this section include:

Straight beams, including girders and purlins, and cambered members.

1.3 QUALITY ASSURANCE

A. Standards: Comply with ANSI/AITC A 190.1 "Structural Glued Laminated Timer", and American Institute of Timber Construction, AITC 117. Southern Pine Inspection Bureau (SPIB).

Form units from lumber graded by complying with requirements of American Lumber Standards Committee and PS 20.

B. Manufacturer Qualification: Provide factory-glued structural units, produced by an AITC-licensed firm, qualified to apply the AITC "Quality Inspected" mark.

C. Factory mark each piece of glued laminated structural units with AITC Quality Inspected mark. Place AITC mark on timber surfaces which will not be exposed in completed work.

1.4 DELIVERY, STORAGE AND HANDLING

A. Keep glued laminated structural units dry during delivery, storage, handling, and erection, by maintaining factory-applied protective covering in weather tight and light-proof condition, or by applying other weather tight protection. Maintain protective covering until building enclosure is completed to extent necessary for protection of interior Glulam work, and until final finishing of exterior work is ready to proceed. Store Glulam units in areas where relative humidity will approximate completed conditions.

B. Time delivery and installation of Glulams to avoid extended on-site storage, and to avoid delaying other trades whose work must follow erection of Glulams. If laminated units are to be stored before erection, place individual units or bundle wrapped units on blocks well off ground with individual members separated for air circulation. Leave wrappings intact,

but slit or puncture lower side to permit drainage of water which may accumulate.

C. Handling: Use padded or non-marring slings and protect corners with wood blocking when hoisting.

PART 2 - PRODUCTS

2.1 STRUCTURAL GLUED LAMINATED UNITS

A. Lumber: Comply with ANSI/AITC A190.1 AND APPLICABLE LUMBER association standards cited therein for grades required to achieve Glulam requirements for design values, appearance, fabrication limitations and species.

B. Preservative Treatment: Pressure treat lumber prior to gluing, in accordance with AWPA water-borne preservatives.

C. Stress Values for Glued Laminated Member: Provide glued laminated members sized as shown on drawings with laminating combinations that meet or exceed following stress values for normal loading duration and dry condition of use:

Bending (Fb), 2400 psi.
Horizontal shear (Fv), 200 psi.
Compression perpendicular to grain (Fc - tension face), 218 psi.
Modulus of Elasticity (E), 1,800,000 psi.
Tension parallel to grain (Ft-axially loaded), 1000 psi.
Compression parallel to grain (Fc-axially loaded), 1500 psi.

D. Lumber Species: Southern Pine, kiln-dried which meets structural requirements and standards.

E. Appearance Grade: Provide Architectural Grade Units complying with AITC 110.

F. End Sealer: Manufacturer's standard transparent, colorless wood sealer, effective in retarding transmission of moisture at cross-grain cuts.

G. Connectors, Anchors, Accessories: Provide fabricated steel (ASTM A 36) shapes, plates and bars, welded into assemblies of types and sizes indicated or, if not indicated, manufacturer's standard units for timber sizes indicated. Provide steel bolts (ASTM A 307), lag bolts, nails, and other standard fasteners as required for installation.

Finish: Finish fabricated assemblies with hot-dip zinc coating (ASTM A 153), including bolts and other fasteners.

H. Adhesives: Wet-use (waterproof) adhesives shall be used and comply with ANSI/AITC Standard A190 Latest Edition, Structural Glued Laminated Timer.

2.2 FABRICATION

A. General: Comply with ANSI/AITC A190.1. Shop-fabricate for connections and connecting hardware to greatest extent feasible, including drilling of bolt holes.

B. Camber: The required camber for fabrication of each member is shown on drawings, and may be either circular or parabolic, at manufacturer's option.

C. End-Cut Sealing: Immediately after end-cutting each member to final length, and after wood treatment (if any), apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces "flood-coated" for not less than 10 minutes.

D. Seal Coat: After fabrication and sanding of each unit, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit, except for treated wood where treatment has included a water repellent.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install miscellaneous steel connectors, anchors, and accessories.

B. Plan and execute erection procedures so that close fit and neat appearance of joints and structure as a whole will not be impaired. When hoisting members into place, use padded or non-marring slings, and protect corners with wood blocking. Fasten joints securely without damage. Compression joints shall be brought to full beavina. Check assemblies before erection for accuracy of dimensions, anchorage and camber.

C. Adequately brace members as they are placed to maintain safe position until full stability is provided.

D. Cutting: Avoid cutting Glulam members during erection, to greatest extent possible. Except for fastener drilling and other minor cutting, coat cuts with end sealer as specified for "Fabrication".

Where treated members must be cut during erection, apply a heavy brush coat of the same preservative treatment, complying with AWPA Standard M4.

E. Do not remove wrapping on individually wrapped members until it will serve no useful purpose, including protection from weather, soiling and damage from work of other trades.

Coordinate removal of wrapping with finishing work specified in Division 9.

F. Repair damaged surfaces and finishes after completion of erection and removal of wrappings, or replace damaged members as directed where damage is beyond acceptable repair.

3.2 FINAL ALIGNMENT

A. As erection progresses check plumbness, squareness and alignment and make adjustments as required. Final tightening and alignment of bolts shall not be completed until Structure has been properly aligned.

END OF SECTION 06 18 00

SECTION 06 20 00 - ARCHITECTURAL WOODWORK AND FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of each type of woodwork is indicated on drawings and in schedules. Woodwork as specified herein shall mean both architectural woodwork and finished carpentry.

B. Architectural woodwork is distinguished from finish carpentry by being primarily shop fabricated to conform to high quality of standards of material and workmanship.

Types of architectural woodwork include the following:

Architectural cabinets (millwork): Countertops
Casework

C. Finish Carpentry: Involves products which meet architectural woodworking quality standards but are primarily of stock materials and partially or totally fabricated in the field.

Types of Finish Carpentry include the following standing and running trim (if any):

Closet and utility shelving
Finish carpentry
Standing and running trim

1.3 QUALITY ASSURANCE

A. AWI Quality Standard: Comply with applicable requirements of "Architectural Woodwork Standards, Edition I (AWS)" published by the Architectural Woodwork Institute (AWI), except as otherwise indicated.

B. Installer Qualifications: Installation of architectural woodwork items shall be by same firm which fabricated them.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data for each product and process specified as work of this section and incorporated into items of architectural woodwork during fabrication, finishing, and installation.

B. Wood Treatment Data: Submit chemical treatment manufacturer's instruction for

handling, storing, installation, and finish of treated material. Include certification that materials comply with indicated treatment and standards.

C. Quality Certification: Submit woodwork Manufacturer's (Fabricator's) certification, stating that fabricated woodwork complies with quality grades and other requirements indicated.

D. Shop Drawings: Submit shop drawings showing location of each item, dimensioned plans and elevations, large scale details, attachment devices and other components.

1.5 DELIVERY, STORAGE, AND HANDLING

Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

1.6 PROJECT CONDITIONS

A. Conditioning: Woodwork Manufacturer and Installer shall advise Contractor of temperature and humidity requirements for woodwork installation and storage areas. Do not install woodwork until required temperature and relative humidity have been stabilized and will be maintained in installation areas.

B. Maintain temperature and humidity in installation area as required to maintain moisture content of installed woodwork within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. Require Woodwork Manufacturer to establish optimum moisture content and required temperature and humidity conditions.

PART 2 - PRODUCTS

2.1 FABRICATION, GENERAL

A. Wood Moisture Content: Comply with requirements of referenced quality standard for moisture content of lumber at time of fabrication and for relative humidity conditions in the installation areas.

B. Fabricate woodwork to dimensions, profiles, and details indicated with openings and mortises precut, where possible, to receive hardware and other items and work.

Ease edges to a 1/16" radius, for corners of cabinets and edges of solid wood (lumber) members less than 1" in nominal thickness, _" radius for edges of rails and similar members over 1" in nominal thickness.

C. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

D. Pre-Cut Openings: Fabricate architectural woodwork with pre-cut openings, where possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams for proper size and shape. Smooth edges of cutoffs and, where located in countertops and similar exposures seal edges of cutouts with a water-resistant coating.

E. Measurements: Before proceeding with fabrication of woodwork required to be fitted to other construction, obtain field measurements and verify dimensions and shop drawing details for accurate fit.

Where sequence of measuring substrates before fabrication would delay the project, proceed with fabrication (without field measurements) and provide ample borders and edges to allow for subsequent scribing and trimming of woodwork for accurate fit.

2.2 STANDING AND RUNNING TRIM, AND RAILS

A. Quality Standard: Comply with AWS Section 6 Custom Grade.

Rout or groove backs of flat trim members, kerf backs of other wide flat members, stop kerf ½" from ends where exposed in finished work.

B. Interior & Exterior Trim for Opaque Finish: Grade A White Pine or any lumber or panel product allowed by AWS for Grade specified.

C. Exterior Fascia Board - Southern Yellow Pine - Preservative treated

2.3 HIGH PRESSURE DECORATIVE LAMINATE (HPDL)

A. Laminate Cladding: High pressure decorative laminate complying with NEMA LD 3. Colors, patterns and finishes as indicated, or as selected by Architect from laminate manufacturer's standard products. Minimum 16 selections available.

Acceptable Manufacturers (HPDL):
Formica
Laminart
Nevamar
Ralph Wilson Plastics Company

Laminate Grade for Exposed Surfaces: GP-50 except post formed use PF-42.

Semi-Exposed Surfaces: GP-28; CL-20 or shops standard low pressure laminate.

Backing Laminate: Backer 20 nominal .020".

2.4 ARCHITECTURAL CABINETS, LAMINATE CLAD

A. Quality Standard: Comply with AWI Section 400B, Custom Grade.

Type of Cabinet Construction: Flush overlay
Exposed Surfaces: HPDL
Semi-Exposed Surfaces: Overlay or varnished
Edges: HPDL

2.5 CABINET HARDWARE AND ACCESSORY MATERIALS

A. Hardware Standard: Comply with ANSI/BHMA A156.9 "American National Standard for Cabinet Hardware" for items indicated by reference to BHMA numbers or referenced to this standard.

Quality Level: Type 2 (Institutional), unless otherwise indicated.

Finish: 626 (Satin chromium plated, brass or bronze base) provide manufacturer's standard finish for concealed hardware.

B. Cabinet Door Hardware:

Spring Hinges - 150 degrees
Magnetic catches
Pulls - wire type, 4" centers

C. Drawer Hardware:

Side mounted, full extension, ball-bearing, nylon roller drawer slides with load capacity of 75 lb. per pair.

Pull.

D. Shelf Supports Adjustable: Side mounted slotted-type standards and brackets designed to support a uniform 40 lb. per linear foot load.

E. Grommets: Provide grommets for all wiring openings in tops, consisting of 2.75" diameter-grommet, grommet cap and slot cover. Furnish in one of five colors to best match top.

F. Locks: Best cabinet with 2 keys each. Key alike each suite. (See Drawing for location of locks).

2.6 CLOSET AND UTILITY SHELVING

A. Quality Standard: Comply with AWI Section 600, Custom Grade.

Shelving Material: Lumber, any closed-grain hardwood listed in standard or Birch faced veneer plywood with edge bands.

2.7 FASTENERS AND ANCHORS

A. Screws: For metal framing supports, provide screws as recommended by metal framing manufacturer. Nails shall have casing or finish heads.

B. Nails: Provide stainless steel or aluminum nails for exposed exterior woodwork which is to receive transparent finish (if any). Provide any type of non-corrosive nails for other exterior woodwork.

C. Anchors: Select material, type, size and finish required by each substrate for secure anchorage. Provide non-ferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion-resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts and anchors to be set into concrete or masonry work for subsequent woodwork anchorage.

2.8 _STAINLESS STEEL.

For Exterior Counter Tops Provide Type 304 Stainless Steel 14 gage, 18-8 polished Tops & Edges.
All seams & corners to be fully welded, ground smooth, and polished.

2.8 TOPS FOR ARCHITECTURAL CABINETS

Quality Standard: Comply with AWS Section 10.

Type of Top: High pressure decorative laminate (HPDL). Minimum 24 selections.

Panel: ¾" medium density particle board with .02" back-up sheet. Panels where a sink is installed or located in kitchens or wet rooms shall be ¾" AC exterior grade plywood or phenolic resin particle board in lieu of particle board.

2.9 PRESERVATIVE TREATMENT BY NON-PRESSURE METHOD

A. Comply with requirements of referenced woodworking standard for non-pressure treatment of woodwork with non-aqueous water repellent solution, except as indicated. Treat units of woodwork after cutting, machining, sanding, gluing and assembling has been completed to the greatest extent possible. Coat surfaces cut after treatment with heavy brush coating of same preservative.

