SECTION 06200

FINISH CARPENTRY

PART 1 – GENERAL

1.1 SUMMARY

A. Provide and install all finish carpentry work, complete, including, but not limited to the following items.
   1. Wood trims.
   2. Rough hardware.
   3. Install doors, door frames, finish hardware, and any other items specified to be installed under this section but furnished under other sections of these specifications.
   4. Restroom accessories, toilet partitions, urinal screens.
   5. Stainless steel counters.
   6. Storage shelf standard and bracket system.

1.2 QUALITY ASSURANCE

A. Grading Marks: Factory mark each piece of lumber and plywood with type, grade, mill, and grading agency identification. Certificate of inspection and grading by a recognized agency may be submitted with each shipment in lieu of factory marking, at Contractor's option.

B. Qualifications of Installers: Use adequate number of skilled workmen who are thoroughly trained and experienced in necessary crafts and who are completely familiar with specified requirements and methods needed for proper performance of work of this section.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

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

B. Store materials away from threat of termite or other insect infestation.

1.4 SUBMITTALS

A. General: Submit each item below.

B. Product Data for each type of factory-fabricated product and process specified, including details of construction relative to materials, dimensions of individual components, profiles, textures, and colors.

C. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated material:

1. For each type of preservative-treated wood product include certification by treating plant stating type of preservative solution and process used, net amount of preservative retained, and compliance with applicable standards.
2. For water-borne-treated products include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.

1.5 WARRANTY

A. Provide manufacturer's limited life time warranty for storage shelf standard and bracket system. Warranty to cover defects in materials and workmanship which occur during normal use.

PART 2 – PRODUCTS

2.1 WOOD PRODUCT QUALITY STANDARDS

A. Softwood Lumber Standards: Comply with U.S. Department of Commerce PS 20 and with applicable grading rules of the respective grading and inspection agency for the species and product indicated.

B. Architectural Woodwork Quality Standards: Comply with AWI Guide Specifications and Quality Certification Program.

2.1 MATERIALS AND PRODUCTS

A. General:

1. Provide rough sawn, dressed or worked and dressed lumber, as applicable, manufactured to the actual sizes as required by PS 20 or to actual sizes and pattern as required, unless otherwise indicated or scheduled. Provide rough sawn lumber where indicated on drawings.
2. Moisture Content of Softwood Lumber: Provide kiln-dried lumber having a moisture content from time of manufacture until time of installation not greater than values required by the applicable grading rules of the respective grading and inspecting agency for the species and product indicated.
3. Moisture Content of Hardwood Lumber: Provide kiln-dried lumber having a moisture content from time of manufacture until time of installation within a range of 8 percent to 13 percent for individual pieces, and an average of 11 percent for the entire lot.

B. Interior Finish Carpentry:

1. Solid lumber shall be milled to profiles required of Douglas Fir vertical grain, B and Better for paint finish. Provide rough sawn lumber where indicated on drawings.

C. Miscellaneous Materials:

1. Fasteners and Anchorages: Provide nails, screws and other anchoring devices of the proper type, size, material and finish for application indicated to provide secure attachment, concealed where possible, and complying with applicable ANSI standards. Provide all fasteners and anchorages with a hot-dipped zinc coating (ASTM A 153). Fasteners at wet areas shall be Type 316 stainless steel.

D. Storage Shelf Standard and Bracket System

1. Provide standard and bracket system manufactured by Knape & Vogt or an approved equal.

a.	Material:	14 gauge 304 grade stainless steel construction.
b.	Finish:	Stainless steel; corrosion resistant.
c.	Mounting:	Wall mounted on concrete masonry unit.
d.	Load Rating:	Provide manufacturer's standard recommended spacing of standards and brackets at 16"o.c.
e.	Features:	Reinforced brackets to be inserted into slotted standards mounted on wall. Every bracket to include locking mechanism.
f.	Standards:	Knape & Vogt 87 SS 72, 7/8" wide X 11/16" deep X 72" high, stainless steel construction.
g.	Brackets:	Knape & Vogt 187LL SS 12, 14 gauge 304 grade stainless steel, with injection molded thermoplastic polymide resin lock lever, vertically adjustable in 2" increments.
h.	Shelving:	Knape & Vogt 1987 SS 12 X 32, 14 gauge stainless steel. See drawings for amount of shelves to provide.
i.	Accessories:	Provide manufacturer's standard fasteners, anchors, end shelf rests, center shelf rests, front shelf rests and shelf cushions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are of defective manufacturer with respect to surfaces, sizes or patterns.

B. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8-inch in 8-feet for plumb and level countertops; and with 1/16-inch maximum offset in flush adjoining 1/8-inch maximum offsets in revealed adjoining surfaces.

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

D. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum lengths of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners, to produce tight fitting joints with full surface contact throughout length of joint. Use scarf joints for end-to-end joints. Sand smooth for imperceptible joints. Make exterior joints water-resistant by careful fitting.

E. Anchor finish carpentry work to anchorage devices or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and where prefinished matching fasteners heads are required, use fine finishing nail for exposed nailings, countersunk and filled flush with finished surface, and matching final finish where transparent finish is required.

F. Re-treat cut and penetrated lumber in accordance with SECTION 06311 TREATED LUMBER

G. Install storage shelving standards and brackets at 16" o.c. and according to the manufacturer's written specifications and instructions. Use manufacturer's recommended type of fasteners and wall anchors. Install brackets into standards according to manufacturer's instructions.

3.2 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION

A. Repair damaged and defective finish carpentry wherever possible to eliminate defects functionally and visually; where not possible to repair properly. Adjust joinery for uniform appearance.

B. Clean hardware, lubricate and make final adjustments for proper operation.

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

D. Clean all storage shelving. Replace damaged and defective products and parts at no cost to the State.

END OF SECTION

SECTION 06311

TREATED LUMBER

PART 1 - GENERAL

1.1 SUMMARY

A. Plant preservative and insecticide treatment of lumber and other wood products specified in other Sections of this Specification by pressure and dip methods.

B. Field treatment of field cut or drilled lumber.

1.2 RELATED SECTIONS

A. Section 06200 – Finish Carpentry: Lumber products.

1.3 REFERENCES

A. American Wood-Preservers' Association
1. AWPA C2-00: Lumber, Timber, Bridge Ties and Mine Ties-Preservative Treatment by Pressure Processes.
2. AWPA C9-00: Plywood-Preservative Treatment by Pressure Processes.
3. AWPA C31-00: Lumber Used out of Contact with the Ground and Continuously Protected from Liquid Water-Treatment by Pressure Processes.
4. AWPA M4-01: Care of Preservative-Treated Wood Products.
5. AWPA C20-99: Structural Lumber- Fire Retardant Treatment by Pressure Process.
6. AWPA N1-01: All millwork, Preservative Treatment by Non-Pressure Process.
7. AWPA N2-00: Composite Wood Products, Preservative Treatment by Non-Pressure Process.

1.4 SUBMITTALS

A. Submit in accordance with Section 01330 - SUBMITTALS.
1. Product Data: Provide data on all treatment products, including field application instructions if applicable.
a. Provide manufacturer's Material Safety Data Sheets on all products, and hazardous materials.
b. Provide ICBO approvals for treatment solutions used.

2. Preserver Certifications: Provide a Certificate of Treatment showing compliance with these specifications for the following:
   a. Kiln drying
   b. Method of treatment performed, including dip treatment.
3. Contractor's Certification: Provide a certification letter stating that all wood used on this job including cuts and penetration were treated and coated with preservatives in compliance with requirements of this contract.
4. Guarantee: Guarantee form for written guarantee.

1.5 REGULATORY REQUIREMENTS

A. Comply with State OSHL (Occupancy Safety and Health Law) and pollution controls regulations of the State Department of Health and EPA.

1.6 DELIVERY STORAGE AND HANDLING

A. Protect AWPA C31 inorganic boron treated wood from contact with the ground, rain or other sources of liquid water until permanent installation of covering construction.

1.7 GUARANTEE

A. Provide a five year guaranty to replace all treated wood which is attacked by dry wood termites or deteriorates due to dry rot. The Surety shall not be held liable beyond two years of the project acceptance date.

PART 2 - PRODUCTS

2.1 GENERAL

A. Mill lumber to finish size and shape prior to treating, and treat before assembly. Plywood may be treated in regular panel sizes.

B. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

C. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece, or omit marking and provide certificates of treatment compliance issued by inspection agency.

2.02 PRESSURE TREATMENT WITH WATER-BORNE PRESERVATIVES

A. Treating Solutions:
   1. Copper azole, Type A (CBA-A).
   2. Inorganic boron (SBX).

B. Treatment Methods:
   1. General:
      a. All water-borne treatment methods require incising of lumber of nominal 2 inch thickness (1-1/2 inches actual dimension).
      b. Choice of treatment method and conditions of use of each treating solution shall conform to the treatment schedule contained in Part 3.
   2. CBA-A: Treatment methods, depth of penetration and treating solution retention shall conform to AWPA C2 for lumber and C9 for plywood.
   3. SBX: Treatment method shall conform to AWPA C31. Treating solution retention shall be a minimum of 0.28 pounds per cubic foot (equivalent to 0.42 DOT).

C. Drying:
   1. Before Treatment:
      a. CBA-A Treatment: Wood shall be air dried or kiln-dried before treatment to an average moisture content of 28 percent or less per AWPA standards.
      b. SBX Treatment: Wood having a moisture content higher than 28% is acceptable when treating with SBX.
   2. After Treatment: All 1 inch and 2 inch lumber and all plywood shall be dried to a moisture content of 19 percent or less after treatment.

2.3 PRESSURE TREATMENT WITH OIL-BORNE PRESERVATIVES

A. Treating Solution:
   1. 0.50 percent by weight chlorpyrifos, 0.75 percent by weight 3-iodo-2-propynyl butyl carbamate (IPBC). The solvent used in formulating the preservative solution shall meet the requirements of AWPA hydrocarbon solvent Type C, Standard P9, Paragraph 3.1.
   2. For interior application use low odor mineral spirits as solvent.

B. Treatment Methods: Treated wood shall attain the following net retention requirements: 0.0175 pounds of Chlorpyrifos per cubic foot of wood, 0.035 pound of 3-Iodo-2 propynyl butyl carbamate per cubic foot of wood.

C. Drying:

1. Before Treatment: All wood treated with oil-borne preservatives shall be kiln-dried to an average moisture content of 12% to 15% per AWPA standards.
2. After Treatment: Wood shall be thoroughly dried and virtually odor-free prior to installation.

2.4 PRESERVATION BY DIP TREATMENT

A. Treating Solution:

1. Any of the Oil-Borne Preservatives listed above.
2. A solution of 1 quart chlopyrifos in 55 gallons of a 0.50 percent IPBC solution.

B. Treatment Methods:

1. Immersion treat for a minimum period of 15 minutes.
2. Do not incise lumber scheduled to be left unpainted or receive a clear finish.

C. Drying: After Treatment: Wood shall be thoroughly dried and virtually odor-free prior to installation.

2.5 FIELD TREATMENT

A. Treatment Method:

1. Treat in accordance with AWPA Standard M4 using two heavy brush coats of a treating solution.
2. Doors shall be treated after manufactured.

PART 3 - EXECUTION

3.1 SCHEDULE OF TREATMENTS

A. Species:

1. Treat all wood species.
2. All water-borne and oil-borne treatment solutions are applicable to Douglas-fir and hem-fir species except for CBA-A treatment which is acceptable for hem-fir species only.

B. Application:

1. Pressure Treatment:
   a. General: Unless otherwise stipulated, all lumber and plywood shall be pressure treated.
   b. Exposed lumber 1-1/2 inch (net thickness) and over that will be unpainted or receive a clear finish shall be and pressure treated with oil-borne preservative. Do not incise lumber.

c. SBX treated wood shall not be used in areas exposed to direct precipitation (e.g. exposed decking, trellises, fencing, etc.) unless painted or covered with a finish material.

2. Dip Treatment: All finish lumber under 1-1/2 inch net thickness (except hardwood flooring); doors (solid wood and solid-core flush wood doors); finish plywood; and mill work items, such as for cabinet work, shelving and similar wood work that will be exposed to view in the finished work.

3. Field Cuts: Treat end cuts, notches and penetrations into treated lumber or plywood. Exception: Cuts and penetrations made in SBX treated wood 2 inches or less in nominal thickness need not be field treated.

END OF SECTION

SECTION 07410

PREFORMED METAL ROOFING

PART 1 – GENERAL

1.1 SUMMARY

A. Type of panels required include the following: Formed standing seam sheet panels, intended for concealed fastener installation with roofing accessories.

B. Metal Roofing Underlayment: Self adhering waterproofing underlayment.

1.2 RELATED SECTIONS

A. Section 5310 Steel Deck

B. Section 05400 Rough Cold Formed Metal Framing

C. Section 7480 Metal Wall Panels

D. Section 07620 Sheet Metal Flashing and Trim
1. Gutters.
2. Flashing.

E. Section 07920 Sealants

F. Section 08630 Units Tubular Skylights

G. Section 15400 Plumbing.

1.3 SUBMITTALS

A. Samples: Submit manufacturer's standard colors for metal roofing to the Engineer for selection.

B. Manufacturer's Product Data: Submit manufacturer's product specifications, standard details, installation instructions and general recommendations, as applicable to materials and finishes for each component and for total system of preformed panel.

C. Shop Drawings: Submit shop drawings of all roofing, flashing, fastenings, supports, anchors, and clearances, and connection details to the Architect for approval.

1.4 GUARANTEE

A. Metal Roofing: Furnish 2-year written guarantee to the Engineer jointly signed by Preformed Metal Roofing Contractor, Sheet Metal Contractor and General Contractor which shall provide for repairs or replacement of roofing, wall panels, and flashing where leaking occurs due to faulty materials and workmanship at no extra cost to the State.

B. Metal Roofing: Provide manufacturer's warranty for coating system under Hawaiian weather conditions, provide following as a guide for expected warranty:

1. For 10 years, roof panels will not perforate or structurally fail. Should cosmetic degradation or color change to pigmented color coating occur, there will not be progressive deterioration of steel base material to extent that would cause panel to no longer be able to provide wind and live load resistance for which it was designed, and that would cause panel to leak.
2. For 5 years, roof panels will not change color more than 5 NBS units as determined in accordance with procedures set forth in ASTM D2244; chalk more than 5 rating, when measured in accordance with procedure set forth in ASTM D659; drip, flake, check, blister, crack, peel or otherwise lose adhesion. Term "crack" shall not include minute forming defects which may occur in fabrication of coated panel.
3. Should product fail to meet conditions set forth above, manufacturer will, at its option, either recoat or replace allegedly non-complying material. Manufacturer reserves the right to investigate each installation of coated roof products and to review records and drawings regarding such application.
4. Repainted or replacement material supplied shall be subject to warranty only for remainder of time applicable to material originally purchased.
5. This warranty is not applicable where failure to meet conditions specified in items "1" or "2" above from product misuse, fire, physical damage, or unusual corrosive prevailing atmosphere or environment.

C. Underlayment: Provide a 10 year warranty. Warrant materials against leaks caused by defects in materials or manufacturing from date of purchase.

1.5 QUALIFICATIONS

A. Applicator: Company specializing in performing work of this section with minimum 3 years experience and approved by manufacturer.

B. Installation Crew: Provide and maintain same foreman and crew from start to finish of work unless change is approved by the Engineer and manufacturer's representative.

1.6 PERFORMANCE REQUIREMENTS

A. General: Provide manufactured roof panel assemblies complying with performance requirements indicated and capable of withstanding structural movement, thermally induced movement, and exposure to weather without failure or infiltration of water into the building interior.

B. Water Penetration: Provide manufactured roof panel assemblies with no water penetration as defined in the test method when testing according to ASTM E 1646 at a minimum differential pressure of 20 percent of inward acting, wind-load design pressure of not less than 6.24 lb/sq. ft (300 Pa) and not more than 12.0 lb/sq. ft. (575 Pa).

C. Wind-Uplift Resistance: Provide roof panel assemblies that meet requirements of UL 580 for Class 90 wind-uplift resistance.

D. Structural Performance: Provide manufactured roof panels assemblies capable of safely supporting design loads indicated under in-service conditions with vertical deflection no greater than the following, based on testing manufacturer's standard units according to ASTM E 1592 by a qualified independent testing and inspecting agency.
1. Maximum Deflection: 1/180 of the span.

1.7 MATERIAL HANDLING

A. Keep sheets dry. Moisture can become trapped in a bundle of sheets and when left there, may cause discoloration. If moisture has entered a bundle, wipe sheets dry as staining can occur in a day or two.

1.8 PROJECT CONDITIONS:

A. Field Measurements for Metal Roofing: Verify location of structural members and openings in substrates by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Roof Panels: Formed from 22-gauge galvalume coated steel conforming to ASTM A792, Grade 33 with a minimum AZ50 coating. Panel

configuration shall be structural standing seam roofing with concealed fasteners. Pan width shall be 12 inches with 1 3/4" vertical leg (custom or standard product) as manufactured by KloecKner Mac 175, Metal Sales Manufacturing Corp. vertical seam or an approved equal. Pan surface shall be smooth flat.

B. Flashing and Closures: Formed of prefinished material to match roof metal panels of manufacturer's standard flashings for the panels specified.

C. Configuration of flashings shown on the drawings are intended to indicate basic intent. Other flashings which accomplish the basic intent will be acceptable if standard with the panel manufacturer. Provide metal flashings for locations indicated. Furnish sheet metal flashing items in 8- to 10-foot lengths. Single pieces less than 8 feet long may be used at corners, and at ends of runs. Provide accessories and other items essential to complete the sheet metal installation of the same materials as the items to which they are applied. Connect all pieces of linear flashing by a slip joint to permit thermal movement.