Provide non-pressure treatment for the exterior woodwork except for cedar or redwood or redwood lumber.

Interior woodwork indicated to be preservative treated.

2.11 PLYWOOD CEILING AND SOFFITS

A. APA - A/C Grade exterior
15 / 32 Minimum

Thickness (1 /2 " Nominal)

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.

B. Prior to installation of architectural woodwork, examine shop fabricated work for completion, and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

A. Install woodwork plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including tops); and with no variations in flushness of adjoining surfaces. Install in accordance with AWS for Quality Level specified and as required herein.

B. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

C. Pressure Treated Wood: Handle, store, and install pressure treated wood in compliance with recommendations of chemical treatment manufacturer including those for adhesives, where required for installation . For preservative treated lumber cut or drilled in field, treat cut ends with preservative solution used for original treatment by brushing, spraying, dipping, or soaking; as required by ASPA M4.

D. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fasteners heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.

E. Standing and Running Trim: Install with minimum number of joints using full-length pieces (from maximum length of lumber available). Stagger joints in adjacent and related members. Cope at returns, miter at corners and comply with referenced Quality Standards for joinery.

F. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unincumbered operation. Complete the installation of hardware and accessory items as indicated. Maintain veneer sequence matching (if any) of cabinets with transparent finish.

G. Tops: Anchor securely to base units and other support systems .

3.3 ADJUSTMENT, CLEANING, FINISHING, AND PROTECTION

A. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate and adjust hardware.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.

D. Refer to the Division 9 sections for final finishing of installed architectural woodwork.

E. Provide final protection and maintain conditions, in a manner acceptable to Fabricator and Installer, which ensures architectural woodwork being without damage or deterioration at time of substantial completion.

END OF SECTION 06 20 00

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of insulation work is shown on drawings or indicated by provisions of this section.

B. Applications of insulation specified in this section include the following:

Batt-type building insulation
Masonry foam insulation
Blown-in building insulation

C. Related work specified elsewhere includes deck roof insulation, sound attenuation blankets, and masonry cavity wall insulation.

1.3 QUALITY ASSURANCE

A. Maximum Allowable Asbestos Content: Provide insulations which contain less than 0.25% by weight of asbestos of any type or mixture of types occurring naturally as impurities as determined by polarized light microscopy test per Appendix A of 40 CFR 763.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product literature and installation instructions for each type of insulation and vapor retarder material required.

B. Certified Test Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including R-Values (aged values for plastic insulations), densities, compression strengths, fire performance characteristics, perm ratings, similar properties.

PART 2 - PRODUCTS

2.1 MASONRY FOAM INSULATION

A. Provide proprietary non-expanding, plastic, foamed-in core, non-combustible insulation with an in-place density of 2.5 to 3.3 lb/cf. R-value for 8", 105 lb. density CMU shall be not less than 8.2.

B. Acceptable Products:

1. Thermal Corporation of America "Thermco"
2. Tailored Chemical Products, Inc. "Core-Fill-500"

2.2 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Type recommended by insulation manufacturer and complying with requirements for fire performance characteristics.

B. Mechanical Anchors: Provide mechanical anchors as recommended by insulation manufacturer for type of application and condition of substrate to secure insulation in place where batt insulation would be otherwise unsupported, including stick clips, wire retainers, and friction anchors.

C. Eave Ventilation Troughs: Preformed rigid fiberboard or plastic sheet designed and sized to fit between roof framing members and to maintain cross ventilation of a minimum of 3" at vented eaves.

2.3 BLOWN-IN BLANKET INSULATION

A. Fiberglass, rock wool, or cellulose insulation. Install to R-30 in Attic

B. Properties:

1. Flame spread index: 0-25, ASTM E84
2. Smoke developed: Not more than 450
3. Minimum in-place thermal resistance: ASTM C739, K of 3.0 per inch
4. Non-corrosive
5. Odorless
6. Pest and vermin resistant
7. Non-settling
8. Moisture and fungus resistant
9. IBC approved

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with manufacturer's instructions for particular conditions of installation. Properly prepare areas to receive insulation.

B. Extend insulation full thickness over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement. Place on exterior of steel beams and columns such that there is a continuous thermal envelope.

3.2 INSTALLATION OF MASONRY FOAM INSULATION

A. Install foam insulation in concrete unit masonry cells of all 8" to 12" exterior units. Installation shall be by experienced personnel certified and approved by the Manufacturer. Install foam as wall is constructed in two stages, one at the 10' height and one before topping with bond beam. Alternately, the foam can be pumped into each cavity through a 5/8" hole drilled into the mortar joints at approximately 5' from floor level and repeated in lifts of 10' until wall is filled. Installer shall be experienced application of this type insulation and shall be approved by the Manufacturer. Pump foam into cell to completely fill each cavity. Protect completed operation from moisture of not less than 24 hours. Do not allow wall to be painted for two weeks.

3.3 INSTALLATION OF ATTIC BLOWN-IN INSULATION

A. Using standard pneumatic equipment, blow in attic insulation to achieve a uniform and continuous thermal barrier. Do not block natural attic ventilation to soffit.

3.4 PROTECTION

General: Protect installed insulation and vapor retarders from harmful weather exposures and from physical abuses. Replace damaged or displaced insulation to maintain a complete envelope.

END OF SECTION 07 21 00

SECTION 07 26 00 - MEMBRANE VAPOR BARRIER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

Under slab membrane vapor barrier.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product literature and instructions for membrane material and mastic.

PART 2 - PRODUCTS

2.1 MEMBRANE VAPOR BARRIER

A. Acceptable Products:

1. Fortifiber Corporation - Moistop Underslab
2. Griffolyn - T-65 Vapor Barrier
3. Raven Industries - Rufco Super Sampson. 400 SSB

B. Characteristics:

1. Multiply reinforced polyethylene film
2. Perm rating: Less than 0.30 when tested in accordance with ASTM E96-66 Method A.

2.2 ADHESIVE OR TAPE

Acceptable to manufacturer of membrane vapor barrier.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install membrane over compacted, clean subgrade material, free of debris and protrusions.

B. Lay membrane over interior building area to receive concrete slabs; lap edges 6" and seal with mastic or tape over entire lap. Apply membrane in greatest practical widths. Lay membrane with seams perpendicular to and lapped in direction of concrete pour. Turn

edges of membrane up to within 1/2" of top of slab at intersection with vertical surfaces. Patch all punctures.

C. Where expansion or control joints are indicated in slab, lay membrane continuous under joint filler.

D. Seal openings in membrane around pipes and other protrusions with mastic. Fold at corners to form envelope.

E. Protect membrane installation from damage until concrete slab is in place.

END OF SECTION 07 26 00

SECTION 07 41 13 - PREFORMED ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of each type of preformed roofing is indicated on the drawings or by provisions of this section.

B. Types of products required include the following: Architectural standing seam type roof panels, gutters, down spouts, related trim, anchoring devices, and accessories for a complete weathertight system.

C. Related products specified elsewhere:

1. Wood nailers
2. Plywood roof deck

1.3 QUALITY ASSURANCE

A. Performance Test Standards: Provide preformed panel systems which have been pretested and certified by manufacturer to provide specified resistance to air and water infiltration and structural deflection and failure when installed as indicated and when tested in accordance with AAMA Standard Test TM-l, "Specification for Method of Test for Metal Curtain Walls for Water Penetration Using Dynamic Pressure."

B. Field Measurements: Where possible, prior to fabrication of prefabricated panels, take field measurements of structure or substrates to receive panel system. Allow for trimming panel units where final dimensions cannot be established prior to fabrication.

C. Installer: The installer shall have not less than three years experience in installation of similar systems and shall be accepted in writing by the manufacturer.

D. Industry Standards: Conform to recommendations and details of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product specifications, warranty, standard details, certified product test results, installation instructions and general recommendations, as applicable to materials and finishes for each component and for total system of

preformed panels.

B. Samples: Submit two samples, each 12" square, of each exposed finish material.

C. Shop Drawings: Submit small-scale layouts of panels on walls and roofs, and large-scale details of edge conditions, joints, ridge vents, corners, custom profiles, supports, anchorages, flashings, closures, and special details. Distinguish between factory and field assembly work.

1.5 WARRANTY

A. Guarantee finish against failure by cracking, peeling, blistering, chipping of finish, and without chalking in excess of 8 (ASTM D659), and without fading in excess of 5 NBS units for a period of 20 years.

B. Guarantee watertightness of complete system for a period of two years from date of substantial completion. Guarantee shall be executed by the Contractor and Installer.

1.6 DELIVERY, STORAGE AND PROTECTION

A. Panels shall be factory protected by a strippable film, which shall be removed for installation.

B. Store panel in a clean, dry location. Do not expose panels with protective film to the sun. Stack to prevent damage and to allow for adequate ventilation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Architectural Panels Specifications are based upon the following:

1. Berridge Cee-Lock with gasket
2. Perma-Clad Perm-Loc "S"
3. Imetco Snap-Lok

B. Substitutions allowed prior to bids: See Section 00 21 13 Instructions to Bidders.

2.2 SYSTEM DESCRIPTION

A. Architectural:

1. Material: 24 gage Galvalume Steel ASTM A792, ASTM A446 Grade C.
2. Finish: Kynar 500 with strippable protective coating.
3. Color: color to match: as selected
4. Seam Spacings: 12"- 18"o.c.

5. Anchors: Concealed to allow for movement and wind uplift.
6. Length: One piece.
7. Trim and Flashing: Matching (all exposed to view). Provide heavier gages where required for condition.
8. Texture: Smooth.
9. Seam Height: 1" to 1½".

2.3 MISCELLANEOUS MATERIALS

A. General: Provide insulating materials to comply with requirements indicated for materials and compliance with referenced standards; in sizes to fit applications indicated, selected from manufacturer's standard thickness widths and lengths.

B. Provide ice and water shield under layment. Product shall be elastic self-adhering, flexible sheet flashing of 40 to 60 mils thickness. Equal to Grace "Ice & Water Shield".

C. Roof Plumbing Vents: Locate roof vents in panel pans. Flash with flexible pipe flashing system equal to ITW Buildex "Dektite."

D. Fasteners: Manufacturer's standard noncorrosive types, with exterior heads gasketed. Fasteners shall be concealed where possible.

E. Accessories: Except as indicated as work of another specification section, provide components required for a complete roofing/siding system, including trim, copings, fascias, gravel stops, mullions, sills, corner units, ridge closures, clips, seam covers, battens, flashings, gutters, louvers, sealants, gaskets, fillers, closure strips and similar items. Match materials/finishes of preformed panels.

F. Bituminous Coating: Cold-applied asphalt mastic, SSPC paint 12, compounded for 15 mil dry film thickness per coat.

2.4 AUXILIARY INSULATION MATERIALS

A. Mechanical Anchors: Corrosion-resistant type as recommended by insulation manufacturer for deck type and complying with fire and insurance uplift rating requirements. Uplift rating FM I-90.

2.5 PANEL FABRICATION

A. General: Fabricate and finish panels and accessories at the factory to greatest extent possible, by manufacturer s standard procedures and processes, and as required to fulfill indicated performance requirements which have been demonstrated by factory testing. Comply with indicated profiles and dimensional requirements, and with structural requirements.

B. Required Performances: Fabricate panels and other components of roof system for the following installed performances:

1. Roof Wind Loading: 30 lb. per sq.ft. inward; 15 lb. per sq.ft. outward.
2. Roof Live Loading: 20 lb. per sq.ft.
3. Water Penetration: No significant, uncontrolled leakage at 4 lbs per sq ft pressure with spray test.
4. Air Infiltration: 0.02 cfm per sq.ft. for gross roof/wall areas, with 4 lb. per sq.ft. differential pressure.

C. Apply bituminous coating or other permanent separation materials on concealed panel surfaces where panels would otherwise be in direct contact with substrate materials which are noncompatible or could result in corrosion or deterioration of either material or finishes.

D. Fabricate panels to allow for thermal expansion and contraction without effecting water penetration or air infiltration.

E. Condensation: Fabricate panels for control of condensation, including vapor inclusion of seals and provisions for breathing, venting, weeping and draining.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with panel fabricator's and material manufacturers' instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the work securely in place, with provisions for thermal/structural movement. Install panels with concealed fasteners. Separate dissimilar materials by application of coating or underlayment. Where anchoring through rigid roof insulation, provide minimum 4" x 4" galvanized steel bearing plates to prevent compressing insulation.

B. Inspection: Inspect substrate to receive preformed panels. Verify satisfactory condition including soundness, level, and adequate support.

C. Installation Tolerances: Shim and align panel units within installed tolerance of 1/4" in 20'-0" on level/plumb/slope and location/line as indicated, and within 1/8" offset of adjoining faces and of alignment of matching profiles.

D. Underlayment: Install underlayment over insulation lapping joints a minimum of 6". Install ice and water shield to weep out the building. Install in accordance with manufacture’s printed instructions.

E. Seaming: Complete seaming of panel joints by operation of portable power-driven equipment of type recommended by panel manufacturer.

F. Joint Sealers: Install gaskets, joint fillers and sealants for weatherproof performance of panel systems. Provide types of gaskets and sealants/fillers indicated or, if not

otherwise indicated, types recommended by panel manufacturer.

G. No through panel penetrations or perforation shall be made in metal roofing panels. Anchors shall be concealed except matching pop rivets allowed in fascia and flashings. Flash plumbing vents. Install plumbing vents and flashing boots in panel pans. Do not install in vertical standing seams.

3.2 CLEANING AND PROTECTION

A. Cleaning: Remove temporary protective coverings and strippable films (if any) as each panel is installed. Upon completion of panel installation, clean finished surfaces as recommended by panel manufacturer, and maintain in a clean condition during construction. Protect completed installation from damage.

B. Damaged Units: Replace panels and other components of the work which have been damaged or have deteriorated beyond successful repair by means of finish touch-up or similar minor repair procedures.

END OF SECTION 07 41 13

SECTION 08 11 00 - METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

Extent of steel (hollow metal) doors and frames, is indicated on drawings.

1.3 QUALITY ASSURANCE

A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements.

B. Shop Drawings: Submit for fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, construction, location and installation of finish hardware and reinforcements, and details of joints, connections, and anchorage.

Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings. Indicate coordination of glazing frames and stops with glass and glazing requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Schedule deliveries with construction requirements. Ship in stages as construction progresses.

B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

Manufacturer: Subject to compliance with requirements, provide steel doors and frames by one of the following:

Allied Steel Products, Inc.
Amweld/Division of American Welding & Manufacturing Co.
Ceco Corporation
Curries Manufacturing, Inc.
D&D Specialties, Inc.
Dittco Products, Inc.
Fenestra Corporation
Mesker Industries, Inc.
Steelcraft/Division of American Standard Co.
Republic Builders Products Corp./Subsidiary of Republic Steel

2.2 MATERIALS

A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A569 and ASTM A568.

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A366 and ASTM A568.

C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A526, with ASTM A525, G60 zinc coating, mill phosphatized.

D. Supports and Anchors: Fabricate of not less than 18 gage galvanized sheet steel.

E. Inserts, Bolts, and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A153, Class C or D as applicable.

F. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.

2.3 FABRICATION, GENERAL

A. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

B. Finish Hardware Preparation: Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.

C. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.

D. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware," published by Door and Hardware Institute.

E. Shop Painting: Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

F. Provide labels appropriately identifying fire-rated doors and frames.

2.4 STANDARD STEEL DOORS

A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly on site. Comply with SDI-100 requirements as follows:

1. Interior Doors: SDI-100, Grade II, heavy-duty, Model 1, minimum 18 gage faces.

2. Exterior Doors: SDI-100, Grade III, extra heavy-duty, Model 2, minimum 16 gage faces.

B. Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel.

C. Fabricate exterior doors, panels and frames from galvanized sheet steel with closed top and bottom edges as integral part of door construction or by addition of minimum 16 gage inverted steel channels.

2.5 STANDARD STEEL FRAMES

A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 16 gage cold-rolled furniture steel.

Fabricate frames with mitered corners, welded construction for all applications except knocked-down for field assembly at interior applications for single non-fire rated opening in drywall partitions. All drywall frames shall have double return back bend to prevent cutting into wall. Fabricate exterior frames from galvanized sheet steel.

B. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.

C. Plaster Guards: Provide 26 gage steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware

operation and to close off interior of openings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.

B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames," unless otherwise indicated.

Except for knock-down (KD) frames, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

Provide a minimum of 3 adjustable wall anchors per jamb located at hinge and strike levels. Provide floor anchors of a minimum of 18 gage steel at all frames.

At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.

C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in SDI-100.

3.2 ADJUST AND CLEAN

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

B. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION 08 11 00

SECTION 08 31 00 - ACCESS DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes access doors for installation in walls and non-accessible ceilings.

B. Provide access doors where valves, switches, dampers, junction boxes, controls, operating devices, cleanouts or other similar devices occur in inaccessible locations and access doors are not furnished by others.

1.3 SUBMITTALS

A. Submit Manufacturer's product data and installation instructions, including setting drawings, templates, instructions, and directions for installation of anchorage, devices.

Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, finishes, latching provisions, fire rating, and other data pertinent to installation.

1.4 QUALITY ASSURANCE

A. Fire-Resistance Ratings: Wherever access doors occur in rated assemblies, provide access doors from manufacturer listed in Underwriters Laboratories, Inc.'s "Building Materials Directory." Provide UL label on each fire-rated access door appropriate for the rated assembly.

1.5 PROJECT CONDITIONS

A. Size: Provide 12" x 12" access doors except where larger size necessary. Provide 8" x 8" access doors where workable and approved by the Architect.

B. Verification: Obtain specific locations and sizes for access doors from trades requiring access to concealed equipment, and indicate on submittal schedule. Obtain Architect approval of locations which are not shown.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide access doors by one

of the following:

Bar-Co., Inc.
Cesco Products
J.L. Industries
Karp Associates, Inc.
Milcor, Inc.

2.2 MATERIALS AND FABRICATION

A. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners to secure access doors.

B. Frames: Fabricate from 16-gage steel, with nominal 1" flanges.

For gypsum drywall or gypsum veneer plaster, furnish perforated frames with drywall bead.

For installation in masonry construction, furnish frames with adjustable metal masonry anchors.

C. Flush Panel Doors: Fabricate from not less than 14-gage sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees. Finish with manufacturer's factory-applied prime paint. Provide screwdriver operated cam latches in sufficient number to hold door flush.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's instructions for installation of access doors. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

3.2 ADJUST AND CLEAN

A. Adjust hardware and panels after installation for proper operation. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 31 00

SECTION 08 33 14 - EXTERIOR COUNTER SHUTTERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division l Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of counter shutters is shown on the drawings and includes exterior manual operated stainless steel counter shutters.

1.3 QUALITY ASSURANCE

A. Performance Requirements: Furnish each overhead coiling shutters as a complete unit produced by one manufacturer, including hardware, support, accessories, mounting and installation components.

B. Insert and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of units. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data, roughing-in diagrams, and installation instructions indicating compliance with requirements. Provide operating instructions and maintenance information.

B. Shop Drawings: Submit shop drawings indicating installation, dimensions, clearances and other special conditions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

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

Cornell
McGuire Co. Overhead Door
Raynor
R & S Manufacturers
Wayne Dalton

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtain:
    1. Material: Stainless Steel #4 finish.
    2. Thickness: 22 gage.
    3. Bottom Bar: Tubular stainless steel with hand holds, slide bar locks, and weatherstripping.
    4. Nominal Height: 1½"

B. Guides:
    1. Material: 13 gage Stainless Steel #4 finish.
    2. Mounted: In opening mounted (between jambs).

C. Hood:
    1. 24 gage Stainless Steel.

D. Operation:
    1. Manual push up from exterior
    2. Torsion springs assembly with adjustable tension.

E. Finish:
    Clear Anodized.

F. Lockable:
    From both exterior.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install door and operating equipment complete with hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports in accordance with final shop drawings, manufacturer's instructions, and as specified herein.

B. Test and Adjust: Upon completion of installation including work by other trades, lubricate, test and adjust doors to operate easily, free from warp, twist or distortion.

END OF SECTION 08 33 14

SECTION 08 71 00 - FINISH HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division l Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

Definition: "Finish Hardware" includes items known commercially as finish hardware which are required for swinging, sliding, and folding doors, except special types of unique and nonmatching hardware specified in the same section as the door and door frame.

1.2 HARDWARE SPECIFIED ELSEWHERE

Rough hardware
Toilet compartments

1.3 QUALITY ASSURANCE

A. Manufacturer: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

B. Supplier: A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than two years, and who is, or who employs an experienced architectural hardware consultant who is available at reasonable times during the course of the work for consultation about project's hardware requirements to Owner, Architect, and Contractor.

C. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local building code requirements. Provide only hardware which has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of door and door frame labels.

Where emergency exit devices are required on fire-rated doors (with supplementary marking on doors' UL or FM labels indicating "Fire Door to be Equipped with Fire Exit Hardware"), provide UL or FM label on exit devices indicating "Fire Exit Hardware."

1.4 SUBMITTALS

A. Product Data: Submit manufacturers technical product data for each item of hardware in accordance with Division l section "Submittals." Include information necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.

B. Hardware Schedule: Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function finish attachment quantity, fire rating, and operation. Revise schedule to comply with all applicable codes. Schedule shall be prepared by a member of the Door and Hardware Institute.

1. Final Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:

a. Type, style, function, size and finish of each hardware item
b. Name and manufacturer of each item
c. Fastenings and other pertinent information
d. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule
e. Explanation of all abbreviations, symbols, codes, etc. contained in schedule
f. Mounting locations for hardware
g. Door and frame sizes and materials
h. Fire-rating
i. Keying information

C. Submittal Sequence: Submit schedule at earliest possible date, particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.

D. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

E. Samples: Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample of proposed lockset and other samples as requested by the Architect, with specified finish for approval. Samples will be returned to the supplier.

F. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware. Upon request, check shop drawings of such other work to confirm that adequate provisions are made for proper location and installation of hardware.

1.5 PRODUCT HANDLING

A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

C. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

D. Provide secure lock-up for hardware delivered to the project but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

PART 2 - PRODUCTS

2.1 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the Finish Hardware Data Sheet and Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following.

B. Manufacturer's Product Designations: One or more manufacturers are listed for each hardware type required. **An asterisk (*) after a manufacturer's name indicates whose product designation is used in the Hardware Schedule for purposes of establishing minimum requirements.** Provide either the product designated, or, where more than one manufacturer is listed, the comparable product of one of the other manufacturers which comply with requirements including those specified elsewhere in this section.

2.2 MATERIALS AND FABRICATION

A. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to Architect.

Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

D. Furnish screws for installation with each hardware item. Provide Phillips flathead screws except as otherwise indicated. Finish exposed (exposed under any condition)

screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

E. Provide concealed fasteners for hardware units which are exposed when door is closed, except to extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex screw fasteners.

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

2.3 HINGES. BUTTS AND PIVOTS

Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

Steel Hinges: Steel pins
Nonferrous Hinges: Stainless steel pins
Exterior Doors: Nonremovable pins
Outswing Locked Doors: Nonremovable pins
Interior Doors: Nonrising pins
Tins: Flat button and matching plug, finished to match leaves, except where hospital tip (HT) indicated

2.4 LOCK CYLINDERS AND KEYING

A. Standard System: Key to Owner’s existing system.

B. Review existing keying systems with the Owner and provide the type required (master, grandmaster or great-grandmaster), integrated with Owner's existing system.

C. Comply with Owner's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.

D. Key Material: Provide keys of nickel silver only.

E. Key Quantity: Furnish three change keys for each lock; five master keys for each master system; and five grandmaster keys for each grandmaster system.

Furnish one extra blank for each lock.

Deliver keys to Owner's representative.

2.5 LOCKS, LATCHES AND BOLTS

A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set.

B. Exit Device Dodging: Except on fire-rated doors, wherever closers are provided on doors equipped with exit devices, equip the units with keyed dogging device to hold the push bar down and the latch bolt in the open position.

2.6 CLOSERS AND DOOR CONTROL DEVICES

A. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.

B. Access-Free Manual Closers: Provide adjustable units complying with ANSI A117.l provisions for door opening force and delayed action closing.

C. Electromechanical Closers and Holders: Provide units designed to hold door in open position under normal usage and to release and automatically close door under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts. Coordinate requirements, voltage, and operation with fire detection.

Provide integral smoke detector device in combination door closers and holders complying with UL 228.

2.7 WEATHERSTRIPPING

General: Provide continuous weatherstripping at each edge of every exterior door leaf. Provide type, sizes, and profiles shown or scheduled. Provide non-corrosive fasteners as recommended by manufacturer for application indicated.

2.8 HARDWARE FINISHES

A. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lockset (or push-pull units if no latch/locksets) for color and texture.

B. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, or aluminum, except as otherwise indicated. The suffix "-NL-" is used with standard finish designations to indicate "no lacquer."

C. The designations used in schedules and elsewhere to indicate hardware finishes are the industry-recognized standard commercial finishes, except as otherwise noted.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division 9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.