2.2 METAL FINISH AND COLOR

A. General: Apply coatings either before or after forming and fabricating panels, as required by coating process and as required for maximum coating performance capability.

B. Fluoropolymer 3-Coat Coating System: Manufacturer's standard 3-coat, thermocured system composed of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 1402, Test Method No. 7.

1. Primer shall have a dry mil thickness of 0.9-1.0 and the topcoat shall be of 0.9-1.0 dry mil thickness for a total dry mil thickness of 1.8 to 2.0.
2. Color: Match To be selected from the manufacturer's standard colors. Submit colors to the Engineer for selection.

C. Interior/Underside finish shall be off-white polyester.

2.3 MISCELLANEOUS MATERIALS

A. Fasteners: Fasteners shall be manufacturer's standard noncorrosive types. Where required, exposed fasteners shall be gasketed on the exterior side of the covering to waterproof the covering and finished to match roof or wall finish. Concealed fastener and clip system shall be manufacturer's standard for system provided and uplift specified.

B. Accessories: Except as indicated as work of another specification section, provide components required for a complete roofing system, including clips, standoff clips, sidelap clips, zee and cee structural framing over metal deck, trim, copings, fascias, flashings, sealants, gaskets, fillers, rubber roof jacks, closure strips and similar items. Match materials/finish of preformed roof panels where exposed.

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

2.4 PANEL FABRICATION; PERFORMANCES

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 performance requirements, which have been demonstrated by factory testing. Comply with indicated profiles and dimensional requirements, and with structural requirements. Fabricate panels in full lengths from ridge to eaves to the greatest extent possible.

1. Metal gauges: Thicknesses required for structural performances, but not less than manufacturer's recommended minimums for profiles and applications indicated, and not less than 22-gauge.

B. Apply bituminous coating or other permanent separation materials on concealed panel surfaces where panels would otherwise by in direct contact with mortar, concrete, wood or other substrate materials which are non-compatible (i.e. cooper and aluminum) or could result in corrosion or deterioration of either material or finishes.

C. Performance Criteria:

1. Provide wind uplift resistance in accordance with the local 2006 International Building Code.
2. Structural capacity of metal roofing system shall be determined in accordance with ASTM E1592. A minimum of two tested spans is required in order to interpolate allowable load data between tested spans. Extrapolation of data outside the tested spans is not allowed.
3. Provide a design analysis signed by a registered Professional Engineer, confirming that the structural capacity of the metal roofing system as determined in accordance with ASTM E1592 is adequate to resist the design loads required by the 2006 UBC. Analysis should include calculations verifying the design loads, the uplift pressures, and how those loads affect the various areas of discontinuity clearly shown and distinguished from the typical field roof elements.

2.5 UNDERLAYMENT:

A. Underlayment shall be self adhering, waterproof, composed of non-slip polymer film laminated to a rubberized asphalt adhesive. Provide Wind & Waterseal, manufactured by MFM Building Products Corp. or an approved equal.

B. Underlayment Characteristics:
1. Material shall adhere to clean, dry metal decking surface.
2. Self sealing around punctures and fasteners to prevent water penetration.
3. Color: White
4. Roll Width: 36 inches.
5. Thickness: 40 mils min.

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 concealed anchor clips and fasteners with provisions for thermal/structural movement as well as carrying the weight of the panels.

B. Arrange side laps to leeward of prevailing wind direction.

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. Joint Sealers: Install joint fillers and sealants where indicated and where required for weatherproof performance of panel system. Provide types of sealants/fillers indicated or, if not otherwise indicated, types recommended by panel manufacturer.

Refer to Section 07920 – SEALANTS of these specifications for product and installation requirements applicable to indicated joint sealers.

E. Roof installation shall be for conditions indicated.

F. Fill ends of panel seams at eaves with urethane sealant.

G. Installation of Underlayment:
1. Clean substrate surface of oil. Substrate surfaces shall be dry.

2. Apply in clear, dry weather at recommended temperature.
3. Apply underlayment in accordance to manufacturer's written specifications and instructions.
4. Do not apply underlayment over silicone or solvent based sealants. Installer to be responsible for compatibility with caulks and sealants.

3.2 CLEANING AND PROTECTION

A. 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. Touch-up paint shall not be used without the permission of the Engineer.

B. Cleaning: Upon completion of panel installation, clean finished surfaces as recommended by panel manufacturer, and maintain in a clean condition during construction.

END OF SECTION

SECTION 07460

METAL SOFFIT AND CEILING PANELS

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Steel soffit and ceiling interlocking system.

B. Related Sections include the following:
   1. Section 05400 - Cold Formed Metal Framing for attachment at exterior soffits.
   2. Section 06200 – Finish Carpentry for exterior wood trim and fascia.
   3. Section 07620 – Sheet Metal Flashing and Trim for flashing, gutters, and other sheet metal work.
   4. Section 09220 – Metal Support Assembly for attachment at interior ceiling.

1.2 SUBMITTALS

A. Product data: For each type of product specified. Include identification of materials; dimensions of individual components; installation instructions; and available profiles, textures and colors.

B. Samples for Verification: 12 inch x 12 inch section of selected panel with color, texture, and pattern specified.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage in an experienced installer who has completed siding installations similar in material, design, and extent to that indicated for Project that has resulted in construction with a record of successful in-service performance.

B. Source Limitations for Siding and Accessories: Obtain each color, texture, pattern, and type of siding and related accessories from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1.4 DELIVERY, STORAGE AND HANDLING

A. Delivery materials to Project site in manufacturer's unopened packages or bundles with labels intact.

B. Store materials in a dry, well-ventilated, weathertight place. Comply with manufacturer's written instructions for storage, handling and protection.

1.5 PROJECT CONDITIONS

A. Weather Limitations: Proceed with siding installation, only if existing and forecasted weather conditions permit siding to be installed according to manufacturer's written instructions and if substrate is completely dry.

1.6 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the State of other rights the State may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Project Warranty: Submit a written warranty, executed by siding manufacturer, agreeing to repair or replace siding that fails in materials or workmanship within the specified warranty period. Failures include, but are not limited to, cracking, deforming, fading, or otherwise deteriorating beyond normal weathering. Fading is defined as loss of color, after cleaning with product recommended by manufacturer, of more than 4 color-difference units as measured according to ASTM D 2244.
   1. Warranty Period: 20 years from date of substantial completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or an approved equal:
   1. Metals Sales.
   2. AEP Span.

2.2 SOFFIT AND CEILING

A. Steel Soffit and Ceiling: Galvalume, AZ50 conforming to ASTMA792 for painted panels.
   1. Metal Sales: Striated.
   2. AEP Span: Prestige Series

B. Pattern: 12-inch (305–mm) exposure with 2 rib spaced at 4 inches apart.

C. Ventilation: provide unperforated soffit and ceiling panels.

D. Thickness: 22 gauge.

E. Thickness of Panel: 1 inch or 1 ½ inch.

F. Finish: manufacturer's standard polyvinylidene system with 70% fluoropolymer resin.

G. Panel Lengths: Provide maximum panel lengths to reduce joining of panels.

2.3 ACCESSORIES

A. Soffit and Ceiling: Provide flashing, trims, closure strips. Flashing and trim shall not be less than the thickness of the panels. Closure strips shall be molded, closed cell, solid cell synthetic rubber, neoprene or polyvinyl chloride premolded to match the configuration of the covering and shall not absorb or hold water and any other items recommended by the manufacturer.

B. Sealants: Provide sealants as recommended by the soffit and ceiling panel manufacturer.

C. Fasteners: Provide manufacturer of soffit and panel's concealed noncorrosive fasteners in sufficient length to penetrate a minimum of 1 inch (25 mm) into substrate. Provide prefinish fasteners in color to match siding where face nailing is unavoidable.

2.4 COLORS AND TEXTURES

A. Provide soffit and ceiling panel products and accessories complying with the following requirements:

1. Provide manufacturer's full range of colors and textures for soffit and ceiling panel accessories of type indicated for selection by the Engineer.

2.5 FABRICATION

A. Fabricate panels at factory by manufacturer's standard procedures and processes to fulfill laboratory testing reports. Comply with indicated profiles with dimensional and structural requirements.

B. Fabricate and provide panels with the very minimal or least amount of "oil canning" occurrence. Contractor and supplier shall contact manufacturer's regional representative prior to fabrication. Have representative to check if panels fabricated have the minimal amount of "oil canning".

C. Fabricate panels in flashings and accessories in continuous longest practical lengths.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for substrates, installation tolerances, and other conditions affecting performance of siding. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Arrange a meeting at the job site between the manufacturer's regional representative and the installer for a pre-installation conference.

C. Examine the delivered panels at the job site. Reject and replace any damaged panels and panels with "oil canning" beyond the minimal acceptable tolerance at no cost to the State.

3.2 PREPARATION

A. Clean substrates for compliance with requirements for substrates, installation tolerances, and other conditions affecting performance of siding. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

3.3 INSTALLATION

A. General: Comply with siding manufacturer's written installation instructions applicable to products and applications indicated, unless more stringent requirements apply.

B. Install furring channels on to ceiling and soffit framing.

C. Install siding in continuous lengths without seams on to soffit channels.

D. Isolate dissimilar metals by separating from siding with rubber gaskets, elastomeric sealant, or rubber washers where fasteners penetrate siding. Dissimilar metals behind siding may be isolated by covering with polyethylene film.

3.4 ADJUSTING AND CLEANING

A. Remove and replace damaged, improperly installed, or otherwise defective siding materials with new materials complying with specified requirements at no cost to the State.

B. Clean finished surfaces according to siding manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION

SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Metal flashing.
   2. Gutters and downspouts.

1.2 SUBMITTALS

A. Product data: Manufacturer's technical product data, installation instructions and general recommendations for each specified sheet material and fabricated product.

B. Samples of the following flashing, sheet metal, and accessory items:
   1. 8-inch-square samples of specified sheet materials to be exposed as finished surfaces.
   2. 12-inch-long samples of fabricated products exposed as finished work. Provide complete with specified finish.

C. Shop drawings showing layout, profiles, methods of joining, and anchorages details, including flashing, gutters, downspouts, and expansion joint systems. Provide layouts at 1/4-inch scale and details at 3-inch scale.

1.3 PROJECT CONDITIONS

A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

1.4 WARRANTY

A. Special Warranty: Roofing Installer and Manufacturer(s), bonded warranty without monetary limitation, in which roof installer and manufacturer(s) agree to repair or replace components of roofing system that fail in materials or workmanship within the specified warranty period. Failure includes roof leaks, and materials, and adhesion failure due to wind conditions.

B. Warranty Period: Ten years from the Project Acceptance Date.

C. Wind Conditions: Cover peak wind speeds up to 80 MPH as defined by the Building Code.

D. Warranty shall state the Manufacturer's acceptance that the roof was installed in accordance with the contract requirements and that the County's personnel were properly instructed in the maintenance procedures.

E. In the event of a failure the County, Roofing Installer and Manufacturer shall mutually agree and determine roof system failures and remedies.

PART 2 - PRODUCTS

2.1 SHEET METAL FLASHING AND TRIM MATERIALS

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below:

1. Factory-Painted Aluminum Sheet: ASTM B 209 (ASTM 209M), 3003-H14, with a minimum thickness of 0.0040 inch (1.0 mm), unless otherwise indicated.

B. Fasteners: Same metal as flashing/sheet metal or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

C. Bituminous Coating: SSPC - Paint 12, solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

D. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non-drying, nonmigrating sealant.

E. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section.

F. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.

2.2 FABRICATED UNITS

A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant

performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

B. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams, tin edges to be seamed, form seams, and solder.

C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

D. Sealant Joints: Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.

E. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. All work shall be done by mechanics skilled in trade and under proper supervision of Contractor.

C. Examine surfaces where sheet metal work is to be installed and report any improper or defective base for this work to the Engineer in writing. Should work proceed in absence of such written report, this Contractor shall be responsible for finished job.

D. Hem exposed edges of sheet metal 1/2" unless otherwise indicated.

E. Join various part with rivets or sheet metal screws, where required, to provide strength or stiffness. Lap minimum of 3/4" and rivet not more than 3" o.c. Solder joints and miters with metal backup.

F. Anchor all work securely in manner which will not cause distortion and overstress fasteners when metal expands and contracts. Use cleats wherever possible to avoid exposed fasteners in face of metal.

G. Install all flashing in coordination with Roofing Contractor.

H. In general, form, fabricate and install all sheet metal work so as to adequately provide for all possible expansion and contraction in completed work which shall be weather and watertight. All work shall be accurately formed with all lines and angles in true alignment and installed plumb, level and in proper plane without bulges or waves.

3.2 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, remove substances that might cause corrosion of metal or deterioration of finishes; repair any damage caused by other trades in completing their sections of work; and remove all debris arising from this work and leave premises broom clean to satisfaction of the County.

B. Protection: Advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of Substantial Completion.

END OF SECTION

SECTION 07920

SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Completely close with sealant or caulking compound all joints around frames of doors, windows, or other openings in exterior wall; and all other joints indicated or specified to be caulked or sealed.

1.2 SUBMITTALS

A. Manufacturer's Data: Submit copies of manufacturer's product data and specifications for type of sealant required, to the Engineer for approval.

B. Color Samples: Three (3) sets each of color finish samples of sealants.

1.3 GUARANTEE

A. Furnish written warranty to the Engineer guaranteeing work completed under this section is free from defects of materials or workmanship for a period of one year from date of final acceptance of this project. Repair and replace all such defective work and all work damaged during term of warranty. Leakage, hardening, cracking, crumbling, melting, shrinking or running of sealing compound, or staining or adjoining work shall be adjudged defective work.

1.4 JOB CONDITIONS

A. Examine joint surfaces and backing, and their anchorage to the structure, and conditions under which joint sealer work is to be performed, and notify Contractor in writing of conditions detrimental to proper completion of the work and performance of sealers. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

B. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength.

1.5 PRODUCT HANDLING

A. Delivery: Deliver caulking compounds and sealants to the jobsite in sealed containers labeled to show the designated name, formula, or specification number, lot number, color, date of manufacturer, shelf life, curing time, manufacturer's directions, and name of manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sealant Backer Rod: Compressible rod stock of polyethylene foam, polyethylene-jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable, nonabsorptive material as recommended for compatibility with sealant by the sealant manufacturer to control the joint depth for sealant placement, to break bond of sealant at bottom of joint, to form optimum shape of sealant bead on back side, and to provide a highly compressible backer which will minimize the possibility of sealant extrusion when joint is compressed.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

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

D. Primer for Sealant: Nonstaining material recommended by sealant manufacturer where required for adhesion of sealant to joint substrates..

E. Sealants:

1. At Exterior Joints: One-part elastomeric or silicone one-part sealant of type recommended by manufacturer for exterior joints. Provide one or more of the following, or approved equal.
   a. Sika Chemical, "Sika-Flex la".
   b. Tremco "Lasto-Meric".
   c. Pecora "Synthacalk".
   d. Dow Corning 795 Silicone Building Sealant.
   e. G.E. Silicone Silpruf Weatherproofing Sealant.

2. At Interior Joints: Provide one or more of the following, or an approved equal.
   a. Caulking Compounds: Non-staining, non- bleeding, paintable.
      1. Contech/Sonneborn "Kaukit"
      2. Woodmont "Chem-calk 700"
      3. Pecora Corp. "200 R2 Architectural Calking
   b. Non-Elastomeric Sealant: Acrylic-emulsion type.
      1. Sikaflex 420
      2. Contech/Sonneborn "Sonolac"
      3. Tremco "Acrylic Latex"

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

3.2 JOINT PREPARATION

A. Clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond of sealant or caulking compound.

B. Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.

3.3 INSTALLATION

A. Set joint filler units at proper depth or position in joint to coordinate with other work, including installation of bond breakers, backer rods and sealants.

B. Install sealant backer rod for liquid elastomeric sealants, except where shown to be omitted by sealant manufacturer for application shown.

C. Install bond breaker tape where indicated and where required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.

D. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" or joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where

horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

E. Install sealant to depths as shown or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of bead:

1. For normal moving joints sealed with non- elastomeric sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.
2. For joints sealed with non-elastomeric sealants and calking compounds, fill joints to a depth in range of 75% to 125% of joint width.

F. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

G. Recess exposed joint fillers slightly behind adjoining surfaces, unless otherwise shown, so that compressed units will not protrude from joints.

3.3 CURE AND PROTECTION

A. Cure sealants and calking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Advise Contractor of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of the Engineer's acceptance.

END OF SECTION

SECTION 08255

FRP FLUSH DOORS AND ALUMINUM FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Fiberglass reinforced polyester (FRP) flush doors with aluminum frames.

1.2 RELATED SECTIONS

A. Section 08710 - Door Hardware

B. Section 04816 – Concrete Unit Masonry Assemblies

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.

B. Single door with single point latching:
1. Uniform Static Load, ASTM E330: Plus or minus 75 pounds per square foot.
2. Forced Entry Test, 300 Pound Load Applied, SFBC 3603.2 (b)(5): Passed.
3. Cyclic Load Test, SFBC P.A. 203: Plus or minus 53 pounds per square foot.
4. Large Missile Impact Test , SFBC P.A. 201: Passed.

C. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
1. Flame Spread: Maximum of 170, Class C.
2. Smoke Developed: Maximum of 390, Class C.

D. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
1. Flame Spread: Maximum of 15.
2. Smoke Developed: Maximum of 310.

E. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 15.0 foot-pounds per inch of notch.

F. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.

G. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.

H. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.

1.4 SUBMITTALS

A. Comply with Section 01300 - Submittal Procedures.

B. Product Data: Submit manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.

C. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections, and details, indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, hardware schedule, finish, options, and accessories.