C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

E. Set thresholds for exterior doors in full bed of butyl rubber or polyisobutylene mastic sealant.

3.2 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

C. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

D. Continued Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of

hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.3 HARDWARE CRITERIA SCHEDULE

A. Acceptable Manufacturers:

Butts: Hager, Soss, Lawrence, McKinney, Stanley*, PBB

Locks: Corbin, Russwin, Sargent, Schlage*, Best

Push/Pull: Baldwin, Brookline, Ives, Builders Brass Works, Rockwood, Hager*
Overhead Closers: LCN*, Sargent, Rixson-Firemark

Thresholds and Weatherstripping: Zero, National Guard*, Pemko, Reese

Kickplates: Hager, Builders Brass Works, Rockwood

B. Additional Requirement: See drawing for hand, frame and door materials, fire rating, and other conditions affecting final hardware schedules.

C. Schedule: Each door leaf to be as scheduled unless noted.

Hardware Heading #1: Doors- # 1

1 ½	Pr Butts-	FBB 191 4 ½ X 4 ½	US 32D
1	Lockset	L9453P L07	US 32D
1	Closer	4010 Series Hold-open X	AL
1	Stop	234 W	US 26D
1	Threshold	896 S X DW	
1	Set Weatherstripping	284Q X DP	
1	Door Bottom Sweep	200 SSS X DW	

Hardware Heading #2: Doors- # 5

1 ½	Pr Butts-	FBB 191 4 ½ X 4 ½	US 32D
1	Lockset	L9453P L07	US 32D
1	Closer	4010 Series Hold-open X	AL
1	Stop	241 F	US 26D
1	Threshold	896 S X DW	
1	Set Weatherstripping	284Q X DP	
1	Door Bottom Sweep	200 SSS X DW	

Hardware Heading #3 Doors- # 3

1 ½	Pr Butts	FBB 191 4 ½ x 4 ½	US 32 D

1	Deadbolt	B 660	US 32 D
1	Pull Handles	121 L	US 32 D
1	O.H. Holder	GJ 104 H	US 32 D
1	Threshold	896 S x DW	
1	Door Bottom Sweep	200 SSS x DW	
1	Set Weather Stripping	284Q x DP	

Hardware Heading #4: Doors- # 6,7 RH

3	Pr Butts-	FBB 191 4 ½ X 4 ½	US 32D
1	Lockset	L9453P L07	US 32D
2	OH Holder Stops	GJ 104 H	US 32D
1	Set Surface Bolts	GJ 1708 B + 1712T	US 26D
1	Astrager	178 SA x DH	
1	Threshold	896 S	
1	Set Weatherstripping	284Q X DP	
2	Door Bottom Sweep	200 SSS X DW	

Hardware Heading #5: Doors- # 8

1 ½	Pr Butts-	FBB 191 4 ½ X 4 ½	US 32D
1	Lockset	L 9080 L07	US 32D
1	O H Holder	GJ 104H	US 32D
3	Silencers		

Hardware Heading #6: Doors- # 2,4

1 ½	Pr Butts-	FBB 191 4 ½ X 4 ½	US 32D
1	Deadbolt	B 663 P	US 32D
1	Closer	4040 Series PA - DA	AL
1	Push	30 S 4 x 16	US 32D
1	Pull	34 G 4 x 16	US 32D
1	Kick Plate	190 S 12 x 34	US 32D
1	Threshold	415 + 700 ES x DW	
1	Stop		
1	Set Weatherstripping	284Q X DP	

Hardware Heading #7: Doors- Key Control Cabinet

Mounted where instructed by owner

END OF SECTION 08 71 00

SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Surface preparation and field application of paints and coatings.

B. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

C. Work includes painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.

D. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors or paintings are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. In finished areas, piping, conduits, ductwork, hangers, and other similar items shall also be painted. Paint electrical plywood backboards before installation.

E. Pre-finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) toilet enclosures, prefinished partition systems, acoustic materials, and finished mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets. Do not paint exterior concrete retaining wall or light pole bases unless noted.

F. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.

G. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.

H. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.

I. Do not paint over code-required labels, such as Underwriters' Laboratories and Factory Mutual, or equipment identification, performance rating, name, nomenclature plates or sprinkler heads.

1.2 RELATED SECTIONS

A. Division 02, Asphalt Concrete Paving

B. Division 05, Division 08, Division 10 and Division 13, shop-primed items

1.3 REFERENCES

A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

C. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.

D. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.

1.4 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Provide data on all finishing products. Reference applicable product specified.

C. Samples: Submit one sample, illustrating range of colors and textures available for each surface finishing product scheduled.

D. Manufacturer's Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention.

1.6 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum 3 years documented experience.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for finishes.

B. Conform to Federal, State and Local laws and regulations, regarding lead content, VOC, and disposal.

1.8 FIELD SAMPLES

A. Provide field sample of paint under provisions of Section 01 45 00.

B. Provide field sample panel, 2' long x 2' wide, illustrating coating color, texture, and finish. All color selections are preliminary and subject to change until approval of actual field samples applied on representative surfaces. The Architect shall make color selections.

C. Locate where directed.

D. **Final acceptance of colors, texture, sheen and application will be from samples applied on the job on actual substrates. The Architect may change the color or sheen based upon this test sample. DO NOT PROCEED WITH PAINTING WITHOUT THE ARCHITECT'S APPROVAL OF FIELD SAMPLES.**

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

C. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

D. Store paint materials at minimum ambient temperature of 45°F (7°C) and a maximum of 90°F (32°C), in ventilated area, and as required by manufacturer's instructions.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

C. Minimum Application Temperatures for Latex Paints: 45°F (7°C) for interiors; 50°F (10°C) for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish Finishes: 65°F (18°C) for interior or exterior, unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 50 footcandles measured mid-height at substrate surface.

F. Provide adequate ventilation of occupied spaces exposed to paint fumes or agents. Where occupied spaces are adjacent to painting or connected by means of HVAC system. Seal off these spaces from exposure of paint fumes including erection of temporary barriers, scaling HVAC, providing fresh air or paint applications during non-occupied hours to minimize exposure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS: Unless otherwise listed, provide product of one of the following.

A. Paint:
   1. Duron
   2. Dulux Paints
   3. Sherwin-Williams (SW)
   4. Porter
   5. Benjamin Moore

B. Substitutions: Under provisions of Section 01 25 13.

2.2 MATERIALS

A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.

B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but necessary or recommended to achieve the finishes specified, of commercial quality.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and substrate conditions are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter before applying coatings and continuing when conditions change. Do not apply coating unless the moisture content is below the following maximum values:
   1. Wood: 15 percent
   2. Horizontal Concrete: 8 percent
   3. Masonry, plaster, stucco, gypsum soffits and horizontal concrete: 12 percent

3.2 PREPARATION GENERAL

A. Prepare surfaces as recommended by the paint manufacturer and as requested herein.

B. Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

C. Correct defects and clean surfaces which affect work of this section. (Remove existing

coatings that exhibit loose surface defects.) Surfaces to be painted must be free of foreign objects and imperfections.

D. Seal with shellac and seal marks which may bleed through surface finishes.

E. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

G. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.

H. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.

I. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.

J. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.

K. Wood Doors: Seal top and bottom edges with primer. Reseal where wood doors are trimmed.

L. Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block (CMU) and cement plaster to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening to remove glaze. Prepare in accordance with ASTM E84. Rub block to remove loose mortar. Joints shall be uniform. Fill irregularities with cement grout, finish flush to adjacent surface with smooth uniform surface.

Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions. Generally allow cementitious surfaces not less than 30 days to cure before painting.

Clean concrete floor surfaces scheduled to be painted with a commercial solution of muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize acid, and allow to dry before painting. Rub concrete masonry units to remove loose mortar.

Fill irregularities with cement grout and prime.

M. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

N. Gypsum Drywall: Fill minor cracks and holes with spackle and sand smooth. Remove all foreign matter and surface defects.

For surfaces designated to receive gloss, semi-gloss or epoxy finishes, roller apply a batter consistency mixture of wallboard joint compound and water to entire surface. Remove with broad knife without leaving ridges. Sand smooth.

3.3 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish.

D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Sand wood and metal lightly between coats to achieve required finish.

F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

G. Allow applied coat to dry before next coat is applied.

H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

I. Prime concealed surfaces of interior and exterior woodwork with primer paint.

J. Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

K. Where a portion of a surface is damaged or unsatisfactory, refinish an entire surface plane from corner to corner, floor to ceiling. Spot touch-up is not acceptable.

3.4 CLEANING

A. Clean work under provisions of Section 01 70 00.

B. Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.5 WORKMANSHIP

A. Coverage and hide shall be complete and uniform in color, texture, sheen, and finish.

B. Finish surfaces shall be free of runs, ridges, laps, drops, waves, and brush or roller marks.

C. Rework and refinish surfaces not in conformance with the requirements under Preparation and Application, or finish until satisfactory results are obtained.

3.6 PAINT SCHEDULE (MATERIALS):

A. Exterior Acrylic Latex Flat House Paint

Ben.Moore	183 Super Spec 100% Acrylic Flat House Paint
Duron	WeatherShield Flat O6
Dulux	Professional Flat
SW	A100 Exterior Latex Flat A6
Porter	929 AcriPro 100 Exterior Acrylic Flat

B. Exterior Acrylic Latex Semi-Gloss House Paint

Ben.Moore	170 Super Spec 100% Acrylic Semi-Gloss House Paint
Duron	WeatherShield Semi-Gloss O3
Dulux	Professional Semi-Gloss
SW	A100 Exterior Latex Semi-Gloss A8
Porter	6029 AcriPro 100 Exterior Acrylic Semi Gloss

C. Exterior Elastomeric Waterproof Coating

Ben.Moore	056 Moorlatic Acrylic Elastomeric Coating
Duron	Dura Clad Premium "10" Elastomeric
Dulux	2260 XXXX Decra-Flex High Build Elastomeric UV cured smooth
SW	Elastomeric Coating A5W100
Porter	6000 Porter Flex Elastomeric Coating, Smooth

D. Exterior Silicone Alkyd Gloss Enamel

Ben.Moore	M21 I.M.C. Silicone Alkyd Gloss Enamel
Duron	Dura Clad 93-040
Dulux	(Glidden) 5539 Glid-Guard
SW	Silicone Alkyd Enamel B56Z Vol.Solid 59%
Porter	Porter Guard 2200 Silicone Alkyd Enamel

E. Exterior Acrylic Gloss Enamel

Ben.Moore	M28 I.M.C. 100% Acrylic Gloss Enamel
Duron	Dura Clad DTM 95-056
Dulux	Acrylic Waterborne Gloss Enamel 4208
SW	DTM Acrylic Gloss, B66-100
Porter	Porter Guard DTM Acrylic Gloss Enamel, 2909

F. Exterior Concrete Masonry Latex Block Filler

Ben.Moore	285 Super Spec Acrylic Latex Block Filler
Duron	Block Kote 08-126

Dulux	3010 XXXX Ultra-Hide Block Filler
SW	PreRite Latex Block Filler B-25W25
Porter	6223 ProMaster 2000 Latex Block Filler

G. Exterior Concrete Acrylic Primer

Ben.Moore	068 Masonry Bonding Primer
Duron	Bond 'N' Seal 08-124
Dulux	2000 Decrashield Acrylic Primer
SW	A24 Series Loxon Acrylic Primer
Porter	6010 Porter Lock Acrylic Masonry Sealer

H. Exterior Wood Acrylic Primer

Ben.Moore	169 Super Spec Acrylic Latex Primer
Duron	08/124 Bond 'N' Seal
Dulux	Professional Acrylic Primer
SW	A-100 Latex Primer B42W41
Porter	6010 335 AcriPro 100 Exterior Acrylic Primer

I. Exterior Ferrous Metal Acrylic Primer

Ben.Moore	M06 I.M.C. Alkyd Metal Primer
Duron	95-05 Dura Clad DTM
Dulux	4020 XXXX Devflex DTM
SWB66W1	
Porter	212/215 PorterGuard DTM Primer Finish

J. Exterior/Interior Alkyd Galvanized Metal or Aluminum Primer

Ben.Moore	M04 I.M.C. Acrylic Metal Primer
Duron	N/A
Dulux	Devguard 4120
SW	Galvite H5 B50WZ30
Porter	299 PorterGuard Alkyd Zinc Dust Coating

K. Interior Acrylic Latex Flat

Ben. Moore	275 Super Spec Acrylic Laatex Flat
Duron	38 Series Ultra Deluxe Vol.Solids 30%
Dulux	1210 XXXX Ultra-Hide Vol.Solids 31.5%
SW	ProMar B30W200 Vol.Solids 34%
Porter	6109 ProMaster 2000 Vol. Solids 33%

L. Interior Acrylic Latex Eggshell

Ben.Moore	274 Super Spec Acrylic Latex Eggshell
Duron	36XX Ultra Deluxe Solids 35%
Dulux	1412 XXXX Ultra-Hide Solids 35.4%
SW	B20W200 ProMar 200 Solids 34%
Porter	6129 ProMaster 2000 Latex Eggshell Solids 35%

M. Interior Acrylic Latex Semi-Gloss

Ben.Moore	276 Super Spec Acrylic Latex Semi-Gloss

Duron	35XX Ultra Deluxe Vol.Solids 35%
Dulux	1416 XXXX Ultra-Hide Vol.Solids 36%
SW	B31W200 ProMar 200 Vol.Solids 36%
Porter	6139 ProMaster 2000 Latex S.G. Vol. Solids 37%

N. Interior Acrylic Latex Gloss

Ben.Moore	M28 I.M.C. Acrylic Gloss Enamel
Duron	Plastic Kote Interior Acrylic
Dulux	3028 XXXX Ultra-Hide
SW	B21W200 ProMar 200
Porter	6149 ProMaster 2000 Acrylic Gloss

O. Interior Alkyd Eggshell

Ben.Moore	305 Dulamel Alkyd Eggshell Enamel
Duron	45XX Wall Kote
Dulux	1512 Ultra-Hide
SW	B33W200 ProMar 200
Porter	129 ProMaster 2000 Alkyd Satin

P. Interior Alkyd Semi-Gloss

Ben.Moore	271 Super Spec Aklyd Semi-Gloss Enamel
Duron	55 Series Craft Kote
Dulux	1516 Ultra-Hide
SW	B34W200 ProMar 200
Porter	149 ProMaster 2000 Alkyd S.G.