D. Samples:
   1. Door: Submit manufacturer's sample of door showing face sheets, core, framing, finish, hardware, options, and accessories.
   2. Color: Submit manufacturer's samples of standard colors of doors and frames.

E. Test Reports: Have available certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.

F. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.

G. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.

H. Warranty: Submit manufacturer's standard warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 25 years successful experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials and finish from damage during handling and installation.

1.7 WARRANTY

A. Warrant doors, frames, and factory hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.

B. Warranty Period: Ten (10) years starting on date of shipment.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Special-Lite, Inc.; Vistawall, Tubelite, Inc.; or Approved Equal

2.2 FRP FLUSH DOORS

A. Model: SL-17 Flush Doors with SpecLite3 fiberglass reinforced polyester (FRP) face sheets. Model listed solely to establish standard and design quality. This is not meant to limit competition but to simplify the description of type and quality. Comparable products of other manufacturers are acceptable provided they meet materials, design intent and construction specified; consideration will be made if the proposed substitution is approved prior to bid opening.

B. Construction:

1. Door Thickness: 1-3/4 inches.
2. Stiles and Rails: Aluminum Alloy 6063-T5, minimum of 2-5/16-inch depth.
3. Corners: Mitered.
4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom as standard tubular shaped stiles and rails reinforced to accept hardware as specified.
5. Securing Internal Door Extrusions: 3/16" angle blocks and hex-type nuts for joinery. Welds, glue, or other methods are not acceptable.
6. Furnish extruded stiles and rails with integral reglets to accept face sheet and lock it into place to permit flush appearance.
7. Rail caps or other face sheet capture methods are not acceptable.
8. Extrude top and bottom rail legs for interlocking continuous weather bar.
9. Bottom of Door: Install bottom weather bar, with nylon brush weatherstripping, into extruded interlocking edge of bottom rail.

D. Face Sheet:

1. Material: SpecLite3 FRP, 0.120-inch thickness. Abuse-resistant engineered surface.
2. Texture: Matte.
3. Color: To be selected by the Engineer from the manufacturer's full range of colors.

E. Core:

1. Material: Poured-in-place polyurethane foam.
2. Density: Minimum of 5 pounds per cubic foot.
3. R-Value: Minimum of 11.

F. Hardware:

1. Premachine doors at factory in accordance with templates from specified hardware manufacturers and hardware schedule. Install panics, locks and hinges at the factory.Reinforce doors for closers, kickplates and door holders,, etc. See attached hardware schedule.

2.3 MATERIALS

A. Aluminum Members:

1. Extrusions: ASTM B 221.
2. Sheet and Plate: ASTM B 209.
3. Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.

B. Components: Door and frame components from same manufacturer.

C. Fasteners:
1. Material: Aluminum, nonmagnetic stainless steel, or other noncorrosive metal.
2. Compatibility: Compatible with items to be fastened.
3. Exposed Fasteners: Screws with finish matching items to be fastened.

D. Glazing Gaskets: Glazing factory-installed glass and gaskets factory-installed in captive assembly of glazing stops.
1. EPDM: ASTM D 2000.
2. Closed-Cell Foam: ASTM D 1667.

2.4 FABRICATION

A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated on the drawings.

B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.

C. Assembly:
1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
2. Remove burrs from cut edges.

D. Welding: Welding of doors or frames is not acceptable.

E. Fit:
1. Maintain continuity of line and accurate relation of planes and angles.
2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

F. Class A Flame Spread and Smoke Developed Rating:
1. Class A flame spread and smoke developed rating on interior faces of exterior panels and both faces of interior panels.
2. Flame Spread, ASTM E 84: Maximum of 25.
3. Smoke Developed, ASTM E 84: Maximum of 450.

2.5 ALUMINUM DOOR FRAMING SYSTEMS

A. Tubular Framing:

1. Size and Type: As indicated on the drawings.
2. Materials: Aluminum Alloy 6063-T5, 1/8-inch minimum wall thickness.
3. Applied Door Stops: 0.625-inch high, with screws and weatherstripping.
4. Frame Members: Box type with 4 enclosed sides. Open back framing is not acceptable.
5. Caulking: Caulk joints before assembling frame members.
6. Joints:
   a. Secure joints with fasteners.
   b. Provide hairline butt joint appearance.
7. Field Fabrication: Field fabrication of framing using stick material is not acceptable.
8. Applied Stops: For side, transom, and borrowed lites and panels, with fasteners exposed on interior or unsecure portion only. Applied stops will incorporate pressure gasketing for weathering seal. Reinforce with solid bar stock fill for all frame hardware attachments.
9. Hardware:
   a. Premachine and reinforce frame members for hardware in accordance with manufacturer's standards and hardware schedule.
   b. Factory install hardware.
10. Anchors:
    a. Anchors appropriate for wall conditions to anchor framing to wall materials.
    b. Minimum of 5 anchors on jambs up to 7'-4" height, and 1 additional anchor for each additional foot of frame. Use 1/4" x 20 zinc plated screws, imbedded in subframe at least 1-1/2".
    c. Secure head and sill members of transom, side lites, and similar conditions.

2.6 HARDWARE

A. Hinges: As supplied by manufacturer.

B. Preps: Install locks and hinges at the factory. Reinforce doors for closers, kickplates and door holders. Prepare doors and frames at factory for hinges, locksets, and stops/holders using manufacturer's current templates.

C. All hardware shall comply with ADAAG Section _____.

2.07 ALUMINUM FINISHES

A. All anodized finished to be at least a Class I finish, 0.7 mils thick.

B. Anodized: Frames, louvers , vision lites and door edges.

1. Color to be selected by the Engineer. Provide standard color chart.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive doors. Notify the Engineer of conditions that would adversely affect installation or subsequent utilization of doors. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

3.3 INSTALLATION

A. Install doors in accordance with manufacturer's instructions. Doors and frames to be installed by Factory approved installers.

B. Install doors plumb, level, square, true to line, and without warp or rack.

C. Anchor frames securely in place.

D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by the Engineer.

E. Set thresholds in bed of mastic and backseal.

F. Install exterior doors to be weathertight in closed position.

G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by the Engineer.

H. Remove and replace damaged components that cannot be successfully repaired as determined by the Engineer.

3.4 ADJUSTING

A. Adjust doors, hinges, and lock sets for smooth operation without binding.

3.5 CLEANING

A. Clean doors promptly after installation in accordance with manufacturer's instructions.

B. Do not use abrasive cleaning materials or methods that would damage finish.

3.6 PROTECTION

A. Protect installed doors to ensure that, except for normal weathering, doors Swill be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 08305

ACCESS DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes ceiling access doors for installation in the following types of construction:
   1. Metal ceiling panels.

B. Provide non-rated access doors where indicated.

C. Provide medium security access doors.

D. Related sections.
   1. Section 07460 Metal Soffit and Ceiling Panels.
   2. Section 05400 Cold Formed Metal Framing.

1.2 SUBMITTALS

A. Product data in form of manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions, and directions for installation of anchorage devices.
   1. Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.

B. Shop drawings showing fabrication and installation of access doors and frames, including details of each frame type, elevations of door design types, anchorage and accessory items.

1.3 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain access doors for entire project from one source from a single manufacturer.

B. Size Variations: Obtain the Engineer's acceptance of manufacturer's standard size units, which may vary slightly from sizes indicated.

C. Coordination: Furnish inserts and anchoring devices that must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

1.4 PROJECT CONDITIONS

A. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and indicate on submittal schedule.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide access doors by one of the following or approved equal:
1. Barco Access Doors
2. Babcock – Davis
3. Milcor, Inc.
4. Nystrom, Inc.

2.2 MATERIALS AND FABRICATION

A. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts, and ready for installation.

B. Access Doors and Frames: Fabricate units of continuous welded steel construction unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.

C. Frames: Fabricate from 0.0598 inch thick zinc coated steel sheet.
1. Fabricate frame with exposed flange nominal 1 - inch wide around perimeter of frame for units installed in the following construction:
a. Metal ceiling panels.

D. Flush Panel Doors: Fabricate from 0.0747 inch thick zinc coated steel sheet with concealed spring hinges or concealed piano hinge set to open 175 degrees.
1. Door size: 20 inches wide by 30 inches long minimum.

E. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed.
1. Provide one cylinder lock per access door. Furnish 2 keys per lock. Key all locks alike, unless otherwise scheduled.

F. Finish and Color: Surfaces for frames and doors shall be made paintable. Color to match color of metal ceiling panels.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's instructions for installation of access doors.

B. Coordinate installation with work of other trades.

C. Set frames accurately in position and securely attach to supports with face panels level in relation to adjacent metal ceiling panels finish surfaces.

3.2 ADJUST AND CLEAN

A. Adjust hardware and panels after installation for proper operation.

B. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 08331

ROLLING COUNTER DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following types of overhead coiling doors
   1. Provide and install new overhead coiling doors for counter.
   2. Provide face mounted installation.

B. Related Sections include the following:
   1. Section 04816 Concrete Masonry Unit.
   2. Section 05580 Formed Sheet Metal.
   3. Section 09900 Painting.
   4. Section 10240 Aluminum Security Screen.
   5. Division 16 – Electrical.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide overhead coiling doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:
   1. Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward and outward.

B. Operation-Cycle Requirements: Design overhead coiling door components and operator to operate for not less than 20,000 cycles.

C. Operable Parts to comply with ADAAG Sections 309. Specific sections ADAAG 309.2, 309.3 and 309.4.

1.3 SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, operating instructions, and maintenance information. Include the following:
   1. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
   2. Summary of forces and loads on walls and jambs.

B. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's data sheets.

D. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who is an authorized representative of the overhead coiling door manufacturer for both installation and maintenance of units required for this Project.

B. Source Limitations: Obtain overhead coiling doors through one source from a single manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide products by one of the following or an approved equal:
   1. The Cookson Company.
   2. Cornell Iron Works Inc.
   3. Overhead Door Corporation.
   4. Raynor Garage Doors.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtain: Fabricate overhead coiling door curtain of interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of material thickness recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
   1. Aluminum Door Curtain Slats. ASTM B 209 (ASTM B 209M) or ASTM B 221 (ASTM B 221M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
      a. Provide manufacturer's standard flat-profile slats.
      b. Provide interlocking 1-1/2 inch, rolled in extruded 0.055 inch thick aluminum.

B. Endlocks: Manufacturer's standard locks, secured to curtain slats with galvanized rivets, or high-strength nylon. Provide locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.

C. Windlocks: Malleable-iron castings secured to curtain slats with galvanized rivets or high-strength nylon, as required to comply with wind load.

D. Bottom Bar: Manufacturer's standard continuous channel or tubular shaped, either stainless steel or aluminum to suit type of curtain slats.

E. Curtain Jamb Guides: Fabricate curtain jamb guides of steel angles, or channels and angles, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Provide integral wearstrips on guides to prevent overtravel of curtain and a continuous bar for holding windlocks.

1. Mounting: Facemounted on interior side of room.

2.3 HOODS AND ACCESSORIES

A. Hood: Form to entirely enclose coiled curtain and operating mechanism at opening head and act as weatherseal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.

1. Fabricate aluminum hoods, complying with ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and not less than 0.032 inch (0.8 mm) thick, for aluminum doors.
2. Shape: Square.

B. Weatherseals: Provide replaceable, adjustable, continuous, compressible weather-stripping gaskets fitted to bottom and at top of exterior doors, unless otherwise indicated. At door head, use 1/8-inch- (3-mm-) thick, replaceable, continuous sheet secured to inside of curtain coil hood.

1. Provide motor-operated doors with combination bottom weatherseal and sensor edge.

C. Push/Pull Handles: For push-up-operated or emergency-operated doors, provide galvanized steel-lifting handles on each side of door.
   1. Provide pull-down straps or pole hooks for doors more than 84 inches (2130 mm) high.

D. Slide Bolt: Fabricate with side locking bolts to engage through slots in tracks for locking padlock, located on both left and right jamb sides, operable from coil side.

E. Fabricate locking device assembly with lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bar to engage through slots in tracks.
   1. Locking Bars: Single-jamb side, operable from inside only.

F. Mounting: Face mounted on interior side of room.

2.4 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of adjustable-tension steel helical torsion spring, mounted around a steel shaft and contained in a spring barrel connected to door curtain with required barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. (2.5 mm/m) of span under full load.

C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast-steel barrel plugs to secure ends of springs to barrel and shaft.

D. Fabricate torsion rod for counterbalance shaft of cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Provide mounting brackets of manufacturer's standard design, either cast-iron or cold-rolled steel plate with bell-mouth guide groove for curtain.

2.5 FINISHES, GENERAL

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

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

A. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

B. Finish: Clear anodized aluminum finish.

2.7 ELECTRIC DOOR OPERATORS

A. General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operational life specified with electrical motor and factory-prewired motor controls, starter, gear reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

B. Comply with NFPA 70.

C. Disconnect Device: Provide hand-operated disconnect or mechanism for automatically engaging sprocket-chain operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

D. Design operator so motor may be removed without disturbing limit–switch adjustment and without affecting emergency auxiliary operator.

E. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V, ac or dc.

F. Door-Operator Type: Provide wall-, hood-, or bracket-mounted, jackshaft, gear-head hoist-type door operator unit consisting of electric motor, enclosed worm-gear running-in-oil primary drive, chain and sprocket secondary drive, and auxiliary chain-hoist and floor level disconnect.

G. Electric Motors: Provide high-starting torque, reversible, continuous-duty, Class A insulated, electric motors, complying with NEMA MG 1, with overload protection, sized to start, accelerate and operate door in either direction, from any position, at not less than 2/3 fps (0.2 m/s) or more than 1 fps (0.3 m/s), without exceeding nameplate ratings or considering service factor.
   1. Type: Polyphase, medium-induction type.
   2. Service Factor: According to NEMA MG 1, unless otherwise indicated.
   3. Coordinate wiring requirements and electric characteristics of motors with building electrical system.
   4. Provide open drip-proof-type motor, and controller with NEMA ICS 6, Type 1 enclosure.
   5. Provide exterior units, full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

H. Obstruction Detection Device: Provide each motorized door with indicated external automatic safety sensor able to protect full width of door opening. Activation of sensor immediately stops and reverses downward door travel.
   1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
      a. Self-Monitoring Type: Provide self-monitoring sensor designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door operates to close only with constant pressure on close button.

I. Limit Switches: Provide adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

J. Provide electric operators with ADA-compliant audible alarm and visual indicator lights.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General: Install door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.

3.2 ADJUSTING

A. For new and existing doors, lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

END OF SECTION

SECTION 08630

UNIT TUBULAR SKYLIGHTS

PART 1 - GENERAL

1.1 SUMMARY OF WORK

A. Provide all labor, materials, tools, and services to install tubular skylight system and related components as shown on drawings and specified herein.

1.2 RELATED SECTIONS:

A. Section 05310 – Steel Deck

B. Section 05400 – Cold Formed Metal Framing.

C. Section 07410 – Pre-formed Metal Roofing.

D. Section 07460 – Metal Soffit and Ceiling Panels.

1.3 REFERENCES

A. ASTM B209 – Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.

B. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 2008a.

C. ASTM A 463/A 463M – Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process; 2006

D. ASTM A 653/A 653M – Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process; 2007

E. ASTM E283 – Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004

F. ASTM E 330 – Structural Performance of Exterior Windows, Curtain Walls and Doors; 2002

G. ASTM E 547 – Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference; 2000.

H. ASTM E 1886 – Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure and Differentials.

I. ASTM E 19986 – Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricane.

J. ASTM D635 - Test Method for Rate of Burning and/or Extent and Time of Burning of self-supporting Plastics in a Horizontal Position; 2006.

K. ASTM D1929 - Test Method for Ignition Properties of Plastics; 1996 (2001).

L. ICC AC-16 - Acceptance Criteria for Plastic Skylights; 2008.

M. Florida Building Code TAS 201 - Impact Test Procedures.

N. Florida Building Code TAS 202 – Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure Loading.

O. Florida Building Code TAS 203 – Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.

1.4 PERFORMANCE REQUIREMENTS

A. Completed tubular daylighting device assemblies shall meet the following performance requirements:

1. Air filtration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
2. Water resistance Test: No uncontrolled water leakage at 10.5 psf pressure differential with water rate of 5 gallons/hours/sf when tested in accordance with ASTM E 547.
3. Uniform Load Test:
   a. No breakage, permanent damage to fasteners, hardware parts, or damage to make system inoperable or cause excessive permanent deflection of any section when tested at Positive Load of 150 psf (7.18 kPa) or Negative Load of 60 psf (2.87 kPa) in accordance with ICC AC-16 Section A, or Negative Load of 70 psf (3.35 kPA) if tested per ICC AC-16 Section B.
   b. All units shall be tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.

4. Hurricane Resistance:
   a. Meets Florida Building Code TAS 201, TAS 202, and TAS 203 for impact and non-impact components.
   b. Meets ASTM E 1886 and ASTM E 1996 for missile and cyclic pressure differential testing.
5. Fire Testing:
   a. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the 2006 International Building Code.
   b. Self-Ignition Temperature – Greater than 650 degrees F per ASTM D-1929.
   c. Smoke Density – Rating no greater than 450 per ASTM Standard E 84 in way intended for use. Classification C.
   d. Rate of Burn and/or Extent – Maximum Burning Rate: 2.5 inches/min (62 mm/min). Classification CC-2 per ASTM D 635.
   e. Rate of Burn and/or Extent – Maximum Burn Extent: 1 inch (25mm). Classification CC – 1 per ASTM D 635.