Q. Interior Alkyd Gloss

Ben.Moore	M22 I.M.C. Alkyd Gloss Enamel
Duron	49XX Wall Kote
Dulux	B54 Devguard Industrial
SW	4308 Industrial Enamel
Porter	2749 Porter Guard Alkyd Gloss

R. Interior Waterborne Polyamide Epoxy Gloss

Ben.Moore	M42 I.M.C. Waterborne Polyamide Epoxy
Duron	95-080 Dura Clad
Dulux	4408 Tru-Glaze
SW	B73-100 Waterbase Tile Clad Amine Epoxy
Porter	9371 Dura Glaze

S. Interior Solvent Epoxy

Ben.Moore	M36 I.M.C. Polyamide Epoxy-Gloss
Duron	93-02 Dura Clad Polyamide
Dulux	4508 Tru-Glaze
SW	B-622 Tile Clad HS
Porter	4000 Porter Glaze

T. Interior Polyurethane Varnish Gloss

Ben.Moore	428 Benwood Polyurethane Clear Gloss
Duron	15-015 Permathane
Dulux	1908 Woodpride
SW	A67 Series
Porter	858 Wood Guardian Gloss Poly

U. Interior Latex Primer Drywall, Concrete

Ben.Moore	253 Super Spec Acrylic Latex Primer/Sealer
Duron	04-126 Ultra Deluxe
Dulux	1030 PVA
SW	B28W200 PrepRite 200 Wall Primer
Porter	867 ProMaster 2000 Latex Primer

V. Interior Acrylic Latex Block Filler

Ben.Moore	285 Super Spec Acrylic Latex Block Filler
Duron	08-126 Block Kote
Dulux	3010 Ultra-Hide
SW	B25W25 Block Filler
Porter	6223 ProMaster 2000 Block Filler

W. Interior Stain

Ben.Moore	234 Benwood Alkyd Wood Stain
Duron	28 Series Penetrating
Dulux	1700 Woodpride
SW	A48 - 100 Wood Classic Oil Stain
Porter	832 Wood Guardian DL Stain

X. Interior Wood Polyurethane Varnish Satin

Ben.Moore	435 Benwood Polyurethane Low Luster Clear
Duron	15-011 Permathane
Dulux	1902 Woodpride
SW	A67 Series
Porter	857 Wood Guardian Satin Poly

Y. Interior: Low Odor Finish: Zero VOC Primer Coat

Ben.Moore	211 Pristine EcoSpec 100% Acrylic Primer Sealer
Duron	71-218 Terminator Primer Sealer
Dulux	LM9116 Lifemaster Vinyl Acrylic Interior Primer Sealer
SW	B11W44 Harmony Latex Primer Sealer
Porter	9-2 Pure Performance Latex Interior Zero VOC Primer

Z. Interior: Low Odor Zero VOC Finish

Ben.Moore	212 Pristine EcoSpec 100% Acrylic Interior Flat Wall Paint
	213 Pristine EcoSpec 100% Acrylic Eggshell Enamel
	214 Pristine EcoSpec 100% Acrylic Semi-Gloss Enamel
Duron	60 Series Genesis Vinyl Acrylic Flat Wall Paint
	79 Series Genesis Vinyl Acry Low Sheen Enamel
	83 Series Genesis Acrylic Semi-Gloss Enamel

Dulux	LM 9100 Lifemaster Vinyl Acrylic Interior Flat Paint
	LM 9300 Lifemaster Vinyl Acrylic Eggshell Enamel
	LM 9200 Lifemaster Vinyl Acrylic Semi-Gloss Enamel
SW	B5 Series Harmony Latex Flat Wall Paint
	B9 Series Harmony Latex Eggshell Enamel
	B10 Series Harmony Latex Semi-Gloss Enamel
Porter	9-110 Pure Performance Flat Wall Paint
	9-411 Pure Performance Eggshell Enamel
	9-510 Pure Performance Semi-Gloss Enamel

AA. Other Products: Provide Manufacturer's recommended, first quality sealers, fillers, primers, and other products compatible with substrate and finish.

3.7 IDENTIFICATION

A. In concealed space above finished ceilings, permanently identify smoke partitions, fire rated partitions, and firewalls with painted 6" high stencil lettering reading, as appropriate: "1 HOUR FIRE AND SMOKE BARRIER--PROTECT ALL OPENINGS" or "SMOKE BARRIER--PROTECT ALL OPENINGS." Change fire rating to suit wall assembly. **Provide on each face of each such partition with a minimum of one identification each surface and at 12'-0" o.c.**

3.8 COLORS

A. Colors shall be as selected by the Architect. Custom colors may be required.

B. The interior walls will be finished with accent colors requiring changes in colors at changes in wall plane. Color changes shall be masked to produce a straight and even edge. The painting contractor shall assume that 10% of all wall planes will be accent colors.

3.9 PAINT SCHEDULE, EXTERIOR

A. Steel:
   1. One coat — Alkyd Metal Primer
   2. Two coats — Acrylic High Gloss House Paint

B. Steel - Galvanized:
   1. One coat — Alkyd Metal Primer
   2. Two coats — Acrylic High Gloss House Paint

C. Wood & Plywood:
   1. One coat — exterior latex primer
   2. Two coats — exterior Latex Satin Alkyd House Paint

3.10 PAINT SCHEDULE, INTERIOR

A. Steel:

1. One coat Acrylic Metal Primer
2. Two Coats Acrylic Gloss enamel

B. Steel - Galvanized:
1. One coat Alkyd Metal Primer
2. Two coats Acrylic Gloss enamel

C. CMU: (Painted)
1. One coat heavy-duty Acrylic latex block filler
2. Two coats latex low luster Enamel

D. CMU: Epoxy Painted
1. One coat HD Block Filler
2. Two coats Water Borne Epoxy

E Wood & Plywood:
3. One coat primer
4. Two coats latex low luster enamel

END OF SECTION 09 91 00

SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of signs is shown on the drawings.

B. Forms of specialty signs required include the following:

Plastic signs with raised letters

1.3 QUALITY ASSURANCE

A. Uniformity of Manufacturer: For each sign form and graphic image process indicated furnish products of a single manufacturer.

B. Examine the on-site conditions prior to fabricating. Field measure for all dimensions. Report in writing any defects in construction or field conditions prior to commencing work.

C. ADA Accessibility: Comply with requirements of ANSI A117.1 for Handicapped accessibility of signs.

1.4 SUBMITTALS

A. Shop Drawings: Submit shop drawings for fabrication and erection of specialty signs. Include plans, elevations, and a large scale details of sign wording and lettering layout. Show anchorages and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.

Furnish full-size spacing templates for individual building mounted letters and numbers.

B. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required. Provide copy of product data for Maintenance Manual. Submit color chart for selection by the Architect.

1.5 FEES AND PERMITS

A. Obtain and pay for all necessary permits, fees, inspections, and tests required by regulating authorities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Sheet: Provide aluminum sheet of alloy and temper recommended by the aluminum producer or finisher for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B209 for 5005-H15.

B. Aluminum Extrusions: Provide aluminum extrusions of ally and temper recommended by the aluminum producer or finisher for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B221 for 6063-T5.

C. Stainless Steel Plate, Sheet and Strip: Provide stainless steel plate, sheet or strip, AISI Type 304, complying with the requirements of ASTM A666.2.

D. Fasteners: Unless otherwise indicated, use concealed fasteners fabricated from stainless steel.

E. Paint: All steel to receive rust inhibiting prime coat of paint.

2.2 PLASTIC SIGNS

A. ADA complying signs for mounting beside door as follows:

1. Letter Height: 5/8"-2" sized to suit available spacing.
2. Letter Style: Helvetica upper case.
3. Letters, Raised: 1/32" minimum with Grade 2 braille.
4. Color, Letters and Background: Contrasting style.
5. Corners: Radiused 1/2" to 3/4".
6. Frame (where noted as insert): Nominal 1/2" deep frame with nominal 1/8" face view width. Signs for toilets, stairs, and other nonchangeable function shall have simulated border.
7. Mounting: Vinyl tape on drywall.
8. Finish: Nonglare.
9. Material: Scratch resistant, nonstatic, fire retardant melamine suitable for raised lettering.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate sign units and accessories where shown or schedules, using mounting methods of the type described and in compliance with the manufacturer's instructions.

Install sign units level, plumb and at the height indicated, with sign surfaces free from distortion or other defects in appearance. Unless otherwise indicated, mount door signs 60" from finish floor to centerline of sign and on wall adjacent to strike side door jamb.

3.2 CLEANING AND PROTECTION

A. At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Architect.

3.3 SIGN SCHEDULE

A. Nominal 8"W x 8"H "WOMEN" with graphic pictogram and handicapped access symbol. Provide 1

B. Nominal 8"W x 8"H "MEN" with graphic pictogram and handicapped access symbol. Provide 1

END OF SECTION 10 14 00

SECTION 10171 - SOLID PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Solid plastic toilet compartments and shower partitions, floor mounted, overhead braced, and matching urinal screens.

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 RELATED SECTIONS

A. Division 06, Rough Carpentry: Framing and plates within walls, Framing above ceiling for partition panel support.

B. Division 10, Toilet and Bath Accessories.

1.3 REFERENCES

A. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 06.

B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of supports, door swings and cutouts for toilet accessories.

C. Product Data: Provide data on panel construction, hardware, and accessories.

D. Samples: Submit one set actual sample of partition panels, illustrating panel finish, colors available, and sheen. Colors will not be selected from printed reproductions of colors.

E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and care instructions.

1.5 REGULATORY REQUIREMENTS

A. Conform to ANSI A117.1 code for access for the handicapped.

B. Panels shall have Class "B" flame spread rating as tested by ASTM E84

1.6 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Capitol Partitions - Poly-Pro and Poly-Pro Plus.

B. Comtec Industries - Product S200 and D400 Series.

C. Santana - Product Poly-Mar HD and Poly-Granite HD.

D. Globel Partitions - Polymar

E. Accurate Partitions Corp.

F. Substitutions: Under provisions of Section 01 25 13.

2.2 MATERIALS

A. Solid Panel: Solid HDPE resin (high density polyethylene), Class B flame spread.

2.3 ACCESSORIES

A. Head Rails: Hollow aluminum tube, 1"x 1-_" size, with anti-grip strips and cast socket wall brackets.

B. Attachments, Screws, and Bolts: Stainless steel; tamper proof type, heavy duty extruded aluminum brackets.

C. Through Bolts and Nuts: Stainless steel with tamper proof heads.

D. Hardware: Stainless Steel. Aluminum and Zamac not acceptable except as noted.

1. Hinges: Surface mounted heavy duty, self-closing, 16 gage stainless steel continuous piano hinge 2" wide. Thru bolted with one way sex bolts. Run full height of door with a minimum of 6 thru bolts to panel and door.
2. Coat Hook: Chrome plated Zamak with rubber bumper, one per door.
3. Latch & Strike: Surface mounted and stainless steel slide latch through bolted to door. Wrap around strike with bumper, stainless steel.
4. Bracket: Continuous ”U” shaped full height with , extruded clear anodized aluminum (6063-T5 Alloy).
5. Door Pull for outswing doors: stainless steel.
6. Bumper for outswing doors: chrome plated Zamak with rubber bumper.
7. Headrail at shower partitions shall have sliding hooks for shower curtain.