1.5 QUALITY ASSURANCE

A. General
1. Provide certified independent laboratory test reports.
2. Provide tubular skylight system, which maintains U.L. (Underwriters Laboratories) listing.
3. Provide tubular skylight system which has been evaluated and approved by ICBO and maintains a current Evaluation Report.
4. Deliver units to job in as pre-assembled manner as possible. Bottom tube and diffuser ring assembly shall be by manufacturer.
5. Manufacturer shall have been engaged in the manufacture of tubular skylights for a period of not less than 10 years.

1.6 SUBMITTALS

A. Shop Drawings/Samples
1. Shop drawings complete and full scale (where practical) showing construction of all components dimensions and details.
2. Samples of product as requested by the Engineer.

B. Test Reports/Calculations
1. Certified independent laboratory test reports verifying compliance with all test requirements of Section 1.3.

C. Product Data: Manufacturer's data sheets on each product to be used, including preparation instructions and recommendations and installation methods.

1.7 GUARANTEE

A. Tubular Skylight and Related Materials

1. Ten-year guarantee on materials and workmanship from the Manufacturer. One-year guarantee from the installer for materials and labor.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Solatube International Inc., Brighten-Up Series – Solatube Model 290 DS (14' Daylight System) or an approved equal.

2.2 MATERIALS

A. Roof Dome:

1. Injection molded polycarbonate classified as CC1 material. Thickness shall be not less than 0.125". Shall be transparent, UV and impact resistant. Roof dome shall contain Raybender Technology, a series of concentric, light refracting etched lines a minimum of 2" high to improve light input when sun is low on horizon.

B. Ceiling Diffuser:

1. Dual Glazed Diffuser Assmebly:

a. Lower Glazing: Integral injection molded acrylic CC2 material. Nominal thickness of 0.110 inch. Provide Solatube "Classic Vusion" diffuser or an equal manufactured by the respective approved equal tubular skylight manufacturer.

b. Upper Glazing: Plastic with EDPM low density sponge seal to minimize condensation and insect and air infiltration per ASTM E 283. Nominal thickness of 0.039 inch. Provide Solatube "Matural Effect Lens, Type LN" or an equal manufactured by the respective approved equal manufacturer.

C. Roof Flashing Base:

1. Roof flashings shall be aluminized steel manufactured in a single piece, leak proof, corrosion resistive without seams, joints or welds. Thickness shall be 0.028 inch.

a. Provide base pitched to match pitch of roof.

D. Main Tube and Reflector:

1. Fabricate from Aluminum sheet meeting the requirements of ASTM B209, alloy and temper as required by the manufacturer to suit forming operations and finish requirements, .0.015 inch thick.
2. Finish - Provide exposed aluminum surface with high polished specular finish meeting AAMA designation M21C31A31. Reflective surface to be Spectralight Infinity or equal.
3. Sizes: Provide 14" diameter tubes.
4. Tube Ring: 0.090 inch nominal thickness of injection molded high impact acrylic.

E. Accessories:

1. Ceiling ring to be injection molded impact resistant acrylic with nominal thickness of 0.110 inch.
2. Sealant – Polyurethane or copolymer – based elastomeric sealant - use type provided or recommended by the manufacturer.
3. Seals:
   Weather seal - Medium density pile weatherstipping and light density polyvinyl chloride foam tape or UV resistant EPDM rubber. Ceiling Diffuser seal - Closed cell polyethylene foam, 3 pounds per cubic foot, and white polyvinyl chloride seal butt joint welded or EPDM rubber.
4. Fasteners shall be same as metals being fastened or non-magnetic stainless steel or other non-corrosive metal as recommended by the manufacturer.
5. Suspension Wires: Steel annealed galvanized, size and type for application.

2.3 FABRICATION

A. General

1. Finish, fabricate and shop prepare all assemblies under responsibility of one manufacturer.
2. Fabricate to allow for thermal movement of materials when subject to a temperature differential from - 30 degrees F to +180 degrees F.
3. Provision shall be made to insure that water will not accumulate and remain in contact within system components.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install tubular skylights in accordance with manufacturers printed installation instructions.

B. Installer to be factory trained and/or certified by the manufacturer prior to commencement of installation.

C. After installation of first unit - conduct field check to determine compliance with specified requirements. Provide water. Correct any deficiencies prior to commencing with subsequent units.

3.2 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up or replace damaged products before substantial completion.

END OF SECTION

SECTION 08710

FINISH HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all finishing hardware required for all doors complete as specified.

B. It is the intent of this Specification to cover in general the class and character of all finish hardware required.

C. The hardware list specified has been made for the convenience of the Contractor and covers in general the necessary hardware for doors, cabinets, etc. Contractor shall furnish hardware schedule as specified.

D. Suppliers proposing substitutes of equivalent products of other than the manufacturers named shall submit schedules listing the product and manufacturer specified and the product and manufacturer of proposed substitute.

1.2 SUBMITTALS

A. Submit in accordance with Section 01330 - SUBMITTALS.
   1. Schedule: Furnish copies of the schedule of hardware in compliance with specifications and Drawings. Schedule format shall be vertical type as listed in DHI document "Sequence and Format for the Hardware Schedule". List each opening and hardware to be applied. State materials finish, and manufacturer's number for each item. Required types are listed.
      a. Include the following information:
         1. Type, style, function, size, quantity and finish of hardware items.
         2. Use BHMA Finish codes per ANSI A156.18.
         3. Name, part number and manufacturer of each item.
         4. Fastenings and other pertinent information.
         5. Location of hardware set coordinated with floor plans and door schedule.
         6. Explanation of abbreviations, symbols, and codes contained in the schedule.
         7. Mounting locations for hardware.
         8. Door and frame sizes, materials and degrees of swing.
         9. List of manufacturers used and their nearest representative with address and phone number.

2. Manufacturer's Data: Submit manufacturer's descriptive literature along with schedule.
3. Keying Schedule: Submit a keying schedule for approval by the Engineer; using keying nomenclature as listed in DHI document "Keying Terminology". Door designation listed in the Keying Schedule shall be same as those used on Drawings and Hardware Schedule. Keying of locks shall be as directed by the Engineer.
4. Tools and Maintenance Instructions: Furnish a complete set of special wrenches, tools, maintenance instructions applicable to each different or special hardware component.
5. Certification: After completion and inspection by hardware supplier of all construction work, certify on an approved form, that all items of finish hardware have been adjusted and are working properly.
6. Bid and submit manufacturer's update/improved item if scheduled item is discontinued.
7. Deviations: Highlight, encircled or otherwise identify deviations from "Schedule of Finish Hardware" on submittal with notations clearly designating those portions as deviating from this section.
8. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from the Engineer for resolution.
9. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, manufacturer's installation, adjustment and maintenance information, and supplier's final inspection report.

1.3 QUALITY ASSURANCE

A. Perform work in accordance with NFPA 101 as applicable.

B. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience. Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.

C. Hardware Supplier: Company specializing in architectural finish hardware, with a local stock warehouse, who has furnished hardware in Hawaii for a period of not less than three years.

D. Hardware Supplier Personnel: Employ an experienced Architectural Hardware Consultant (AHC), or County accepted equal, who is available at reasonable times during the course of the Work, to the County and Contractor for consultation about Project's hardware requirements, to verify specified hardware with door function and hardware finishes, and to establish keying system.

E. Hardware supplier: Direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to the Engineer.

1. Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.

F. Hardware: Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, hinges and closers) from one manufacturer.

G. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturer's instructions and code requirements.

1.4 REGULATORY REQUIREMENTS

A. Conform to the 2010 ADA Standards for Accessible Design.

B. Definition: "Door Hardware" includes items known commercially as finish hardware which are required for swing and sliding doors, except special types of unique and non-matching hardware specified in same Section as door and door frame.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery, store, protect and handle products to prevent damage of any kind and to maintain security to site.

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 proper times to proper locations (shop or project site) for installation.

D. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

E. Deliver permanent keys to the County.

F. Provide secure lock-up for hardware delivered to 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.

1.6 PROJECT CONDITIONS

A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to the Engineer's approval.

B. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information:

1. Location of embedded and attached items to concrete.
2. Location of wall-mounted hardware, including wall stops.
3. Location of finish floor materials and floor-mounted hardware.
4. At masonry construction, coordinate with the anchoring and frame supplier prior to frame installation by placing a strip of insulation, wood, or foam, on the back of the hollow metal frame behind the rabbet section for continuous hinges, as well as at rim panic hardware strike locations, silencers, coordinators, and door closer arm locations. When the frame is grouted in place, the backing will allow drilling and tapping without dulling or breaking the installer's bits.
5. Coordinate: Flush top rails of doors at outswinging exteriors, and throughout where adhesive-mounted seals occur.
6. Manufacturer's templates to door and frame fabricators.

C. Check Shop Drawings for door and entrances to confirm that adequate provisions will be made for proper Hardware installation.

D. Environmental Considerations: Segregate unused recyclable paper and paper product packaging, uninstalled metals, and plastics, and have these sent to a recycling center.

1.7 WARRANTY

A. Part of the respective manufacturer's regular terms of sale. Provide manufacturer's written warranties:

1.	Locksets:	Three years
2.	Extra Heavy Duty Cylindrical Lock:	Seven years
3.	Closers:	Ten years
4.	Hinges:	One year
5.	Other Hardware	Two years

B. The surety shall not be liable beyond two (2) years of the project acceptance date.

1.8 PROJECT RECORD DOCUMENTS

A. Record actual locations of installed cylinders and their master key code.

1.9 OPERATION AND MAINTENANCE DATA

A. Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

1.10 MAINTENANCE MATERIALS

A. Provide special wrenches and tools applicable to each different or special hardware component.

B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 - PRODUCTS

2.1 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware is indicated in HARDWARE GROUPS at end of this Section. Products are identified by using proprietary catalog numbers, and are used to establish quality and function of products desired.

B. Hardware items from other manufacturers equal in all respect to specified items may be substituted, subject to requirements specified under SPECIAL PROVISIONS. Lockset function is not substitutable.

2.2 MATERIALS AND FABRICATION

A. Hand of Door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of indicated door.

B. Base Metals: Produce hardware units of basic metal and forming method specified, 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 flat head screws except as otherwise indicated. Finish exposed screws to match hardware finish. If exposed in surfaces of other work, to match finish of such other work as closely as possible, including prepared-for-paint finish in surfaces to receive painted finish.

E. Provide concealed fasteners for hardware units, which are exposed when door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Do not use through 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 through bolt or use sex screws fasteners.

2.3 HINGES

A. General: Hinges shall conform to ANSI/BHMA A156.1 and the requirements of this specification.

1. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-dgree opening. Advise the Engineer if 8-inch width is insufficient.
2. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify the Engineer of deviations from scheduled hardware.
3. Conventional Hinges: Steel or stainless steel pins and concealed bearing. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.
   a. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins and security studs.

b. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.

B. Screws: Furnish Phillips flat head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges.

C. Hinges Pins: Except as otherwise indicated, provide hinge pins as follows:
1. Nonferrous Hinges: Stainless steel pins.
2. Exterior, Out-swing Doors: Non-removable pins (NRP).
3. Interior Doors: Nonrising pins.
4. Tips: Flat button and matching plug, finished to match leaves.

D. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90-inches or less in height and one additional hinge for each 30-inches of additional height.

E. Size of hinges shall be as follows:

Door thickness/width	Hinge height	Hinge width
1-3/4 inches to 36-inches	4-1/2 inches	4 or 4-1/2 inches
1-3/4 inches over 36-inches	5-inches	4-1/2 inches extra heavy ball bearing
1-3/4 inches over 48-inches	5-inches	4-1/2 inches extra heavy ball bearing
Note: Hinge width shall be of sufficient size to clear frame and trim when door swings 180 degrees.		

2.4 LOCK CYLINDERS AND KEYING

A. This project shall include keying of all new locksets to a new keying system. The new locksets shall be Kaba Peaks Key system. Contractor to confirm keying system with the Engineer before ordering hardware. All work, shall be in compliance with requirements of this Section.

B. Key System: Install new Kaba Peaks Key system. Initiate and conduct meeting(s) with the Engineer and County of Maui Department of Parks and Recreation to determine system structure. Furnish the County's written approval of the system; do not order keys or cylinders without written confirmation of actual requirements from the County. Furnish temporary construction-keyed and permanent cylinders. Contractor to demonstrate to the County that temporary keys no longer operate the locking cylinders at the end of the project.

1. Key system shall be purchased from and made by Kihei Safe and Locksmith Service, 221 Lalo St., Kahului, Hawaii. Phone: (808) 887-2850.

2.5 LOCKS, LATCHES AND BOLTS

A. Extra Heavy Duty Cylindrical Locks and Latches: as scheduled:
   1. Chassis: cylindrical design, corrosion-resistant plated cold-rolled steel, through-bolted.
   2. Locking Spindle: stainless steel , integrated spring and spindle design.
   3. Latch retractors: forges steel. Balance of inner parts: corrosion-resistant plated steel, or stainless steel.
   4. Latchbolt: solid steel.
   5. Backset: 2.75 inches typically, more or less as needed to accommodate frame, door or other hardware.
   6. Lever Trim: accessible design, independent operation, spring-cage supported, minimum 2.00 inches clearance from lever mid-point to door face.
   7. Strikes: 16 gage curved steel, bronze or brass with 1.00 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
   8. Lock Series and Design: Schlage ND series, "Rhodes" design.
   9. Certifications:
      a. ANSI A156.2, 1994, Series 4000, Grade 1.
      b. UL listed for A label and lesser class single doors up to 4 feet X 8 feet.

B. Cylindrical lockset shall be provided with outside lever when locked, is not rigid but will move freely without operating the latch bolt. Lockset shall be prepared for Peaks Interchangeable core to be opened with Peaks Keys.

C. Strikes: Provide manufacturer's standard wrought box strike for each latch of lock bolt, with lip extended to protect frame, finish to match hardware set. Provide dustproof strikes for foot bolts, except where special threshold construction provides non-recessed strike for bolts.

D. Lock Throw:
   1. Provide 3/4-inch minimum throw of latch and 1-inch minimum for deadbolt.
   2. Provide ½"-inch minimum throw of latch on cylindrical lockset.
   3. Flush Bolt Heads: Minimum of 1/2-inch diameter rods of brass, bronze or stainless steel, with minimum 12-inches long rod for doors up to 7-feet in height; minimum 42-inches long rod for doors up to 9'-

6" in height.

E. Provide locksets, latches, and cylinders equal in all respects to those specified in the Hardware Groups.

F. All lockset levers shall conform to 2010 ADA Standards for Accessible Design Sections 309.4 and 404.2.7..

2.6 CLOSERS

A. General: Closers shall conform to ANSI/BHMA A156.4 and the requirements of this specification. Closures shall also conform to 2010 ADA Standards for Accessible Design Sections 404.2.8, 404.2.8.1, and 404.2.9.

B. Provide full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.

C. ISO 2000 certified. Units stamped with date-of-manufacture code.

D. Independent lab-tested 10,000,000 cycles.

E. Non-sized, non-handed, and adjustable. Place closer inside building and rooms.

F. Plates, brackets and special templating when needed for interface with particular header, door, and wall conditions and neighboring hardware.

G. Adjustable to open with not more than 8.0-pounds pressure to open at exterior doors and 5.0-pounds at interior doors.

H. Separate adjusting valves for closing speed, latching speed and backcheck.

I. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.

J. Exterior door closures: tested to 100 hours of ASTM B117 salt spray test, furnish data.

K. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking data on request.

L. Non-flaming liquid, will not fuel door or floor covering fires.

M. Pressure Relief Valves (PRV) not permitted.

N. Closers shall have separate tamper-proof adjustment valves for closing speed, latching speed and backcheck.

O. Closer covers shall be high impact non-corrosive, and flame retardant.

2.7 DOOR PULLS

A. Finish: Match existing finished pull plates.

B. Provide mounting with 2 1/4" clearance from door frame.

2.8 OTHER HARDWARE

A. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.

B. Door Stops: Provide stops to protect walls, casework or other hardware.
   1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.

C. Seals: Inelastic, rigid back, not subject to stretching. Self-compensating for warp, thermal bow, door settling, and out-of-plumb. Adhesive warranted for life of installation.

2.9 FINISHES

A. Finishes: Identified in Hardware Schedule at end of Section.
   1. Areas using BHMA 626: furnish push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise scheduled.
      a. Door closers: factory powder coated to match other hardware, unless otherwise noted.

B. Provide matching finishes for hardware units at each door or opening to greatest extent possible, except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where base metal or metal forming process is different for individual units of hardware exposed at same door or opening.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for applicable units of hardware by referenced standards.

2.10 CYLINDERS

A. Manufacturer:
   1. Scheduled Manufacturer: Schlage Everest 29, No substitute.

B. Requirements: Provide cylinders/cores complying with the following requirements:
   1. Cylinders/cores compliant with ANSI/BHMA A156.5; latest revision, Section 12, Grade 1; permanent cylinders; cylinder faces finished to match lockset, manufacturer's series as indicated.
      a. Full-sized cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
         1. Conventional "Everest T" cylinders with small format interchangeable cores (SFIC) with patented, restricted keyway.
   2. Keying: Kaba Peaks-keyed permanent cylinders/cores, configured into keying system per "KEYING" article herein.
   3. Features: Cylinders/cores shall incorporate the following features:
      a. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent-protected until the year 2029.
      b. Provide Kaba Peaks small format interchangeable cores (SFIC).
      c. Nickel silver bottom pins.
   4. Identification:
      a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Blind code marks shall not include actual key cuts.
      b. Identification stamping provisions must be approved by the Engineer.
      c. Failure to comply with stamping requirements shall be cause for replacement of cylinders/cores involved at no additional cost to the State.