2.4 FABRICATION

A. Fabricate partitions by forming solid plastic with finished faces and edges. Finish edges convex.

B. Bevel corners and edges of cutouts.

C. Doors and Panels:

1. Thickness: 1".
2. Door Width: 24" in-swing.
3. Door Width for Handicapped Use: 32" minimum clear out-swinging or as shown.
4. Height: 55 minimum".

D. Thickness of Pilasters: 1" minimum 81" High w/stainless steel bottom shoe.

2.5 FINISHING

A. Solid Plastic, Color: Doors and panels in colors selected by Architect. Up to four colors may be selected with different colors for panels and doors.

B. Stainless Steel Surfaces: No. 4 finish.

C. Aluminum: Clear anodized.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify site conditions under provisions of Section 01 45 00.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

D. Verify actual finished dimensions of space.

3.2 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Attached continuous panel brackets securely to walls using anchor devices.

C. Attach panels and pilasters to brackets with tamper proof through bolts and nuts. Locate head rail joints at pilaster center lines.

D. Anchor urinal screen panels to walls with continuous panel brackets with anchors not less than 12" o.c.

E. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster. Conceal floor fastenings with pilaster shoes.

F. Equip each door with one continuous hinge, one door latch, one coat hook and bumper; out-swinging door with pull.

G. Install door strike and keeper with door bumper on each pilaster in alignment with door latch.

H. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.3 ADJUSTING

A. Adjust work under provisions of Section 01 70 00.

B. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16" (5 mm).

C. Adjust hinges to position doors in partial opening position when unlatched, and return out swinging doors to closed position.

D. Adjust adjacent components for consistency of line or plane.

END OF SECTION 10 21 13.19

SECTION 10 28 13 - TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Toilet accessories.

B. Grab bars.

C. Attachment hardware.

D. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

Placement of concealed anchor devices which require being built-in.

1.3 REFERENCES

A. ANSI A117.1 - Safety Standards for the Handicapped.

B. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

C. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

D. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

E. ASTM A366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

F. ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and cutout and reinforcements of partitions.

1.5 REGULATORY REQUIREMENTS

A. Conform to ANSI A117.1 code for access for the handicapped.

1.6 COORDINATION

A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of

toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Products specified are by Bobrick Washroom Equipment, Inc., unless otherwise noted.

B. Other acceptable manufacturers offering equivalent products:

1. American Specialties
2. Bradley Corporation
3. Hallmark-Nutone/Div. Scovill

C. Substitutions: Under provisions of Section 01 25 13.

2.2 MATERIALS

A. Sheet Steel: ASTM A366, 20 gage minimum.

B. Stainless Steel Sheet: ASTM A167, Type 304, 22 gage minimum.

C. Tubing: ASTM A269, stainless steel.

D. Adhesive: Two component epoxy type, contact type, waterproof.

E. Fasteners, Screws, and Bolts: Hot dip galvanized, if concealed, stainless steel exposed, tamper-proof, and security type.

2.3 FABRICATION

A. Weld and grind joints of fabricated components, smooth.

B. Form exposed surfaces from single sheet of stock, free of joints. Form surfaces flat without distortion. Maintain surfaces without scratches or dents. Seams shall be tight and exposed edges rolled.

C. Shop assemble components and package complete with anchors and fittings.

D. Provide steel anchor plates, adapters, and anchor components for installation. Anchors shall be concealed.

2.4 KEYING

A. Supply two keys for each accessory to Owner.

2.5 FINISHES

A. Galvanizing: ASTM A123, G60. Galvanize ferrous metal and fastening devices.

B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

C. Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats [epoxy] [electrostatic] baked enamel.
D. Chrome/Nickel Plating: ASTM B456, Type SC 2 satin finish.

E. Stainless Steel: No. 4 satin luster finish.

F. Back paint components where contact is made with building finishes to prevent electrolysis.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that site conditions are ready to receive work and dimensions are correct.

B. Verify exact location of accessories for installation.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions and ANSI A117.1.

B. Install plumb and level, securely and rigidly anchored to substrate.

3.4 SCHEDULE

Products are identified on the drawings by their abbreviation noted in ( ). Provide quantity as shown and/or scheduled.

ITEM	MODEL #	FURNISH
A. Toilet Paper Holder (TPH)	B-2890	Provide 1 each watercloset
B. Grab Bars w/Satin Finish (GB X length)	B-5806 Series	Provide pair of 42"x32" each handicapped watercloset
C. Mirror (M x size)	B-165	Provide 1 each lavatory
D. Diaper Changing Station	KB-200-11	Provide 1 each restroom
E. Hand Dryer	B-7120 115v 1725 watts	Provide 1 each restroom
F. Soap Dispenser	B-818615	Provide 1 each lavatory
G. Sanitary Napkin Disposal	B-354 & B-3544	Provide access to one each toilet

		comp.
H. Curtain Rod	B-207 + 204	Hooks provided at each shower
I. Shower Curtain	B-204-2	Provide pair each regular shower
	B-204-3	Provide pair each accessible shower
J. Towel Bar	B-530x30	Provide one each restroom
K. Robe Hooks	B-672	Provide Pair at each shower
L. Mop Holder	B-223 X 24	Provide at Mop Basin

END OF SECTION 10 28 13

SECTION 10 44 13 - FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

Extent of fire extinguishers, and accessories is indicated on drawings or so specified herein. Identified as "F.E." on drawings.

1.3 SUBMITTALS

Product Data: Submit product data for each type of product. For fire extinguisher cabinets include roughing-in dimensions and details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, and panel style and materials.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

J.L. Industries
Larsen's Manufacturing Company
Kidde

2.2 FIRE EXTINGUISHERS

Provide Type II extinguishers unless otherwise specified. Provide Type III extinguisher in commercial kitchens.

TYPE II - Multi-Purpose: UL rated 4-A:60:B:C, in enameled steel container.

2.3 MOUNTING BRACKETS

Provide manufacturer's standard brackets designed to prevent accidental dislodgement of extinguisher, of sizes required for type and capacity of extinguisher indicated, in manufacturer's standard plated finish. Provide brackets for extinguishers not located in cabinets.

PART 3 - EXECUTION

3.1 INSTALLATION

Install items in this section in locations and at mounting heights indicated at heights to comply with applicable regulations of governing authorities. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

END OF SECTION 10 44 13

SECTION 10 51 26 - PLASTIC LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes plastic lockers and benches as indicated.

1.3 SUBMITTALS

A. Submit product data and installation instructions for metal locker units and related equipment.

B. Submit color samples on squares of actual HDPE material for selection.

C. Shop drawings that show lockers in dimensioned relation to adjacent surfaces. Show lockers in detail, method of installation, fillers, trim, base, and accessories. Include locker numbering sequence information and for combination locks their respective locker numbers.

1.4 QUALITY ASSURANCE

A. Uniformity: Provide lockers that are standard products of single manufacturer, with interchangeable like parts. Include necessary mounting accessories, fittings, and fastenings.

1.5 JOB CONDITIONS

A. Do not deliver lockers until building is enclosed and ready for locker installation. Protect from damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

ASI
Hallowell
Lenox
School Lockers.com

2.2 LOCKERS

A. Size and Type: Cubbie Type, open without doors, flat top, each compartment 12" wide x 12" deep x 12" high,

B. Construction: not less than 6 tier thick HDPE

6. Number Plates: Provide manufacturer's standard etched number plates with numbers not less than 3/8" high. Sequentially number lockers in each room.

7. End Panels: match end closure units.

8. Color - as selected by Architect.

2.3 FABRICATION GENERAL

A. Construction: Fabricate lockers square, rigid, and without warp, with faces flat and free of dents or distortion

2.4 LOCKER ROOM BENCHES

A. Manufacturer's standard units 1 1 / 2 thick HDPE 12" wide X 72" Long. Furnish 3 black anodized aluminum pedestal supports with provisions for concealed fastening to floor and securing to bench.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install lockers in accordance with manufacturer's instructions for plumb, level, rigid, and flush installation. Space fastenings about 48" o.c., unless otherwise recommended by manufacturer, and apply through backup reinforcing plates where necessary to avoid metal
distortion, using concealed fasteners. Anchor all lockers to wall and/or floor construction. Attach number plates in schedule and sequence.

B. Install trim, metal base, sloping top units, and metal filler panels and end panels, using concealed fasteners. Provide flush, hairline joints against adjacent surfaces.

C. Install benches in compliance with manufacturer's instructions, securely anchored in place.

3.2 ADJUST AND CLEAN

A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly and will securely lock.

B. Touch up marred finishes, but replace units that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 10 51 13

SECTION 31 20 00 - EARTH WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

The Owner will have the building pad rough graded. The Contractor shall:

1. Preparing of subgrade for building slabs, walks, and pavements and 5' beyond
2. Drainage fill course for support of slabs
3. Excavating and backfilling of trenches

B. Excavating and Backfilling for Mechanical/Electrical Work: Excavation and backfill in conjunction with underground mechanical and electrical is specified in Division 22 and 26 sections. Work of those Divisions shall conform to requirements of this section.

1.3 DEFINITIONS

A. Excavation consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be at Contractor's expense.

C. Additional Excavation: When excavation has reached required subgrade elevations, notify Architect, who will make an inspection of conditions. If Architect determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Architect. The Contract Sum may be adjusted by an appropriate Contract Modification.

D. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular subbase, drainage fill, topsoil materials, slabs, paving or footings.

E. Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

F. Satisfactory Soil Materials: Clean subsoil, free from debris, roots, topsoil, frozen material and rock larger than ½ cu.ft. fill material shall be tested and approved by Testing Agency for degree of compaction required by its intended use.

G. Unsatisfactory Soil Materials: Soil materials not capable of being compacted to density required, mass or trench rock material, debris and organic materials.

H. Backfill and Fill Materials: Satisfactory soil materials free of rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter.

I. Muck: Wet organic material which will not support a light crawler tractor and requires removal by power shovels or draglines.

J. Trench Rock: Excavation in trenches and pits includes removal and disposal of materials and obstructions encountered which cannot be excavated with a 1.0 cu.yd. (heaped) capacity, 42" wide bucket on track-mounted power excavator equivalent to Caterpillar Model 215D-LC, rated at not less than 120HP flywheel power, and 25,000 lb. drawbar pull. Trenches in excess of 10 feet in width and pits in excess of 30 feet in either length or width are classified as open excavation.

K. Mass Rock: Excavation in open excavations includes removal and disposal of materials and obstructions encountered which cannot be dislodged and excavated with modern track-mounted heavy-duty excavating equipment without drilling or blasting. Rock excavation equipment is defined as Caterpillar Model No. D-8N or equivalent track-mounted loader, rated at not less than 285HP flywheel power and developing 45,000 lb. break-out force (measured in accordance with SAE J732C).

L. Typical of materials classified as rock are boulders one cu.yd. or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits not removable as specified above.

M. Intermittent drilling, blasting, or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

N. Earth Excavation: Excavation not classified as rock or muck.

O. Topsoil: Fertile, friable, natural soil of a loamy character, free of clay, stones, or other objectionable materials and suitable for spreading on banks, shoulders, and grassed fields.

P. The quantity of rock areas to be removed shall be agreed on and measured before excavation of if measured in a “neat pile” after excavation, the volume measured will be considered to be 133% of the actual in place volume and will therefore reduced by 25%.

1.4 SUBMITTALS

A. Test Reports: Submit the following reports directly to Architect from the testing services, with copy to Contractor and other interested parties.

1. Test reports on borrow material.

2. Verification of suitability of each footing subgrade material.
3. Field reports; in-place soil density tests.
4. One optimum moisture-maximum density curve for each type of soil encountered.

1.5 QUALITY ASSURANCE

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

B. Testing and Inspection Service: Contractor shall employ and pay for a qualified independent geotechnical testing laboratory to perform soil testing and inspection service during earthwork operations.

C. Testing Laboratory Qualifications: To qualify for acceptance, the geotechnical testing laboratory must demonstrate to Architect's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E699, that it has the experience and capability to conduct required field and laboratory geotechnical testing without delaying the progress of the Work.

1.6 PROJECT CONDITIONS

A. Site Information: Data in subsurface investigation reports (if any) are available for the convenience of the Contractor. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.

Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.

B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations. **Notify all utility companies prior to any excavation.**

Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

C. Use of Explosives: Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction and the Architect.

D. Protection of Persons and Property: Barricade open excavations in traffic and post with warning lights. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Drainage Fill: Crusher-run aggregate, mixture of crushed gravel and fines

B. Other materials: See Paragraph 1.3 Definitions.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavation Classifications: The following classifications of excavation will be made when encountered:

1. Earth excavation
2. Mass rock
3. Trench rock
4. Muck
5. Additional excavation

B. Do not perform rock, muck, or additional excavation work until material to be excavated has been cross sectioned and classified by Architect. Such excavation will be paid on basis of Contract Conditions relative to changes in work. If work proceeds without such cross sectioning and measurement by the Architect, no adjustment in the Contract Sum shall be made except as determined by the Architect.

C. Rock payment lines are limited to the following:

Two feet outside of concrete work for which forms are required, except footings.

One foot outside perimeter of footings.

In pipe trenches, 6" below invert elevation of pipe and 2' wider than inside diameter of pipe, but not less than 3' minimum trench width.

Outside dimensions of concrete work where no forms are required. Under slabs on grade, 6 inches below bottom of concrete slab.

D. Payment limits for muck and additional excavation work shall be the volume of material as directed to be removed and measured by the Architect.

3.2 STABILITY OF EXCAVATIONS

A. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction to prevent cave ins. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

B. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling,

uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses. The Contractor shall design all shoring and bracing.

3.3 DEWATERING

A. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. Perform grading operation to minimize ponding of water that will deteriorate soil conditions and render them unsatisfactory.
B. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components to remove water from excavations.

C. Establish and maintain temporary drainage ditches and other diversions to convey rain water to runoff areas. Do not use trench excavations as temporary drainage ditches.

D. Permanent Drainage: Should clear free-flowing springs or underground water be discovered, notify the Architect. Should permanent subsurface drainage be required, the Contract will be adjusted by Change Orders.

3.4 STORAGE OF EXCAVATED MATERIALS

A. Remove topsoil to full depth encountered in areas indicated to be graded. Stockpile in areas as designated. Shape for drainage.

B. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for drainage. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

3.5 EXCAVATION FOR STRUCTURES

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.

B. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

C. Cut and Fill: Where the building footings or slabs rest partially on cut and partially on fill, undercut the cut area to a depth of 12" below the proposed subgrade, and backfill and compact with material typical of that used in that portion of the building constructed on fill.

3.6 EXCAVATION FOR PAVEMENTS

Cut surface under pavements to comply with cross sections, elevations, and grades.

3.7 TRENCH EXCAVATION FOR PIPES AND CONDUIT

A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 6-9" of clearance on both sides of pipe or conduit.

B. Excavate trenches for conduit to depth to establish slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil or bedding.

C. Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed stone or sand prior to installation of pipe.

D. For pipes or conduit less than 6" in nominal size; and for flat-bottomed, multiple-duct conduit units, do not excavate beyond indicated depths. Hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.

E. For pipes and equipment 6" or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90° (bottom ¼ of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads ensure continuous bearing of pipe barrel on bearing surface.

F. Protect excavations against freezing.

3.8 BACKFILL AND FILL

A. Place soil material in layers to required subgrade elevations, using suitable soils materials except for the following:

1. Where indicated, provide drainage fill material.

2. Backfill trenches with concrete where trench excavations pass within 18" of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing. Concrete is specified in Division 3.

3. Fill in top 12" shall be free of rocks exceeding 3" in dimension and free of gravel or other foreign materials.

4. Backfill curbs and top dress banks, shoulders, planting beds, and grass fields with topsoil (6" maximum depth).

B. Backfill excavations as promptly as work permits but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable,

dampproofing, waterproofing, and perimeter insulation.

2. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.

3. Removal of concrete formwork, trash, debris, shoring, bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place.

3.9 PLACEMENT AND COMPACTION

A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface. Proofroll areas to receive fill with a fully loaded 20-ton dump truck, making two complete coverages of area with perpendicular passes. Areas exhibiting pumping or excessive movement shall be undercut and replaced with compacted fill. Perform proof rolling under observation of testing company. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

B. Place backfill and fill materials in layers not more than 6" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers.

C. Before compaction, moisten or aerate each layer to provide optimum moisture content. Compact each layer to indicated percentage of maximum dry density. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice. Remove and replace soil material that is too wet and cannot be successfully harrowed or disked to remove excess moisture.

D. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

E. Control soil and fill compaction, providing minimum percentage of density specified. Correct improperly compacted areas or lifts if soil density tests indicate inadequate compaction.

F. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, in accordance with ASTM D1557:

1. Under structures, slabs, steps, walks, walls, and pavements, compact top 12" of subgrade and each layer of fill or backfill to 98% Standard Proctor.

2. Under lawns and unpaved areas compact each layer of fill or backfill to 95% standard Proctor. Compacting top of undisturbed subgrade is not required, unless otherwise indicated.

3.10 GRADING

A. General: Uniformly grade areas including transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades. Grade to subgrade allowing for topsoil, pavements, granular fill, and slab depth.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes. Provide final subgrades to a tolerance of plus or minus 0.10 feet.

C. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final subgrades within a tolerance of ½".

D. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.11 DRAINAGE FILL COURSE

A. Placing: Place drainage fill material on prepared subgrade in layers of uniform thickness, conforming to indicated thickness. Maintain optimum moisture content for compacting material during placement operations. Place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

3.12 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Schedule and cooperate with testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.

B. Perform field density tests in accordance with ASTM D1556 (sand cone method) or ASTM D2167 (rubber balloon method), as applicable. Field density tests may also be performed by the nuclear method in accordance with ASTM D2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D3017.

C. Subgrade Inspection: Inspect subgrade to receive fill materials by visual inspection, field density testing, and observation of proofrolling. Provide a minimum of one field density test per 10,000 sq.ft.

D. Footing Subgrade: For each strata of soil on which footings will be placed, perform at

least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata when acceptable to Architect.

E. Paved Areas and Building Slab Subgrade: Perform at least one field density test of subgrade for every 2,000 sq.ft. of paved area or building slab, but in no case fewer than three tests. In each compacted fill layer, perform one field density test for every 2,000 sq.ft. of overlaying building slab or paved area, but in no case fewer than three tests. Observe proofrolling of paved area.

F. Foundation Wall Backfill: Perform at least two field density tests at locations and elevations as directed.

G. If, in opinion of Architect, based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

3.13 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.14 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal to Designated Areas on Owner's Property: Unless otherwise required, transport acceptable excess excavated material, topsoil, and rock to designated soil storage areas on Owner's property. Stockpile soil or spread as directed by Architect.

B. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, and legally dispose of it off Owner's property. If specified, remove excess suitable soils, rocks and topsoil and legally dispose of it off Owner's property.

END OF SECTION 31 20 00

SECTION 31 25 00 - EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Furnishing materials, labor, and equipment to provide temporary slope protection and erosion control.

B. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 QUALITY ASSURANCE

A. Comply with requirements of authorities having jurisdiction. Comply with applicable recommendations of "Manual for Erosion and Sediment Control in Georgia" prepared by the State Soil and Water Conservation Committee of Georgia. Work on public street right-of-ways shall comply with applicable sections of the Georgia Standard Specifications for the Construction of Roads and Bridges.

B. The Specifications and Drawings are not represented as being comprehensive, but rather convey the intent to provide complete slope protection and erosion control for both the Owner's property and adjacent property.

C. Contractor is responsible to provide and maintain slope protection and erosion controls to the satisfaction of the Architect and authorities. The Architect may withhold Certifications for Payment for unsatisfactory slope protection and erosion control until they are corrected.

D. Contractor shall schedule construction in a manner to best provide slope protection and erosion controls. Install riprap and grass slopes, ditches and other areas disturbed by construction at the earliest possible time during the construction sequence.

E. The contractor is responsible for cleaning out and disposing of all sediment once the storage capacity of any facility serving as a sediment area is reduced by 60% and at completion of the Project.

F. Damage to streams or other properties is defined as the addition of soil, debris, rock, topsoil, or construction waste whether deposited by poor construction practice, sedimentation, wind, or other means; or the removal from these areas of soil, rock, topsoil, natural vegetation, or other natural features, whether by erosion, poor construction methods, or other, which can be classified as detrimental to these areas.

G. Damage will be specified either by the Owner, the Architect, or Authorities by actual site

inspections. If it is determined that damage has been caused by the Contractor through negligence, carelessness, by intention, or other, then the Contractor will act as directed to correct said damages as quickly as possible and to take steps to prevent further damage. Such corrections to damage will be at no cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stone Riprap: Unless otherwise indicated, stone riprap shall consist of sound, tough, durable stone which is resistant to action of air and water. The largest pieces of stone shall have a volume of not more than 2 cu.ft. and a weight of not less than 125 pounds, and shall be approximately 90% of the mass of the riprap placed.

B. Silt Fences: Non-woven synthetic polymer fabric. Type C supported silt fences or BSRF fabric consisting of a sandwich of spun bond polyester with a fiberglass scrim installed on wood post with a bonding strip equal to SILT-Saver, Inc. product.

C. Permanent Ground Covers: As specified in Landscaping Specifications.

D. Temporary Ground Covers: Quick growing species such as rye grass that will not later compete with permanent ground covers.

E. Provide fertilizer, mulch, straw, and other materials to control erosion.

PART 3 - EXECUTION

3.1 EROSION CONTROL

A. Establish and maintain erosion control and slope protection Work prior to earth disturbing activities and maintain for duration of the Project.

B. Protect exposed soils with temporary and/or permanent ground covers. Protect slopes from erosion with a combination of grassing, run-off diversion and silt fences. Protect drainage areas by check dams and riprap. All areas where existing vegetation is removed shall be covered with temporary ground cover if exposed for more than 30 days.

C. Provide silt fences, berms, riprap, and other measures to protect adjacent and downstream properties from siltation.

D. Remove and dispose of all temporary erosion control systems at the completion of the project. Clean sediment out of all temporary and permanent erosion control facilities and dispose of as specified in the Earthwork Section for unsuitable materials.

E. Restore damage caused by insufficient erosion control methods or maintenance to the natural conditions as they were prior to construction.

END OF SECTION 31 25 00

SECTION 31 31 16 - TERMITE CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

Provide soil treatment for termite control.

1.3 QUALITY ASSURANCE

A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for work, including preparation of substrate and application.

B. Engage a professional pest control operator, licensed in accordance with regulations of governing authorities for application of soil treatment solution.

1.4 JOB CONDITIONS

To insure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions of the manufacturer.

1.5 SUBMITTALS

Product Data: Submit manufacturer's technical data and application instructions, and handling instructions.

1.6 SPECIFIC PRODUCT WARRANTY

Furnish written warranty signed by Applicator and Contractor certifying that applied soil termiticide treatment will prevent infestation of subterranean termites and, that if subterranean termite activity is discovered during warranty period, Contractor will re-treat soil and repair or replace damage caused by termite infestation. Damage to the Building caused by termites shall be corrected without cost to the Owner up to $25,000 in value. The guarantee shall be for a period of 5 years from date of treatment without renewals being required. The guarantee shall be non-cancelable by all parties except the Owner.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT SOLUTION

Use an emulsible concentrate termiticide for dilution with water, specially formulated to prevent infestation by termites. Fuel oil will not be permitted as a diluent. Toxicant shall be acceptable to Environmental Protection Agency and all other agencies having jurisdiction and shall be effective for use in controlling termite infestation of building. Use only soil treatment solutions which are not injurious to planting.

PART 3 - EXECUTION

3.1 APPLICATION

A. Surface Preparation: Remove foreign matter which could decrease effectiveness of treatment on areas to be treated. Loosen, rake and level soil to be treated, except previously compacted areas under slabs and foundations.

B. Post Signs in areas of application to warn workers that soil termiticide treatment has been applied. Remove signs when areas are covered by other construction.

C. Application Rates: Apply soil treatment solution as follows: (Provide heavier application rates if recommended by manufacturer).

1. Apply 4 gallons per 10 lin.ft. of trench, for each foot of depth from grade to footing, along outside edge of foundation. Dig a trench 6" to 8" wide along outside of foundation to a depth of not less than 12". Punch holes to top of footing at not more than 12" o.c. and apply chemical solution.

2. Hollow masonry walls below grade: At expansion joints, slab perimeters, control joints, columns and other slab penetrations, apply at a rate of 4 gallons per 10 lin.ft.

3. Slab Penetrations: At expansion joints, slab perimeters, control joints, columns and other slab penetrations, apply at a rate of 4 gallons per 10 lin.ft.

Allow not less than 12 hours for drying after application, before beginning concrete placement or other construction activities.

D. Reapply soil treatment solution to areas disturbed by subsequent excavation, landscape grading, or other construction activities following application.