   5. Forward cylinders/cores to the Engineer separately from keys, by means as directed by the Engineer.

C. Temporary Construction Cylinder Keying.
   1. Provide construction cores that permit voiding construction keys without cylinder removal, furnished as determined by the Engineer.
   2. The Engineer will void operation of temporary construction keys.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Pre-Installation Meeting: Before start of work under this contract, the Contractor, hardware installer shall meet to review the hardware installation instructions and installation conditions.

B. Verify that doors and frames are ready to receive Work and dimensions are as indicated.

3.2 ACCEPTABLE INSTALLER

A. Installers shall be able to read and understand manufacturer's templates, suppliers' hardware schedule and printed installation instructions, readily distinguish drywall screws from manufacturer's furnished fasteners and be available to meet with manufacturers' representative and related trades to discuss installation of hardware.

3.3 PREPARATION

A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation. Installation denotes acceptance of wall/frame condition.

B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
   1. Notify the Engineer of code conflicts before ordering material.
   2. Locate latching hardware between 34 inches to 44 inches above the finished floor.

3.4 INSTALLATION

A. Install each hardware item in compliance with manufacturer's instructions and recommendations.

B. 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 protection with finishing work. 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 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 metal thresholds for exterior doors in full bed of butyl rubber, polyisobutylene mastic sealant, or preformed butyl-polyisobutylene sealant tape as specified under Section 07920 - SEALANTS.

F. Operating parts shall move freely and smoothly without binding, sticking or excessive clearance.

G. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards. Use manufacturers' fasteners furnished with hardware items. Replace fasteners damaged by power driven tools.

H. Protect hardware from damage or marring of finish during construction. Use strippable coatings, removable tapes or other approved means.

I. Ensure that hardware displays no evidence of finish paint after building cleanup with exception of prime coated hardware installed for finish painting. The Contractor may achieve this by sequencing installation, removing after fittings and reinstalling after painting is completed, providing protection, cleaning original hardware finish, or other approved means.

J. Latch and Bolt: Install latch and bolt to automatically engage in keeper, whether activated by closer or manual push. In no case shall additional manual pressure be required to engage latch or bolt in keeper.

K. Closers:
   1. Do not mount closers on corridor side of door except at exterior doors.
   2. Carefully adjust closers to operate noiselessly and evenly.
   3. Have manufacturer's representative regulate closers prior to the Engineer's acceptance of the project.

L. Locate floor stops no more than 4 inches from walls and not within paths of travel. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact the Engineer for direction.

M. Core concrete masonry unit for exterior door stop anchors. Set anchors in approved non-shrinking grout. Fill in concrete masonry unit cells with grout.

N. Drill pilot holes for fasteners in doors and/or frames.

3.5 FIELD QUALITY CONTROL

A. Required certified Architectural Hardware Consultant from door hardware supplier to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.6 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 items, which cannot be adjusted to operate freely and smoothly as intended for application made.
   1. Hardware damaged by improper installation or adjustment methods: repair or replace to the Engineer's satisfaction.
   2. Adjust doors to fully latch with no more than 1 pound of pressure.
   3. Adjust door closers for proper function.

B. Clean adjacent surface soiled by hardware installation.

C. Final Adjustment:
   1. Clean operating items as necessary to restore proper function and finish of hardware and doors.
   2. Lubricate bearings surface of moving parts and adjust latching and holding devices for proper function.
   3. Test keys in every lock for proper conformance with keying system.

D. Final Inspection: Installer to provide letter to the Engineer that upon completion installer has visited the Project and has accomplished the following:
   1. Has re-adjusted hardware.
   2. Has evaluated maintenance procedures and recommended changes or additions, and instructed the County of Maui personnel.
   3. Has identified items that have deteriorated or failed.
   4. Has submitted written report identifying problems.

3.7 PROTECTION/CLEANING

A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.

B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

3.8 HARDWARE GROUPS

A. Manufacturers and their abbreviations used in this schedule:

HAG	Hager Hinge
IVE	H. B. Ives
LCN	LCN Closers
SCH	Schlage Lock Company

HARDWARE SCHEDULE

HARDWARE GROUP 1					
Qty.		Description	Catalog Number.	Finish	Mfr.
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	CANE BOLT LOCKABLE	194530 X 195430	630	GUSA
1	EA	CLASSROOM DEADBOLT	B663BD	626	SCH
1	EA	PADLOCK L/CYL-FSIC	KS21D1200	606	SCH
1	EA	PUSH PLATE	8200 4" X 6"	630	IVE
1	EA	PULL PLATE	8303 10" 4" x16"	630	IVE
1	EA	FLOOR STOP	FS444	626	IVE
Cane bolt locked when door held in open position. Cane bolt by Gatelatchusa.com. Add Kaba Peaks SFIC					
HARDWARE GROUP 2					
Qty.		Description	Catalog Number	Finish	Mfr.
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	ENTRANCE OFFICE LOCK	ND50PD RHO	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA SRI	689	LCN
1	EA	FLOOR STOP	FS439	682	IVE
Add Kaba Peaks SFIC					
HARDWARE GROUP 3					
Qty.		Description	Catalog Number	Finish	Mfr.
3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	ENTRANCE OFFICE LOCK	ND50PD RHO	626	SCH
1	EA	FLOOR STOP	FS439	682	IVE

HARDWARE GROUP 4					
Qty.		Description	Catalog Number	Finish	Mfr.
3	EA	HW HINGE	5BB1HW5 X 4.5	630	IVE
1	EA	PADLOCK L/CYL-SFIC	KS21D1200	606	IVE
Add cylinder Hasp for padlock by others. Add Kaba Peaks SFIC.					
HARDWARE GROUP 5					
Qty.		Description	Catalog Number	Finish	Mfr.
3	EA	HW HINGE	5BB1HW5 X 4.5	630	IVE
2	EA	PADLOCK L/CYL-SFIC	KS21D1200	606	IVE
1	EA	CANE BOLT LOCKABLE	194530 X 195430	630	
Add cylinder Hasp for padlock by others. Add Kaba Peaks SFIC.					

END OF SECTION

SECTION 09220 - METAL SUPPORT ASSEMBLY

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Metal channel ceiling and soffit framing.

B. Related Sections include the following:
   1. Section 05400 - Cold Formed Metal Framing for attachment.
   2. Section 06200 – Finish Carpentry for exterior wood trim and roof fascia.
   3. Section 07460 – Metal Soffit and Ceiling Panels.

1.2 REFERENCES

A. ASTM International (ASTM):
   1. A591/A591M – Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Weight (Mass) Applications.
   2. A641 – Standard Specification for Zinc-Coated(Galvanized) Carbon Steel Wire.
   3. A1003/A1003M – Standard Specification for Steel Sheet, Carbon, Metallic-and Nonmetallic-Coated for Cold-Formed Framing Members.
   4. C645 – Standard specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
   5. C754 – Standard Practice for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wall Board, Backing Board, or Water-Resistant Backing Board.

B. Underwriters Laboratories, Inc. (UL) – Fire Resistance Directory.

1.3 SUBMITTALS

A. Submittals for Review:
   1. Product Data: Illustrate framing types, gages, and locations.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Dietrich Metal Framing, Inc.
   2. Cemco

3. Or an approved equal.

2.2 MATERIALS

A. Steel: ASTM A1003/1003M, Class G90 hot dip galvanized.

2.3 COMPONENTS

A. Provide components in accordance with ASTM C645.

B. Ceiling Framing:
1. Furring channels: Hat shaped 7/8 inch deep, 20 gage core steel.

2.4 ACCESSORIES

A. Wire: ASTM A641, galvanized steel.
1. Tie wire 18 gage, soft annealed.

PART 3 – EXECUTION

3.1 GENERAL

A. Coordinate work with installation of metal ceiling and soffit panels.

B. Provide level installation of furring channels.

C. Secure each channel to roof framing.

D. Allow for penetrations through ceiling. Coordinate work with other trades.

3.2 INSTALLATIION OF FURRING FOR METAL CEILING AND SOFFITS

A. Install channels perpendicular to framing spaced maximum 24 inches on center.

B. Tie wire channels to each support.

C. Overlap channels minimum 2 inches at splices, centered over framing member. Screw attach to framing member through both flanges.

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation, painting, and finishing of exposed interior and exterior items and surfaces.

1. Surface preparation, priming, and finish coats specified in this section are in addition to shop priming and surface treatment specified under other sections.

B. Paint exposed surfaces whether or not colors are designated in "schedules," except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is no adjacent materials or surfaces. If color or finish is not designated, the Engineer will select from standard colors or finishes available.

1. Painting includes field painting exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.

C. Mechanical and Electrical Work: Painting of mechanical and electrical work as required to match background is a part of this section.

D. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels.

1.2 SUBMITTALS

A. Schedule of Finishes

1. 4 sets of proposed painting finish schedule shall be submitted to the County for approval. The schedule shall indicate the wet film thickness (mils) at which the proposed paints/coatings will be applied that are necessary to achieve the final dry film thickness indicated on the Schedule of Finishes under Section 2.02.
2. Schedule of finishes shall indicate which products are intended for airless spray application, if any.

B. Color Samples

1. 3 sets of each color finish sample shall be submitted to the Engineer for approval.
2. After the color finish sample has been approved, one set of color finish samples painted onto 8- 1/2" x 11" cardboard shall be

submitted to the Engineer. The cardboard shall be divided into 4 horizontal strips and painted as follows:

a. Prime 3 strips starting from the bottom.
b. 1st coat bottom 2 strips.
c. 2nd coat bottom strip.

C. Schedule of Operations: Before work on the project is commenced, 4 complete sets of a work schedule showing his sequence of operations and dates shall be submitted by the Contractor to the Engineer.

D. Guaranty: 3 copies of a written guarantee shall be submitted to the County.

E. Certifications: 6 copies of asbestos-free, lead-free, zinc-chromate-free, strontium-chromate-free, cadmium-free and mercury-free paint certificates shall be submitted to the Engineer. Should the Contractor require additional copies for distribution to his suppliers and subcontractors, he shall include these additional copies along with his submittal.

F. Manufacturer's Product Data Sheets: 6 copies of the Manufacturer's Product Data Sheets for the primers, paints, coatings, solvents, sealing and patching materials, sealants and caulking shall be submitted to the Engineer. Data sheets shall indicate thinning and mixing instructions, required film thickness (mil) and application instructions. Should the Contractor require additional copies for distribution to his suppliers and subcontractors, he shall include these additional copies along with his submittal.

G. Manufacturer's Material Safety Data Sheets: 6 copies of the Manufacturer's Material Safety Data Sheets for coatings, solvents, and other hazardous materials shall be submitted to the Engineer. Should the Contractor require additional copies for distribution to his suppliers and subcontractors, he shall include these additional copies along with his submittal.

H. Receipt of Delivery: 3 copies of the receipt, signed by the user's representative, attesting to delivery of extra paint as required under Sub-Section 3.07 C - Extra Paint shall be submitted to the Engineer.

I. Standards: 3 copies of the Surface Preparation Standards referenced under Section 3.01 Surface Preparation.

1.3 GUARANTEE

A. The Contractor shall guarantee that the work performed under this section conforms to the contract requirements and is free of any defect of material or workmanship performed by the Contractor. Such guarantee shall

continue for a period of 2 years from the date of project acceptance during which period the Contractor shall remedy at his own expense any such failure to conform or any such defect.

B. The Contractor shall warrant a mildew free surface for a period of one (1) year from the project acceptance date. Should mildew formation occur on surfaces painted or cleaned under this project within one (1) year of the project acceptance date, the contractor shall clean such surfaces as directed by the Engineer at no additional cost to the State.

C. The Engineer shall notify the Contractor in writing within a reasonable time after discovery of any failure or defect.

D. Should the Contractor fail to remedy any failure or defect described in Paragraph A above within 10 working days after receipt of notice thereof, the owner shall have the right to repair or otherwise remedy such failure or damage at the Contractor's expense.

1.4 SPECIAL REQUIREMENTS

A. Codes:
1. The Contractor shall comply with the State OSHL (Occupational Safety and Health Law) and all pollution control regulations of the State Department of Health.
2. Any violation of the above regulations or codes shall be dealt with as mentioned in the Special Provisions Section and the Environmental Protection Section of these specifications.

B. Protection
1. Persons
a. The Contractor shall take all necessary precautions to protect public pedestrians including tenants from injury.
b. The Contractor shall provide, erect and maintain safety barricades around scaffolds, hoists and wherever Contractor's operations create hazardous conditions in order to properly protect the public and tenants.
2. Completed Work: The Contractor shall provide all necessary protection for wet paint surfaces.

3. Protective Covering: The Contractor shall provide and install protective covering over furniture, equipment, floor and other areas that are not scheduled for treatment. Protective covering shall be clean sanitary drop cloth or plastic sheets. Paint applied to surfaces not scheduled for treatment shall be completely removed and surfaces shall be returned to their original condition. If airless spraying is utilized, the Contractor shall take additional precautions to prevent the escape of overspray from the immediate

area being painted and/or to prevent overspray from extending more than 5 linear feet away from the exterior of the building.

4. Safeguarding of Property: The Contractor shall take whatever steps may be necessary to safeguard his work and also the property of the owner and other individuals in the vicinity of his work area during the execution of this Contract. He shall be responsible for and make good on any and all damages and for losses to work or property caused by his or his employee's negligence.
5. Fire Safety: The Contractor shall direct his employees not to smoke in the vicinity and exercise precautions against fire at all times. Waste rags, plastic (polyester sheets), empty cans, etc. shall be removed from the site at the end of each day.

C. Storage Area for Materials: No paint material, empty cans, paint brushes and rollers may be stored in the building(s). They shall be stored in separate storage facilities away from the building(s).

The Contractor may furnish a job site storage facility. Such facility shall comply with requirements of the local Fire Department. The storage area shall be kept clean and the facility shall be locked when not in use or when no visual supervision is possible.

D. Sequence of Operations: The sequence of operations shall divide the surfaces into work areas and present a schedule for:
1. Surface preparation and spot prime.
2. Prime coat.
3. First finish coat.
4. Second finish coat.

Minimum interior work area shall be the complete inside surfaces of one room. Minimum exterior work area shall be one side of the building.

1.5 AREAS (SURFACES/STRUCTURES) TO BE PAINTED

A. Structures:
1. New buildings, complete interior and exterior surfaces.
2. Painting of miscellaneous site work items including parking stalls stripes and International Symbol of Accessibility within parking stalls are specified in sitework specifications for this project.

3. New exterior items attached to exterior surfaces of buildings.

B. Surfaces to be Painted
1. Interior: All interior surfaces, shall be painted unless otherwise indicated on the plans and/or specifically deleted in these specifications.

Interior surfaces to be painted shall be those surface not exposed to weather in an area enclosed by 4 walls.

Extent of treatment for special items is as follows:

a. New walls where noted on plans - interior surfaces shall be completely treated unless specifically noted.

b. Items or surfaces having factory finishes (not including primers) need not be painted unless specifically noted otherwise.

2. Exterior: All new exterior surfaces shall be painted, unless otherwise indicated on the plans and/or specifically deleted in these specifications.

New exterior surfaces to be painted shall be any surface exposed to weather in an area not enclosed by 4 walls and a roof. Extent of treatment for special items is as follows:

a. Exterior doors frames.

b. G.I. pipes and conduits, electric boxes, and similar appurtenances.

c. All exposed wood surfaces.

d. Items or surfaces having factory finishes (not including primers) need not be painted unless specifically noted otherwise.

1.6 WORK INCIDENTAL TO PAINTING

A. Interior

1. Unless otherwise specified, the Contractor is responsible for moving about all furniture and equipment to provide himself with sufficient working space.

The Contractor shall protect these items and make good any damage to them at no cost to the County. After the painting of the room is completed, the Contractor shall replace all furniture and equipment to their original locations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Acceptable Manufacturers:
Akzo Nobel Devoe Paints and Coatings
15885 Sprague Road
Stronsville, OH 44137
(808) 669-6792
Or approved equal.

B. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 010010 paragraph 1.03.

1. When submitting request for substitutions, provide complete product data specified above under Submittals, for each substitute product.

C. Lead Prohibition: All paints shall be lead-free.

D. Mercury Prohibition: All paint shall be mercury-free.

E. Chromate Prohibition: All paint shall be free of zinc-chromate and/or strontium-chromate.

F. Cadmium Prohibition: All paint shall be cadmium-free.

G. All materials shall be delivered to the job site in undamaged original containers bearing the manufacturer's label and shall be stored in such a manner as to prevent damage. All rejected materials shall be removed from the job site immediately.

H. Thinning of paint shall be done using material recommended by the manufacturer. Mix proprietary products according to manufacturer's printed specifications. Compound thinner, mineral oil, kerosene, refined linseed oil, or gasoline shall not be used for thinning.

I. Except for metal primers all paint shall contain the maximum amount of mildewcide per gallon of paint permitted by the mildewcide manufacturer without adversely affecting the quality of the paint.

J. The supplier shall submit a signed certificate indicating the amounts of mildewcide added by both the paint manufacturer and the paint supplier.

2.2 SCHEDULE OF FINISHES

A. The Schedule of Finishes is made for the convenience of the Contractor and indicates the types and quality of finishes to be applied to the surfaces.

B. All paints and stains, unless otherwise noted, are the products of Devoe, and are so named to establish desired quality and standard of materials. Painting materials equal to those mentioned by trade name under the various treatments may be used, provided they meet with the approval of the County.

C. Treatments shall be applied on exposed surfaces of designated materials, in conformity with instructions of the paint product used.

D. Exterior: Provide two coats finish.

1. Wood surfaces:

1st Coat	Devoe DR51801 Kilstain-WB Latex Primer Sealer, 1.5 mils dry
2nd & 3rd	Devoe DR17XX Wonder-Shield Exterior Acrylic Paint, 1.5 mils dry per coat

2. Metal-ferrous:

1st Coat	Devoe Devguard 4160 Multi-Purpose Structural & Tank Primer, 2-2.5 mils dry
2nd & 3rd	Devoe Devflex 4216HP High Performance Acrylic Semi-Gloss, 1.5-4.0 mils dry per coat
2 coats anti-graffiti:	Monochem Permashield Premium topcoat-Gloss or Matte Finish, 2-3 mils dry each coat

3. Metal-galvanized:

1st Coat	Devoe Devguard 4160 Multi-Purpose Structural & Tank Primer, 2-2.5 mils dry
2nd & 3rd	Devoe Devflex 4216HP High Performance Acrylic Semi-Gloss, 1.5-4.0 mils dry per coat
2 coats anti-graffiti:	Monochem Permashield Premium Topcoat-Gloss or Matte Finish, 2-3 mils dry each coat

4. Concrete Masonry Unit(CMU): Graffiti Resistance

1st Coat	4000 Bloxfil Heavy Duty Acrylic Block Filler, 50-75 sq. ft. per gal
2nd & 3rd Coat	Devoe DR17XX Wonder-Shield Exterior Acrylic Paint, 1.5 mil dry each coat.
2 coats anti-graffiti:	Monochem Permashield Premium Topcoat-Gloss or Matte Finish, 2-3 mils dry each coat

E. Interior Surfaces:

1. Wood surfaces

1st Coat	Devoe DRS51801 Kilstain-WB Latex Primer Sealer, 1.5 mils dry
2nd & 3rd	Devoe DRN39XX Wonder-Tones Interior Semi-gloss, 1.5 mils dry each coat

2. Concrete Floors – Non-skid: Solvent Epoxy

1st Coat	Devoe Pre-Prime 167 Penetrating Sealer, 1.5 mils dry
2nd Coat	Devoe Devran 224HS High Build Epoxy, 4-8 mils dry
Non-skid	Broadcast texturing material while stick tacky. Allow to dry then sweep off excess
3rd Coat	Devoe Devran 224HS High Build Epoxy, 4-8 mils dry
4th Coat	Devoe Devthane 379 Clear Gloss, 2-3 mils dry

3. Concrete Masonry (CMU): Graffiti resistance

	1st Coat	4000 Bloxfil Heavy Duty Acrylic Block Filler, 50-75 sq.ft/gal
	2nd & 3rd	Devoe DRN39XX Wonder-Tones Interior Semi-gloss, 1.5 mils dry each coat
	2 coats anti-graffiti:	Monochem Permashield Premium Topcoat-Gloss or Matte Finish, 2-3 mils dry each coat
4	.Concrete Masonry (CMU), Maintenance storage area:	
	1st Coat	4000 Bloxfil Heavy Duty Acrylic Block Filler, 50-75 sq. ft./gal
	2nd & 3rd	Devoe DRN39XX Wonder-Tones Interior Semi-gloss, 1.5 mils dry each coat
5.	Concrete:	
	1st Coat	Devoe DRN30XX Wonder-Tones Interior Semi-gloss, 1.5 mils dry each coat

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. General

1. Prior to surface preparation and coating applications, remove, mask, or otherwise protect, hardware, hardware accessories, machined surfaces, plates, lighting fixtures, public and private property, and other such items not to be coated that are in contact with surfaces to be coated. Following completion of painting, workmen skilled in the trades involved shall reinstall removed items. Restore surfaces contaminated by coating materials, to original condition and repair damaged items.
2. Surface preparation shall be in accordance with the Painting and Decorating Contractors of America, "Architectural Specification Manual," methods are applicable to all substrates, except as modified herein.

B. Wood to be Painted

1. Remove from surfaces to be painted all foreign matter such as nails, screws, staples, tape and gum.
2. Remove all mildew stain from surface by applying Clorox, Purex, Jomax Remover, Sinclair No. 10 Cleaner or equal with strength adjusted as required. After treating thoroughly rinse with potable water.
3. Wash all surfaces with T.S.P. (trisodium phosphate) and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair bond of, or bleed through new finish. After washing, rinse with potable water and allow to dry thoroughly.

4. Fill holes (nail, tack, staple, etc.), cracks, open joints and other imperfections with appropriate compound and allow to set (door and trim included). Seal and caulk all openings which will permit the entrance of water. Sealing and caulking compounds shall be compatible with the substrate and primer/paint and shall be applied and allowed to set in accordance with the manufacturer's recommendations and instructions.
5. Prime bare wood or fill material with specified primer.

C. Concrete to be Painted

1. Remove from surface to be painted all foreign matter such as nails, screws, staples, tape and gum.
2. Remove all mildew stain from surface by applying Clorox, Purex, Jomax Remover, Sinclair No. 10 Cleaner or equal with strength adjusted as required. After treating thoroughly rinse with potable water.
3. Wash all surfaces with T.S.P. (trisodium phosphate) and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair bond of, or bleed through new finish. After washing, rinse with potable water and allow to dry thoroughly.
4. Seal all cracks hairline to 1/8" in width with concrete patching compound. All cracks over 1/8" in width shall be sealed with Tuff Patch (Fibre- Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with manufacturer's recommendations and instructions.
5. All holes 1/4" in diameter or greater shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with manufacturer's recommendations and instructions.
6. Prime bare concrete, seal or patch material with the specified primer.

D. Masonry Block to be Painted

1. Remove from surface to be painted all foreign matter such as nails, screws, staples, tape and gum.
2. Remove all mildew stain from surface by applying Clorox, Purex, Jomax Remover, Sinclair No. 10 Cleaner or equal with strength adjusted as required. After treating thoroughly rinse with potable water.
3. Wash all surfaces with T.S.P. (trisodium phosphate) and water or other appropriate solution to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalking or other foreign matter which would impair bond of, or bleed through new finish. After washing, rinse with potable water and allow to dry thoroughly.

4. Seal all cracks hairline to 1/8" in width on masonry block wall surface with concrete patching compound. All cracks over 1/8" in width shall be sealed with Tuff Patch (Fibre-Glass Cloth System) or equal method before paint application. All patching shall be done in accordance with manufacturer's recommendations and instructions.
5. Prime masonry, seal or patch material with the specified primer.

E. Ferrous Metal and Galvanized Metal
1. Remove from surface to be painted all foreign matter such as tape and gum.
2. Remove all rust and loose mill scale by power tool chipping, de-scaling, sanding, wire brushing and grinding down to bare metal (only tightly adhering surface rust and mill scale which cannot be removed with a dull putty knife remaining) in accordance with Steel Structures Painting Council (SSPC) standard SP3. Care shall be taken so that the surface is not burnished during cleaning.
3. Completely wipe all surfaces with mineral spirits or other appropriate solution as required to remove accumulated film of wax, oil, grease, smoke, dust, dirt, chalky or other foreign matter which would impair the bond of, or bleed through the new finish.
4. Allow the surface to thoroughly dry and immediately prime bare metal areas with the specified primer.

3.02 PAINT APPLICATION
A. General
1. All work shall be done in a workmanlike manner by skilled and experienced mechanics and shall conform to the best painting practices.
2. All materials shall be applied in strict accordance with the manufacturer's specifications, including spread rates, and the finished surfaces shall be free from runs, sags, drops, ridges, waves, laps, streaks, brush marks and variations in color, texture and finish (glossy or dull). The coverage shall be complete and each coat shall be so applied as to produce a film of uniform thickness.
No paint, varnish or enamel shall be applied until the preceding coat is thoroughly dry and approved.
3. No exterior painting of unprotected surfaces shall be done in rainy, damp weather. Coats shall be applied only to surfaces that are thoroughly dry and only under such combination of humidity and temperature that will ensure proper paint application.
4. Any mixing shall be done outside the building.

B. Application: Paint application shall be by brush, roller or airless sprayer only. Airless sprayer application on CMU shall be backrolled.

Colors: Colors are to be selected by the Engineer. Each coat shall be tinted a different shade from the preceding coat.

3.3 BACK PAINTING AND PRIMING

A. All interior wood finish, trim, cabinet work, and plywood shall be thoroughly back-painted on all surfaces which will be concealed after installation with one coat of exterior primer.

B. All knots and sap pockets in surfaces to be painted shall be shellacked before priming. Priming shall be done immediately after interior millwork and finish carpentry has been sized and fitted, sanded and approved before installation.

3.4 PROTECTION OF PROPERTY

A. The Contractor shall be responsible for condition of building in his charge. He shall protect adjacent work and materials from soiling or damage as well as his own. The storage and handling of paints and thinners shall be in accordance with the safety provisions and codes covering such handling and storage.

B. Should the Contractor elect to use airless sprayer application, he shall be completely responsible for the protection of all surfaces, finishes, etc., from overspray or other consequences that result from the use of airless spraying equipment or application. Overspray, if allowed to occur, shall be completely removed from all finished surfaces. Surfaces damaged from the use of airless spraying shall be replaced and/or restored to the satisfaction of the Engineer. Any and all claims from anyone, on-site or off-site, resulting from damages caused by the use of airless spraying shall be the complete responsibility of the Contractor.

3.5 INSPECTION

A. Every facility shall be provided for inspection of the work by the Engineer at any time. Any work not conforming to these specifications shall be cleaned off, and repainted at the expense of the Contractor.

3.6 MISCELLANEOUS

A. Installation of Removed Items: After completion of final paint coat, removed items shall be reinstalled.

B. Clean-up

1. During the progress of the work, all debris, empty crates, waste, drippings, etc. shall be removed by the Contractor and the grounds

about the areas to be painted shall be left clean and orderly at the end of each work day.

2. Upon completion of the work, staging, scaffolding, containers and all other debris shall be removed from the site. All paint, shellac, oil, or stains splashed or spilled upon adjacent surfaces not requiring treatment (hardware, fixture, floor, glass) shall be removed and the entire job left clean and acceptable.

C. Extra Paint

The Contractor shall provide extra paint in each of the different colors of exterior and interior paint used for walls, wainscot, eaves and ceiling to the school upon completion of the project. The paint shall be in unopened one gallon cans and shall be in the quantities listed below:

1. Paint used over large areas, such as the exterior of the building and in several classrooms - 5 gallons of each color.
2. Paint used in single room areas and in small areas, such as bathrooms and doors - 1 gallon of each color.

END OF SECTION

SECTION 10161

TOILET PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Work under this section shall include but not be limited to the following:
   1. Phenolic laminated plastic toilet compartment doors, stiles and accessories.

1.2 COORDINATION WITH OTHER SECTIONS

A. Coordinate the installation of doors, stiles and pilasters with following sections:
   1. Section 04816 Concrete Unit Masonry Assemblies
   2. Section 09900 Painting.

1.3 REFERENCES

A. The publications listed below form a part of this specification:
   1. The 2010 ADA Standards for Accessible Design.
   2. National Electrical Manufacturers Association Standards LD 3.1 - Performance, Application, Fabrication, and Installation of High-Pressure Decorative Laminates.
   3. American Society for Testing and Materials (ASTM) E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 GENERAL REQUIREMENTS

A. Accessible toilet compartments shall be in conformance with the criteria noted in the 2010 ADA Standards for Accessible Design.

1.5 SUBMITTALS

A. Submit the following to the Engineer:
   1. 2 sets of phenolic plastic samples for color selection.
   2. 2 sets of the proposed (selected) manufacturer's current brochures, specifications and shop drawings showing construction and installation details. Drawings shall indicate the elevations of pilasters, stiles, door, hardware, fittings, mounting brackets, proposed method of anchoring, and other related items and installation details.
   3. Manufacturer's certificate attesting that his materials meet or exceed the specified requirements.

1.6 PRODUCT HANDLING

A. Materials shall be delivered to the job-site in their original sealed containers bearing the name of the manufacturer and brand designation.

B. Items shall be delivered and stored in a manner that ensures they will be protected against damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The products of the following manufacturers or an approved equal.
   1. Ampco Products Inc.
      (Phenolic Plastic)
   2. Bobrick Washroom Equipment, Inc.
      (Phenolic Plastic)
   3. Knickerbocker Case Corp., Inc.
      (Phenolic Plastic)
   4. Bradley
      (Phenolic Plastic)

B. The products of other manufacturers are acceptable provided they meet or exceed the material and construction requirements specified hereinafter and are pre-qualified.

C. Submit manufacturer's standard full range of colors to the Engineer for selection.

2.2 MATERIALS AND CONSTRUCTION

A. General: Compartments shall be of the type and size specified and as shown on the plans.

B. Phenolic Plastic Doors, Partitions, Stiles and Pilasters:
   1. Shall be fabricated with a solid phenolic core of multiple resin-impregnated kraft paper sheets with a matte finish melamine surface fused under high temperature and pressure.
   2. The exposed finish surfaces shall be self- lubricating; smooth; waterproof; non-absorbent; stain, chemical and graffiti resistant.
   3. Phenolic Plastic shall have a Class A or B Flame Spread Rating and a maximum Smoke Developed Rating of 450 in conformance with ASTM E 84.
   4. Edges shall be machined smoothed with 1/16" radius corners.

C. Doors:
   1. Doors of phenolic plastic shall be a minimum of 3/4" thick.
   2. Unless otherwise noted on the drawings, a minimum clear door opening width of 32" shall be provide at the door leading to a handicap accessible toilet stall. This clear width shall be measured between the edge of the door bumper/keeper and the face of the door when opened 90 degrees.
   3. Doors to the ambulatory stalls shall comply with ADAAG 604.8.2 Ambulatory Accessible Compartments.

D. Stiles and Pilasters:
   1. Pilasters and stiles shall have adjustable floor anchors with leveling devices, studs, and locking nuts to firmly secure pilasters and stiles to the floor.
   2. Stiles and pilasters shall be of phenolic plastic having partitions a minimum of 1/2" thick and stiles and pilasters a minimum of 3/4" thick.
   3. Partitions to which grab bars are fastened, along with their respective brackets and connectors, shall be capable of supporting the imposed loads noted in the 2010 ADA Standards for Accessible Design.

E. Hardware and Fittings:

1. Doors, pilasters and stiles shall be furnished with the necessary hardware and fittings to provide a complete installation. They shall be pre-cut to facilitate erection and minimize field errors.
2. Materials: Hardware and fittings shall be either satin-finish stainless steel, anodized extruded aluminum or chrome plated brass. Non-ferrous alloys such as Zamac castings shall not be used.
3. Door hinges: Either spring or cam-action type and adjustable to hold the door open about 12 inches in a pre-set position. All parts shall be non- rusting such as stainless steel pintles; nylon or delrin cams; nylon, delrin or self-lubricating bronze bushings; and housings of anodized extruded aluminum alloy or satin-finish stainless steel.
4. Latches: The latch shall be of a shape which is easy to grasp with one hand and which does not require tight grasping, tight pinching or twisting of the wrist to operate and shall be operable by a person on the outside in the event of an emergency. Mechanisms such as slide bolts with a projecting handle on the inside of the stall which can be opened by a person on the outside reaching over the door with a stick are acceptable.
   a. Latches at accessible doors to comply with ADAAG 309.4 Operation.
5. Door Pulls: Handicap accessible toilet stall doors shall be furnished with a grab bar/door pull, 18" long, mounted horizontally on the inside face of the door adjacent to the hinge to facilitate closing of the door upon entry.
6. Coat Hook/Door Bumper: Furnish one each per door.
   a. Coat hooks in accessible toilet compartments to comply with ADAAG 604.8.3 Coat Hooks and Shelves.
7. Shoe: All pilasters and stiles shall have a 3 inch high minimum trim cover or shoe of Type 302 or 304 stainless steel, chrome plated brass or anodized extruded aluminum at the floor.
8. Hardware mounting heights: The highest part of any handle, pull, grab bar, latch or operating mechanism shall be at 36 inches max. above the finished floor.
9. Fasteners: Hardware and fittings shall be fastened with theft-resistant one-way stainless steel or chrome plated brass through-bolts or machine screws in factory installed steel inserts.
10. Partition to Wall Bracket: Manufacturer's standard "U" shaped, continuous, full height channel bracket made to attach partition to wall.

G. Toilet compartments shall comply with 2010 ADA Standards for Accessible Design Sections 604.8, 604.8.1, 604.8.1.2, 604.8.1.3, 604.8.1.4, 604.8.1.5 and 604.8.2.

PART 3 - EXECUTION

3.1 INSPECTION

The Installer together with the Contractor shall examine the areas and conditions under which toilet stall doors, stiles and pilasters are to be installed. Should any condition be found unsuitable, no work shall be performed until the unsatisfactory conditions have been corrected and are acceptable to the Installer. Proceeding with the work will imply acceptance of the conditions by the Installer.

3.2 INSTALLATION

A. Pilasters, stiles and doors shall be erected in strict accordance with the manufacturer's instructions.

B. All parts shall be securely screwed and/or bolted tight, well-anchored to the wall, true to line, level and plumb, with doors and hardware placed at the proper heights and in proper operating condition.

C. The following uniform clearances shall be provided:
   1. 1/8" max. between stiles/pilasters and walls.
   2. 1/8" max. between stiles/pilasters and doors.

D. Anchorage to concrete or to masonry at grouted cells shall be bolts with lead or steel expansion shields. Anchorage to masonry at ungrouted cells shall be with toggle bolts.

3.3 PROTECTION AND CLEANING

A. Protect the work of other trades against damage, injury or soiling.

B. After installation, clean exposed surfaces with cleaners recommended and approved by the manufacturer and protect from damage.

C. Adjust hardware and lubricate moving parts as necessary to ensure smooth operation.

D. Repair and restore adjacent stiles and doors surfaces that are marred or damaged as a result of the installation of toilet pilasters to their original condition. Leave adjacent surfaces in a neat and clean condition.