END OF SECTION 31 31 16

SECTION 32 31 14 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

Polyvinyl Chloride (PVC) coated steel chain link fence, gates and automatic gate operators.

1.3 SUBMITTALS

A. Product data in the form of manufacturer's technical data, specifications, and installation instructions for fence and gate posts, fabric, gate operators, and accessories.

PART 2 - PRODUCT

2.1 FABRIC

A. Polyvinyl Chloride (PVC) Finish: Comply with ASTM F668, with core wire diameter (gage) measured prior to application of PVC coating with not less than 0.30 oz. zinc per sq.ft. of uncoated surface on 9 gage wire forming 2" mesh.
Green color. Selvage as scheduled.

B. Coating: Thermally fused to wire at 0.015 to 0.025 inch thickness.

2.2 FRAMING

A. Strength requirements for posts and rails conforming to ASTM F669.

B. Steel Framework, General: Posts, rails, braces, and gate frames.

1. Type I Pipe: Hot-dipped galvanized steel pipe conforming to ASTM F1083, plain ends, standard weight (Schedule 40) with not less than 1.8 oz. zinc per sq.ft. of surface area coated.

2. Type II Pipe: Manufactured from steel conforming to ASTM A569 or A446, grade D, cold formed, electric welded with minimum yield strength of 50,000 psi and triple coated with minimum 0.9 oz. zinc per sq.ft. after welding, a chromate conversion coating and a clear polymer overcoat. Corrosion protection on inside surfaces shall protect the metal from corrosion when subjected to the salt spray test of ASTM B117 for 300 hours with the end point of 5% Red Rust.

C. Polyvinyl Chloride (PVC) Finish: Provide framework, fittings, and accessories with manufacturer's standard polyvinyl chloride (PVC) plastic resin finish thermally bonded and adhered to a cured primer applied over zinc-coated steel, not less than 10 mils (0.010") thick. Color to match chain link fabric.

D. End, corner and pull posts for following fabric heights:

1. Up to 6 feet: 2.375-inch OD Type I or II steel pipe, 2-inch square galvanized steel tubing weighing 2.60 lb. per lin.ft., or 3.5-inch by 3.5-inch roll-formed sections weighing 4.85 lb. per lin.ft.

2. Over 6 feet: 2.875-inch OD Type I or II steel pipe, 2.50-inch square steel tubing weighing 5.10 lb. per lin.ft., or 3.5-inch by 3.5-inch roll-formed sections weighing 4.85 lb. per lin.ft.

E. Line or intermediate posts for following fabric heights:

1. Up to 6 feet: 1.90-inch OD Type I or II steel pipe, 1.875-inch by 1.625-inch C section weighing 2.28 lb. per lin.ft., or 2.25" x 1.70-inch galvanized steel H section weighing 3.26 lb. per lin. ft.

2. Over 6 feet: 2.375-inch OD Type I or II steel pipe, 2.25-inch by 1.70-inch C section weighing 2.70 lbs. per lin.ft., or 2.25-inch by 1.70-inch galvanized steel H section weighing 3.26 lb. per lin.ft.

F. Gate Posts: Furnish posts for supporting single gate leaf, or one leaf of a double gate installation, for nominal gate widths as follows:

Up to 6 feet: 2.875-inch OD Type I or II steel pipe.
Over 6 feet to 13 feet: 4.00-inch OD Type I or II steel pipe.
Over 13 feet to 18 feet: 6.625-inch OD Type I steel pipe.
Over 18 feet: 8.625-inch OD Type I steel pipe.

G. Top Rail: Manufacturer's longest lengths, with expansion-type couplings, approximately

6" long, for each joint. Provide means for attaching top rail securely to each gate corner, pull, and end post.

2.3 FITTINGS AND ACCESSORIES

A. Material: Comply with ASTM F626. Mill-finished aluminum or galvanized iron or steel, to suit manufacturer s standards. Finish to match fabric.

B. Tension Wire: 0.l77" diameter metallic-coated steel marcelled tension wire conforming to ASTM A824.

C. Tie Wires: 12 gage (0.106" diameter) galvanized steel with a minimum of 0.80 oz. per sq.ft. of zinc coating of surface area in accordance with ASTM A641.

D. Post Brace Assembly: Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at midheight of fabric. Use same material as top rail for brace, and truss to line posts with 3/8-inch diameter rod and adjustable tightener. Provide manufacturers standard galvanized steel or cast iron or cast aluminum cap for each end.

E. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive tension wire or top rail.

F. Tension or Stretcher Bars: Hot-dip galvanized steel with minimum length 2" less than full height of fabric, minimum cross-section of 3/16" by 3/4" and minimum 1.2 oz. zinc coating per sq.ft. of surface area. Provide one bar for each gate and end post, and two for each corner and pull post, except where fabric is integrally woven into post.

G. Tension Wire: Minimum 7 gage galvanized steel with minimum 1.2 oz. zinc coating per sq.ft. of surface area finish same as fabric.

H. Concrete: Provide concrete consisting of Portland cement, ASTM C150, aggregates ASTM C33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 2500 psi. Use at least 4 sacks of cement per cu.yd., 1-inch maximum size aggregate, maximum 3-inch slump, and 2 to 4 percent entrained air.

2.4 SWING GATES

A. Fabrication: Fabricate perimeter frames of gates from metal and finish to match fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members maximum 8 feet apart unless otherwise indicated. Provide same fabric as for fence unless otherwise indicated. Install fabric with tension

bars and bands at vertical edges and at top and bottom edges.

Install diagonal cross-bracing consisting of 3/8-inch diameter adjustable-length truss rods on gates to ensure frame rigidity without sag or twist.

B. Swing Gates: Comply with ASTM F900.
Up to 6 feet High and 8 feet Wide: Fabricate perimeter frames of minimum 1.660-inch OD Type I or II steel pipe or 1.50-inch square galvanized steel tubing weighing 1.90 lb per sq.ft.

Over to 6 feet High and 8 feet Wide: Fabricate perimeter frames of minimum 1.90-inch OD Type I or II steel pipe or 2.00-inch square galvanized steel tubing weighing 2.60 lb. per sq.ft.

C. Gate Hardware: Provide hardware and accessories for each gate, galvanized per ASTM A153.

1. Hinges: Size and material to suit gate size, non-liftoff type, offset to permit 180° gate opening. Provide 1½ pair of hinges for each leaf over 6-foot nominal height.

2. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.

3. Gate Stops: Provide gate stops for double gates, consisting of mushroom-type flush plate with anchors, set in concrete, and designed to engage center drop rod or plunger bar. Include locking device and padlock eyes as integral part of latch, permitting both gate leaves to be locked with single padlock.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install fence in compliance with ASTM F567.

B. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil. If not indicated on drawings, excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than 4 times largest cross-section of post.

Unless otherwise indicated, excavate hole depths approximately 3" lower than post

bottom, with bottom of posts set not less than 36" below finish grade surface.

C. Setting Posts: Center and align posts in holes 3" above bottom of excavation. Space maximum 10 feet o.c., unless otherwise indicated. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations. Unless otherwise indicated, extend concrete footings 2" above grade and trowel to a crown to shed water.

D. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.

E. Brace Assemblies: Install braces so posts are plumb when diagonal rod is under proper tension.

F. Bottom Tension Wire: Install tension wire within 6" of bottom of fabric before stretching fabric and tie to each post with not less than same gage and type of wire. Pull wire taut, without sags. Fasten fabric to tension wire with 11-gage hog rings of same material and finish as fabric wire, spaced maximum 24" o.c.

G. Fabric: Leave approximately 1" between finish grade and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

H. Tension or Stretcher Bars: Thread through clamp to fabric 4" o.c., and secure to end, corner, pull, and gate posts with tension bands spaced not over 15" o.c.

I. Tie Wires: Use U-shaped wire of proper length to secure fabric firmly to posts and rails with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing. Tie fabric to line posts 12" o.c. and to rails and braces 24" o.c.

J. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

K. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

END OF SECTION 32 31 14

SECTION 33 00 00 - SITE UTILITIES AND DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF REQUIREMENTS

A. Work under this section consists of the storm drainage systems. Work shall include trenching, bedding and backfill for all piping and utility appurtenances.

B. Related work specified elsewhere includes but not limited to:

Division 31, Earthwork
Division 31, Erosion and Sediment Control
Division 22, Plumbing

C. Conform to requirements of Division 31-Earthwork for excavation, backfill, compaction, soils, rock, shoring, dewatering, and testing of subgrade and backfill.

1.3 SUBMITTALS

A. Submit manufacturer's product data and specifications for materials. Submit certificates that pipe materials and fittings comply with standards.

B. At completion, submit record drawings.

1.4 QUALITY ASSURANCE

A. Conform to requirements of Authorities having jurisdiction for permitting, bonding, materials, installation, testing and acceptance. Where local requirements exceed these specifications, conform with those requirements.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

A. Backfill Material: When porous backfill is specified, it shall be clean, natural washed sand (ASTM C144-7O).

B. Stone Aggregate for Bedding: #57 crushed limestone or granite.

C. Rip Rap: Unless otherwise indicated, stone rip rap shall consist of sound, tough, durable stone which is resistant to action of air and water. The largest pieces of stone shall have a

volume of not more than two cubic feet and a weight of not less than 125 pounds, and shall be approximately 90% of the mass of the rip rap placed.

2.2 POLYVINYL CHLORIDE (PVC) SEWER PIPE

A. Pipe shall be ASTM D3034, SDR 35, extra strength with integral bell and spigot joints of the following minimum wall thickness:

4" - 0.120 inches
6" - 0.180 inches
8" - 0.240 inches
10"- 0.300 inches
12"- 0.360 inches
14"- 0.437 inches

B. Fittings: Mark each pipe with manufacturer, size, class and test pressure. Elastomeric joints complying with ASTM D3212 using elastomeric seals complying with ASTM F477.

PART 3 - EXECUTION

3.1 PREPARATION OF TRENCHING

A. General: Conform to requirements of Section 02200-Earthwork. Verify tie-in inverts, crossing utilities, and other obstructions prior to commencing work. If conditions are not as indicated, refer to the Architect for decision before proceeding.

B. Width of trenches at any point below top of pipe shall not be greater than outside diameter of pipe plus 16", to permit satisfactory jointing and thorough tamping of bedding material under and around pipe. Do not overexcavate.

C. Keep trenches free from water until the pipe is laid and trench backfilled and mortar has sufficiently hardened.

D. The depth of the trench shall be taken at each grade board and the average of the two adjacent depths used to compute the depth of the cut for that section. if drainage lines are placed by use of laser beam, trench depths shall be measured at points where grade boards would be. All drainage lines shall be measured horizontally from center to center of drop inlets.

3.2 PREPARATION OF BEDDING FOR PIPE LAYING

A. The bedding in the trench shall be formed to prevent any subsequent settlement and rupture of the pipes. Batter boards shall be set at 50' intervals to check the line and invert grade.

B. Provide bedding surface for pipe on a firm foundation of uniform density throughout length of pipe. Bed pipe in undisturbed soil, unless otherwise indicated, which is accurately shaped and rounded to conform to lowest one-quarter outside portion of pipe. Tamp bedding firmly. Bell holes and depressions for joints shall be only of such length, depth

and width as required for properly making particular type joints. Use tamped moist sand bedding where soil has been over excavated. Pipes in rock shall be bedded with 6" of sand.

3.3 PIPE LAYING

A. Inspect each length of pipe and fitting for defects. Inspect grades, bedding and other conditions before proceeding.

B. Lay pipes starting at the lowest point. Lay all pipes with joints lapped upgrade, true to line and grade. Fit and match pipes in a manner so that when laid they will form a sewer with a smooth and uniform invert.

C. Clean ends of pipe carefully before lowering into trenches. The pipes shall be so lowered as to avoid unnecessary handling in the trench. Set joints firmly according to line and grade. Join together to produce an assembly that will be structurally sound and watertight. All cutting shall be done using pipe cutters. No torch cutting or hammer and chisel cutting will be done.

D. Place bedding along the full length of the trench so that the pipe is true to line and grade. Shovel bedding so that the material fills and supports haunch area and encases the pipe.

3.4 BACKFILLING

A. Backfill in accordance with "Earthwork" section. Bring backfill up evenly on both sides of pipe for its full length. Care shall be taken to ensure thorough compaction of fill under haunches of pipe. Thoroughly compact each layer with mechanical tampers and rammers.

B. Flushing: After acceptable chlorination, flush the system with potable water until chlorine residual test made at the point of discharge is equal to the chlorine residual of the water used for flushing. After line remains full for 24 hours, take a bacteriological sample for acceptance of authorities. Retreat if necessary.

END OF SECTION 33 00 00