END OF SECTION

SECTION 10240

ALUMINUM SECURITY SCREENS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide and install aluminum security screens complete with frames and angle clips as specified herein.

B. Provide and install stainless steel anchors, bolts, expansion shields, and other fasteners as detailed and/or required for the complete installation of work under this section.

C. Security screens shall be removable for maintenance work.

D. Security screens shall be provided for Concession counter.

1.2 COORDINATION

A. Before commencing with the work, the Contractor shall examine the surfaces and conditions under which security screens are to be installed and shall report all discrepancies and/or defective conditions to the Engineer so that corrective measures can be taken.

B. Fabrication of the aluminum security screen work shall not commence until these discrepancies and/or defective conditions are corrected, or unless otherwise approved by the Engineer.

1.3 QUALITY ASSURANCE

A. Qualifications of the Manufacturer: Use products produced by manufacturers regularly engaged in the manufacture of aluminum security screens and with a history of successful production.

B. Qualifications of the Installer: The Installer shall be thoroughly trained in the fabrication and installation of the security screens.

1.4 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Manufacturer's Data: Submit manufacturer's product data for all components showing compliance with specified requirements.

C. Shop Drawings and Product Data:

1. Submit three (3)complete sets of installation drawings showing the complete arrangement of screens and details in accordance with the contract drawings.
   a. The shop drawings shall include reference to the sheet and detail on the contract drawings they depict.
   b. Three (3) complete sets of the manufacturer's product data showing compliance with the specified requirements.

D. Certificates: Submit a signed certificate from the proposed manufacturer showing that the Installer has been trained in the fabrication and installation of the security screens.

E. Fabrication of the screens shall not commence until all submittals have been approved by the Engineer.

1.5 DRAWINGS AND SPECIFICATIONS

A. Should the products of other manufacturer's require different drawings, details or other requirements, provide the necessary adjustments at no additional cost to the State.

1.6 PRODUCT HANDLING

A. The Contractor shall execute the necessary precautions to properly protect the security screens and its finish against damage during assembly, transport, storage and installation.

B. The Contractor shall execute the necessary precautions to properly protect surrounding surfaces and parts of the building(s) against damage. Any work or materials damaged as a result of the work performed under this section shall be immediately repaired or restored to its original undamaged condition or replaced with new to the satisfaction of the Engineer at no additional cost to the State.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The products of the following manufacturers or approved equal are acceptable provided they meet the materials, construction and standard of quality specified herein:

1. Emtek Products, Inc.; Amplimesh No. 123 Standard Pattern.
2. Ullrich Aluminum Company; Securamesh "007" Aluminum Grille Specification or as required by mesh size.

2.2 MATERIALS

A. Aluminum Security Screen Mesh: Aluminum security screen mesh shall be manufactured from 6063-T5 or 6063-T4 aluminum alloy and temper.
   1. Standard Size Mesh:
      a. Minimum Extrusion Section Width: 0.228-inch.
      b. Minimum Extrusion Section Height: 0.276-inch.
      c. Maximum Opening Dimension: 1.50-inches by 2.10-inches.

B. Aluminum Extruded Framing: Aluminum framing shall be manufactured from 6063-T5 or 6063-T4 aluminum alloy and temper of the sizes and shapes as detailed in the contract drawings or as recommended by the aluminum security screen manufacturer.

C. Screen Frame Corner Reinforcement: Aluminum, of the type and size recommended by the aluminum security screen manufacturer.

D. Aluminum Angle Clips: 1-1/2 inch by 1-1/2 inches wide x 1/8-inch thick. The length of the angle legs shall be as indicated on the contract drawings.

E. Spacers: 5/8-inch diameter round anodized aluminum. PVC spacers shall not be used.

F. Anchor Bolts, Screws, Nuts & Washers: Stainless steel, Type 304 alloy of the sizes and types recommended by the aluminum security screen manufacturer. Fasteners shall be tamper-resistant type where specified. Use of plastic or lead shields will not be permitted.

G. Pop-Rivets: Pop-rivets shall be 1/8-inch diameter anodized aluminum as recommended by the aluminum security screen manufacturer.

H. Touch-up Paint: L-4485 AN-A-KOTE, dark bronze color or equivalent coating as recommended by the aluminum security screen manufacturer.

I. Finish:
   1. The aluminum security screen shall be free of major scratches and other surface blemishes.
   2. All exposed security screen mesh, frame and clip angle surfaces shall be provided with a dark bronze anodized finish of minimum 0.0007-inch (17.58 microns) thickness.
   3. Cut ends, punched or drilled holes, fasteners used to connect bronze anodized parts and minor scratches shall be touch-up painted to match the bronze anodized finish.

4. Anchor bolts, screws, nuts and washers exposed surfaces shall be dark bronze finish or equivalent to match aluminum security screen assembly as recommended by the aluminum security screen manufacturer.

PART 3 - EXECUTION

3.1 INSPECTION

A. Prior to fabrication of the security screens, the Installer shall examine the areas and conditions under which they are to be installed. The required measurements shall be accurately taken to ensure proper fit of the screens. Should any condition be found unsuitable, fabrication of the screens shall not commence until the unsatisfactory condition(s) have been corrected and are acceptable to the Installer. Proceeding with the work will imply acceptance of the conditions by the Installer.

3.2 FABRICATION AND WORKMANSHIP

A. Fittings and Shop Assembly: Insofar as possible, fit and shop-assemble the work complete and ready for erection and installation in accordance with the approved shop drawings and trade standards.
   1. Fabricate assembly for inset mounting.

B. Accuracy of the Work: Fabricate and erect the work square, plumb, straight and true. All cuts shall be accurate for the minimum joint gap.

C. Holes: Drill or punch holes required for bolted or pop-rivet connections and for the attachment of work of other trades. Burned holes are not acceptable.

D. Cut ends and holes shall be free of burrs.

E. The security screen mesh opening size specified under sub-section 2.2(A)(1) (C) and the orientation of the security screen mesh within the frame shall be maintained at each opening unless otherwise approved in writing by the Engineer.

F. The security screen mesh shall be oriented within the frame so that the direction of the extrusion is in the vertical position. Also, where the screen mesh is connected to the frame and mullions, the mesh opening adjacent to the frame/mullion shall be at least one-half of the opening size noted under sub-section 2.2(A)(1) (C).

G. The corners of the aluminum extrusion frames shall be neatly mitered and assembled using corner reinforcement. The security screen mesh shall be securely fastened to the extruded framing with pop-rivets spaced at a maximum of 6-inches on-center. Welding of the screens and frames is not acceptable.

H. Where provided, vertical "H" section splice bars/mullions shall be located so that they are aligned with the window mullions.

I. Concealed fasteners shall be used to secure the security screen/frame assembly to the supporting angle clips. The angle clips shall be oriented so that the leg in contact with the building is not exposed (located behind the security screen). This leg shall also have slotted holes to permit for field adjustment of the screens.

3.3 INSTALLATION AND ERECTION

A. Installation: The aluminum security screens shall be installed and erected in their proper location/opening, plumb and true, and securely anchored to the substrate in accordance with the manufacturer's installation details, instructions and recommendations.

Fasteners securing the clip angle to the substrate and other fasteners which are exposed or accessible to vandalism shall be the tamper-resistant type. (Note: One-way non-removable fasteners are not permitted.)

B. The security screens shall be independent of the rolling counter door assemblies which they protect.
   1. Security screens shall be positioned so that they do not interfere with the proper operation of the rolling counter door.
   2. Attachment of the security screen/frame to the rolling counter door is not permitted.

C. Replacement: Aluminum security screen sections which are damaged during fabrication, storage, transport or installation shall be immediately removed from the site and replaced with new sections matching the existing.

D. Protection from Entrapped Water: Provide for the drainage of water entrapped within the screen framing system.

E. Dissimilar Materials: Where aluminum surfaces come in contact with dissimilar materials, coat contact surfaces with primer and a heavy coat of bituminous paint of minimum 15 mils dry film thickness or a separator as recommended by the security screen manufacturer. Care shall be taken so that the protective coating is not visible when the assembly is completed.

3.4 CLEAN-UP

A. Upon completion of the installation, the security screens shall be cleaned and all dirt and debris shall be removed from the site. Care shall be taken so as not to damage surrounding areas, surfaces and parts of the building(s). The entire installation shall be left clean and in a condition acceptable to the Engineer.

END OF SECTION

SECTION 10425

IDENTIFYING DEVICES

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following types of signs:
   1. Unframed fiberglass plaque signs for rooms.

1.2 SUBMITTALS

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

B. Product Data: Include manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.

C. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
   1. Provide message list for each sign required, including large-scale details of wording and layout of lettering.

D. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.

1.3 QUALITY ASSURANCE

A. UL and Nema Compliance: Provide lighting fixtures and electrical components for illuminated signs that are labeled and listed by UL and comply with applicable NEMA standards.

B. Single-Source Responsibility: For each separate type of sign required, obtain signs from one source from a single manufacturer.

C. All products shall comply with 2010 ADA Standards for Accessible Design, Sections 703, 703.1, 703.2, 703.3, 703.4, 703.5, and 703.6.

PART 2 – PRODUCTS

2.1 UNFRAMED DIMENSIONAL LETTER PLAQUE SIGNS:

A. Provide ASI Sign Systems ASIntac Series, Best Signs, Brandy Signs, Inc. Inland Pacific Architectural Signage Systems Type H Raised Letters, Mohawk Sign Systems Series 200, Nelson-Harkins TS250 Series or approved equal. Comply with requirements indicated for materials, thickness, finished, colors, design, shapes, sizes, and details of construction.

1. Fabricate signs with edges mechanically and smoothly finished to conform with the following:
   a. Edge Condition: Rounded.
   b. Corner Condition: Rounded to ¼" radius.
2. Materials:
   a. Cast fiberglass sheet backing, 1/8" thick and of the following general types:
      1) Opaque: Colored opaque cast fiberglass sheet. Colors and finishes to be selected by the Engineer from manufacturer's full range of colors and finishes. Comply with 2010 ADA Standards for Accessible Design, Section 703.5.1.
3. Plaque Size: Appropriate plaque size to fit copies and symbols.
4. Raised Copy: Machine-cut copy characters from fiberglass sheet and chemically weld onto the fiberglass backing. Product precisely formed characters with square cut edges free from burrs and cut marks. Comply with 2010 ADA Standards for Accessible Design, Sections 703, 703.1, 703.2, 703.3, 703.5, and 703.6.
   a. Copy: As indicated on schedule, including Grade 2 Braille.
   b. Panel Materials: Matte-finished opaque fiberglass sheet.
   c. Raised Copy Thickness: 1/32" inch.
   d. Letter Size: 1" high
   e. Letter Style: Helvetica Medium, All capitals.
   f. Letter Color: White
   g. Character Proportions:
      1) Width to height ratio between 3:5 and 1:1.
      2) Stroke width to height ration between 1:5 and 1:10.

2.1 FINISHES

A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Engineer from the manufacturer's full range of colors. Comply with 2010 ADA Standards for Accessible Design, Section 703.5.1.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.

1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.

B. Unframed letter plaque signs: Mount signs using the standard method recommended by the manufacturer for the type of wall surface indicated.

1. Face Mounting: Mount plaques using exposed fasteners with rosettes attached through the face of the plaque into the wall surface.

C. Comply with 2010 ADA Standards for Accessible Design, Section 703.4.

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 Engineer.

END OF SECTION

SECTION 10522

FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

PART 1 – GENERAL

1.1 SUMMARY

A. Provide fire extinguisher and cabinet.

B. Provide new UL-listed fire extinguishers bearing UL "Listing Mark" for type, rating, and classification of extinguishers indicated.

1.2 SUBMITTALS

A. Submit product data and finish samples.

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

A. Subject to compliance with requirements, provide products by one of the following or approved equal:
   1. J.L. Industries
   2. Johnson-Lee, Div. of W.F. Lee Corp.
   3. Larsen's Manufacturing Co.
   4. Muckle Manufacturing, division of Technico, Inc.
   5. Waterous, Inc.
   6. Potter-Roemer

2.2 FIRE EXTINGUISHERS

A. Provide fire extinguishers of types and capacities indicated at locations indicated and required by code.

B. Multi-Purpose Dry Chemical type: UL-rated 4A:60B:C, 10 lb. nominal capacity in manufacturer's standard enamel metal container with pressure gauge and hose.

2.3 FIRE EXTINGUISHER CABINETS

A. Manufacturer's standard units of suitable size for housing fire extinguishers of type and capacity indicated and as follows:
   1. Surface-Mounted Cabinet Type: Cabinet box fully exposed. Located as indicated on drawings.
   2. Exposed Trim: one-piece combination trim and perimeter door frame overlapping surrounding wall surface.

3. Door Material: Aluminum sheet.
4. Door Style: Solid Opaque panel with frame.

2.4 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Baked Enamel Finish: AA-C12C42RIx(Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-flouride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's specifications for cleaning, conversion coating, and painting.
1. Color: As selected by the Engineer from the manufacturer's full range.

PART 3 – EXECUTION

3.1 INSTALLATION

A. In accordance with manufacturer's directions for type of mounting required at height and locations indicated, or if not indicated, to comply with applicable regulations of governing authorities.
1. Cabinet and Fire Extinguisher to comply with ADAAG 307.2 and 309.3.

3.2 IDENTIFY FIRE EXTINGUISHERS IN CABINETS
"FIRE EXTINGUISHER" will be printed on door by process indicated below, as selected by the Engineer from manufacturer's standard letter sizes, styles, colors and layouts.

A. Application Process: Silkscreen.

END OF SECTION

SECTION 10800

TOILET ACCESSORIES

PART 1 –GENERAL

1.1 SUMMARY

A. Furnish accessories as listed herein for each toilet room where indicated on drawings.

1.2 RELATED SECTIONS

A. Section 04816 Concrete Unit Masonry Assemblies

B. Section 15400 Plumbing

1.3 QUALITY ASSURANCE

A. Use products produced by manufacturers regularly engaged in manufacture of similar items and with a history of successful production.

1.4 SUBMITTALS:

A. Submit shop drawings showing grab bar installation and anchoring method.

B. Submit product data.

C. Submit one representative sample for finish and workmanship.

D. Provide templates and other information required to assure proper blocking, cut-outs, backing, etc.

1.5 DELIVERY, STORAGE AND HANDLING

A. Maintain protective covers on units final cleanup.

PART 2 – PRODUCTS

2.1 MANUFACTURERS: Provide products from listed manufacturers below or approved equal.

A. Accessories:

1. Paper Towel Dispenser and Disposal Unit, Surface Mounted
   a. Bobrick Model No. B-3909
   b. ASI Model No. 04697-9
   c. Bradley Model No. 237-35-11
2. Grab Bars
   a. Bobrick Model Nos. B-6806.99x48", B-6806.99x36"
   b. ASI Model Nos. 169(48"), 164(36")
   c. Bradley Model Nos. 812-48"-2, 812-36"-2
3. Mirror
   a. Bobrick Model No. B-2908-1836(18"x36")
   b. ASI Model No. 0620-B (18"x36")
   c. Bradley Model No. 781-2 (18"x36")
4. Soap Dispenser
   a. Bobrick Model No. B-2111
   b. ASI Model No. 0347
   c. Bradley Model No. 6562
5. Stainless Steel Seat Cover Dispenser, Surface Mounted
   a. Bobrick Model No. B-221
   b. ASI Model No. 04775M
   c. Bradley Model No. 5831
6. Toilet Paper Holder
   a. Bobrick Model No. B-2888
   b. ASI Model No. 0030
   c. Bradley Model No. 5402

B. Protective Undersink Piping Covers. Provide product which meets or exceeds following requirements and features:

1. Provide piping covers which will fit Undersink pipes, valves etc. Comply with 2010 ADA Standards For Accessible Design Section 606.5.
2. Material shall be soft vinyl molded vinyl.
3. Wall thickness shall be 1/8" or thicker.
4. Shall be UV resistant.
5. Fasteners shall be stainless steel.
6. Color: White.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install toilet accessory units in accordance with manufacturer's instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated and in accordance with 2010 ADA Standard for Accessible Design where required.
   1. Accessories to be located per ADAAG 309.4 Operation.

B. Install accessory units over blockings within wall.

3.2 ADJUSTING AND CLEANING

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces after removing protective coatings.

END OF SECTION

SECTION 11400

FOOD SERVICE EQUIPMENT

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes food service equipment indicated on Drawings.
   1. Provide stainless steel counters, with bottom stainless steel shelves, stainless steel counter with integral sink, and other items noted on drawings.
   2. Coordinate work for plumbing fittings and drains.

1.2 DEFINITIONS

A. Terminology Standard: Refer to NSF 2, "Food Equipment" or other applicable NSF standards for definitions of food service equipment and installation terms not otherwise defined in this Section or in other referenced standards.

1.3 RELATED SECTIONS

A. Section 15400 - Plumbing

1.4 SUBMITTALS

A. Product Data: For each type of food service equipment indicated. Include manufacturer's model number and accessories.

B. Shop Drawings: For food service equipment not manufactured as standard production and catalog items by manufacturers. Include plans, elevations, sections, roughing-in dimensions, fabrication details, service requirements, and attachments to other work.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing food service equipment, who has completed installations similar in design and extent to that indicated for this Project, and who has a record of successful in-service performance.

B. Manufacturer Qualifications: Engage a firm experienced in manufacturing food service equipment similar to that indicated for this Project and with a record of successful in-service performance.

C. Source Limitations: Obtain each type of food service equipment through one source from a single manufacturer.

D. NSF Standards: Comply with applicable NSF International (NSF) standards and criteria and provide NSF Certification Mark on each equipment item, unless otherwise indicated.

E. SMACNA Standard: Where applicable, fabricate food service equipment to comply with the Sheet Metal and Air Conditioning Contractors National Association's (SMACNA) "Kitchen Equipment Fabrication Guideline," unless otherwise indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver food service equipment as factory-assembled units with protective crating and covering.

B. Store food service equipment in original protective crating and covering and in a dry location.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of food service equipment installation areas by field measurements before equipment fabrication and indicate measurements on Shop Drawings and Coordination Drawings. Coordinate fabricate schedule with construction progress to avoid delaying the Work.

1.8 COORDINATION

A. Coordinate equipment layout and installation with other work, including new serving counter, and new floor finish.

1.9 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the State of other rights the State may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Warranty Period: 5 years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Stainless-Steel Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304, stretcher leveled, and in finish specified in "Stainless-Steel Finishes" Article.

B. Stainless-Steel Tube: ASTM A 554, Grade MT-304, and in finish specified in "Stainless-Steel Finishes" Article.

C. Sound Dampening: NSF-certified, nonabsorbent, hard-drying, sound-deadening coating. Provide coating compounded for permanent adhesion to metal in 1/8-inch (3-mm) thickness that does not chip, flake, or blister.

D. Gaskets: NSF certified for end-use application indicated; of resilient rubber, neoprene, or PVC that is nontoxic, stable, odorless, nonabsorbent, and unaffected by exposure to foods and cleaning compounds.

2.2 FABRICATION, GENERAL

A. Fabricate items according to NSF 2 requirements. Factory assemble equipment to greatest extent possible.

B. Welding: Use welding rod of same composition as metal being welded. Use methods that minimize distortion and develop strength and corrosion resistance of base metal. Provide ductile welds free of mechanical imperfections such as gas holes, pits, or cracks.

1. Welded Butt Joints: Provide full-penetration welds for full-joint length. Make joints flat, continuous, and homogenous with sheet metal without relying on straps under seams, filling in with solder, or spot welding.
2. Grind exposed welded joints flush with adjoining material and polish to match adjoining surfaces.
3. Where fasteners are welded to underside of equipment, finish reverse side of weld smooth and underpressed.
4. Coat unexposed stainless-steel welded joints with suitable metallic-based paint to prevent corrosion.
5. After zinc-coated steel is welded, clean welds and abraded areas and apply SSPC-Paint 20, high-zinc-dust-content, galvanizing repair paint to comply with ASTM A 780.

C. Fabricate field-assembled equipment prepared for field-joining methods indicated. For metal butt joints, comply with referenced SMACNA standard, unless otherwise indicated.

D. Where stainless steel is joined to a dissimilar metal, use stainless-steel welding material or fastening devices.

E. Form metal with break bends that are not flaky, scaly, or cracked in appearance; where breaks mar uniform surface appearance of material, remove marks by grinding, polishing, and finishing.

F. Sheared Metal Edges: Finish free of burrs, fins, and irregular projections.

G. Provide surfaces in food zone, as defined in NSF 2, free from exposed fasteners.

H. Cap exposed fastener threads, with stainless-steel lock washers and stainless-steel camp (acorn) nuts.

I. Provide provisions for plumbing fittings and drains.

2.3 STAINLESS-STEEL COUNTERS

A. Edges and Backsplashes: Provide equipment edges indicated complying with referenced SMACNA standard, unless otherwise indicated.

B. Apply sound dampening to underside of metal work surfaces, including sinks and similar units. Provide coating with smooth surface and hold coating 1 inch (25 mm) back from open edges for cleaning.

C. Counters: Fabricate with reinforced tops, legs, integral single compartment sink. and reinforced undershelves or cross bracing to comply with reference SMACNA standard, unless otherwise indicated, and as follows:

1. Tops: Minimum 0.0781-inch- (1.984-mm-) thick stainless steel, unless otherwise indicated.
2. Legs: 1-5/8 inch (41.3 mm) OD, minimum 0.0625-inch-(1.588-mm-) thick stainless steel with stainless-steel gusset and adjustable insert bullet-type feet with minimum adjustment of 1 inch (25 mm) up or down without exposing threads, unless otherwise indicated.
3. Undershelves: Minimum 0625-inch- (1.588-mm-) thick stainless steel, unless otherwise indicated.
4. Top and Undershelf Reinforcement: Provide minimum 0.0781-inch- (1.984-mm-) thick, stainless –steel reinforcing, unless otherwise indicated.
5. Cross Bracing: 1-1/4 inch (31.75 mm) OD, minimum 0.0625-inch-(1.588-mm-) thick stainless steel, unless otherwise indicated.

6. Fabricate single sink compartment with fully covered vertical and horizontal interior corners. Bottoms of each compartment shall be creased to insure complete drainage to waste opening. Sinks shall be 14 gauge polished stainless steel, installed as an integral unit. Sink size: 21" X 16" X 7 ½" deep. Provide holes for faucet and controls.

2.4 STAINLESS-STEEL FINISHES

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

1. Remove or blend tool and die marks and stretch lines into finish.

2. Grind and polish surface to produce uniform, directional textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

B. Concealed Surfaces: No.2B finish (bright, cold-rolled, unpolished finish).

C. Exposed Surfaces: No.4 finish (bright, directional polished).

D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

E. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances, service-utility connections, and other conditions affecting installation and performance of food service equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Examine and coordinate locations of plumbing work with plumbing provisions for sink. Correct unsatisfactory conditions prior to installation.

3.2 INSTALLATION, GENERAL

A. Provide Counters: Level and plumb, according to manufacture's written instructions, original design, and referenced standards.

B. Complete equipment field assembly, where required, using methods indicated.
   1. Provide closed butt and contact joints that do not require a filler.
   2. Grind field welds on stainless-steel equipment smooth, and polish to match adjacent finish. Comply with welding requirements in Fabrication, General Article.

C. Install with access and maintenance clearances according to manufacturer's written instructions and requirements of authorities having jurisdiction.

3.3 PROTECTING

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure food service equipment is without damage or deterioration at the time of Substantial Completion.

END OF SECTION

SECTION 15400 – PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide a complete plumbing system including water and waste systems. "Provide" shall mean "furnish and install" when used herein. Connect all fixtures and equipment to existing plumbing systems as shown on drawings.

B. Work involves providing new plumbing systems, including fixtures, waste, vent, water, hot water heater and hot water piping systems.

1.2 SUBMITTALS

A. Equipment Submittal: Before beginning work, submit for review certified literature showing a list indicating manufacturer and model of fixtures and trim, and a list indicating all materials and items that are of a different manufacturer or model than those specified.

B. Certificates: The State shall have the right to require a written certificate, dated and signed by a responsible employee of the Contractor, evidencing the performance of any portion of the work, or any testing; as a condition precedent to the acceptance of any work or the result of any test. Whenever a regulatory agency performs inspections or tests of any portion of the work, a certificate shall be furnished by the Contractor that the inspection or test was satisfactorily passed.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

Furnish new equipment, fixtures, materials and accessories bearing the manufacturer's identification. Coordinate deliveries to avoid interferences or construction delays. Protect products during delivery, storage, installation, and the remainder of the construction period after installation.

1.4 COORDINATION WITH OTHER SECTIONS

Excavating, trenching and backfilling shall follow standard industry practices and the Uniform Plumbing Code, latest edition.

1.5 QUALITY ASSURANCE

A. Comply with all the requirements of the State of Hawaii, County of Maui and applicable utility companies, and all recommendations of manufacturers.

B. Obtain and pay for all fees, permits, licenses, assessments, connection charges and inspections required for this work.

C. Substitution of another manufacturer's product for equipment specified hereinafter and for items with "or pre-approved equal" after the brand name requires a formal request for substitution by the Contractor on the State's Substitution Request Form and written

permission by the State. Products of the following manufacturers are acceptable in lieu of those specified hereinafter by the manufacturer and model number.

1. Valves: Dezurick, Hammond, Lukenheimer Nibco, Stockham or Walworth.

2. Drainage System Specialties: Josam, Smith, Wade or Zurn.

3. Pipe Supports: Elcen, Fee and Mason, Grinnell or Unistrut.

4. Fixtures: Kohler, American Standard, Eljer, Elkay.

5. Fixture Trim: Delta, Bradley, Chicago, Elkay, Speakman, Symmons

D. Comply with the recommendations and requirement of the latest edition Codes and Standards listed hereinafter in addition to the detailed requirements of this specification. In the event of conflicting requirements, this specification shall prevail.

1. American Society for Testing and Materials Publications (ASTM):

A 74	Cast Iron Soil Pipe and Fittings
A 53	Pipe, Steel, Black and Hot-Dipped Zinc Coated Welded and Seamless
B 88	Seamless Copper Water Tube
B 306	Copper Drainage Tube (DWV)
C 564	Rubber Gaskets for Cast Iron Soil (R 82) Pipe and Fittings

2. American National Standards Institute Publications (ANSI):

B16.18	Cast Copper Alloy Solder-Joint Pressure Fittings
B16.22	Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings
B16.23	Cast Copper Alloy Solder Joint Drainage Fittings – DMV
B16.26	Cast Copper Alloy Fittings for Flared Copper Tubes
B16.29	Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings

3. Cast-Iron Soil Pipe Institute Publication (CISPI):

Standard Hubless Cast-Iron Sanitary System No.301 with Cast-Iron No Hub Pipe and Fittings Pamphlet

Installation Suggestions for "No Hub" Pipe 100 Fittings

4. ADAAG Americans with Disabilities Act Accessibility Guidelines

5. National Fire Protection Agency (NFPA):

70 National Electrical Code

1.7 GUARANTEE

All work in this section to be guaranteed for a period of one year from date of acceptance of the work as a whole by the State. Should any equipment, fixture or material fail within this period, the Contractor shall be responsible for all damage to any part of the premises caused by the failure and shall repair or replace the defects at no cost to the State. Start of beneficial use is not the start of the guarantee period.

1.8 ACCESSIBILITY REQUIREMENTS

Furnishing and installation of all items in this section shall comply with the 2010 ADA Standards for Accessible Design.

PART 2 - PRODUCTS

2.1 EQUIPMENT

Drinking Fountain (DF/PDF): Elkay EHWM217C or approved equal. Provide Elkay 97258C Apron or approved equal. Fountain shall comply with 2010 ADA Standards for Accessible Design, Sections 305, 307, 309 and 602. Capacity and characteristics as indicated on drawings.

2.2 PIPE AND FITTINGS

Only "domestic" piping shall be allowed on this project (made in USA, no foreign products).

A. Waste and Vent Piping Below Grade: Service weight cast iron soil pipe. ASTM 74, ty-seal gaskets, or no-hub cast iron soil pipe conforming to CISPI 301 with MG or Husky series 4000 heavy duty joint couplings.

B. Waste and Vent Pipes Smaller Than Three Inches Above Grade: Service weight cast-iron soil pipe, ASTM A 74, no-hub cast-iron soil pipe conforming to CISPI 301 with stainless steel bands.

C. Waste and Vent Pipes Three Inches or Larger Above Grade: Schedule 40 galvanized steel pipe, ASTM A 53, with recessed cast-iron screwed drainage fittings or service-weight soil pipe, ASTM A74, no-hub cast-iron soil pipe conforming to CISPI 301 with stainless steel bands.

D. Water Pipes: Type "L" hard drawn copper tube, ASTM B 88 with non-lead soldered (95-5) joint wrought copper pressure fittings for aboveground. All solder shall be non-lead; flux shall be non-corrosive complying with Copper Development Association Standard 1.0.

2.3 FIXTURES

Provide chrome plated all brass faucets, angle stops, tube risers, chrome plated P-traps, escutcheons and cover plates. Provide connecting fittings, wall support brackets as required. Furnish masonry

and concrete contractor with wall sleeves and inserts required for fixture installation. All valves bronze and brass with chrome plating.

Provide access panels as required for servicing of valves, etc. Provide safety shields for all piping and valves under accessible fixtures. All fixture trim shall be non-lead compliant.

A. Water Closet (WC): Floor mounted, floor outlet, flush valve, vitreous china, elongated bowl, 1.28 gallons per flush maximum, 14-3/4" high. Provide solid plastic open seat and angle stop.

B. Accessible Water Closet (PWC): Floor mounted, floor outlet, flush valve, vitreous china, elongated bowl, 1.28 gallons per flush maximum, 17-1/2" high. Provide solid plastic open front seat with integral molded bumper and angle stop. Provide trip lever on wider side of toilet stall.

C. Accessible Lavatory (PLAV): 21" x 18" overall dimensions, vitreous china, front overflow, back splash, wall hung, 4" faucet centers, Delta 22C131 faucet with vandal-proof single lever handle and outlet, ceramic disc cartridge. Provide offset lavatory drain with strainer. Provide floor mounted concealed arm wall hanger support. Provide p-trap, continuous waste (17-gauge, brass, chrome plated), copper chrome plated water risers with couplings, angle stops and escutcheon.

D. Lavatory (LAV): Same as PLAV.

E. Accessible Urinal (PUR): American Standard Washbrook, vitreous china, siphon jet flush urinal, 3/4" top inlet, 14-1/8" wall to front of flare, Provide chrome plated, American Standard flush valve with angle stop and vacuum breaker, ADA compliant, 0.125 gallons per flush, 5lb. lever actuated. Provide floor mounted carrier and drain screen.

F. Urinal (UR): Same as PUR.

G. Mop Sink (M/S-1): Elkay EFS2523C, 18 gauge, type 304 stainless steel, floor type mop sink, 3" outlet. Provide polished chrome wall mounted sink faucet with threaded hose outlet with rubber hose and vacuum breaker. 2.0 gpm cold water flow restrictor.

2.4 PLUMBING SYSTEM SPECIALTIES

A. Cleanouts:

1. Floor Cleanout: Smith 4020 series. Provide clamp device when installed in floor with waterproofing membrane. Provide nickel bronze heavy duty cleanout covers.

2. Wall Cleanout: Smith 4530 series with access frame and cover.

B. P-traps Installed Below Floor: Deep-seal cast-iron P-trap with trap primer connection. Provide trap primer and tubing.

C. Water Hammer Arrester: J.R. Smith Series 5000, all stainless steel, PDI certified. Provide access panel. Sized to accommodate fixtures on the pipe branch served.

D. Floor Drains: J.R. Smith 2010A cast iron drain with flashing collar and adjustable nickel bronze strainer head with secured square hole heel proof grate maximum 1/4-inch grate openings, 6" diameter head.

E. Exterior Hose Bibb: Chicago No. 998, chrome plated, vacuum breaker, 3/4" inlet, loose key handle with bronze square head stop.

F. Interior Hose Bibb: Chicago No. 952, chrome plated, vacuum breaker, loose key handle with in-line wall mounted stop.

G. Wall Hydrant (Type A): Box type, narrow hydrant for wall installation with vacuum breaker. Stainless steel box and hinged cover with operating key lock, all bronze interior parts, 3/4" hose connection, "WATER" stamped on cover, 3/4" IP 90 degree inlet elbow adapter, Zurn Z-1350.

H. Vent Flashing: Prefabricated roof cap/curbing (non-lead). Provide Josam series 26700 vandalproof vent cap.

PART 3 - EXECUTION

3.1 PREPARATION

Visit the work site and become fully aware of all existing conditions. Investigate the Contract Documents and make proper provisions to avoid interferences or construction delays. Determine the exact route of each pipe. Make off-sets and changes in direction required to maintain proper head room and pitch or to accommodate the structure and the work of other trades. Furnish other trades with information to properly locate and size openings in the structure required for this work. Furnish anchor bolts, sleeves, inserts and support required for this work.

3.2 INSTALLATION AND REQUIREMENTS

Perform work using personnel skilled in the trade involved. Provide competent supervision. Furnish new equipment, fixtures, materials and accessories bearing the manufacturer's identification and conforming to recognized commercial standards. Provide all extra materials and labor for a complete operable system at no extra cost to the State. Installation shall be in accordance with manufacturer's recommendations. Provide access panels for all items requiring servicing, inspection, maintenance and adjustment.

3.3 UTILITY CONNECTIONS

Existing utility locations were determined from information available at the time of design. Verify the exact location and elevation of all existing utilities. Notify the State immediately in writing of all discrepancies. Be fully responsible for any and all damage resulting from failure to exactly locate and preserve existing ground utilities.

3.4 EQUIPMENT INSTALLATION

Install equipment in the space allotted with sufficient clearance and support for proper operation and maintenance. Where equipment differs in arrangement or connections from those shown, provide all required changes in piping, supports, floor drain locations and appurtenances and cost of work of any other trades affected. Provide equipment accessories necessary for proper operation and support. Final connections shall include shutoff valves, regulators, traps, unions, strainers, and direct/indirect waste connections. Plumbing contractor shall obtain all information necessary for a complete and operable system. Provide structural steel framing for equipment as required.

3.5 PIPING INSTALLATION

Conform to the requirements of the Uniform Plumbing Code and all manufacturer's recommendations. Inspect all pipes inside and outside. Remove interior obstructions and ream out pipe ends. Tool markings on polished fittings are not acceptable. Cut pipe accurately so that it can be worked into place without springing or forcing. Install pipes parallel to the wall of the structure and plumb. Make changes in direction with fittings. Bushings are not permitted. Provide proper support and adequate provisions for expansion, contraction, slope and anchorage. Provide dielectric unions at all dissimilar metals. Wrap pipe or tubing with 1/4-inch thick felt, secured with tape, where they contact other materials. Have piping treated, inspected and approved before it is furred in, buried or otherwise hidden. Provide standard weight galvanized steel pipe sleeves for all pipes passing through structure, sufficiently large to provide 1/4-inch clearance around pipe. Caulk watertight around pipes passing through sleeves. Wrap pipe with polyethylene tape where it passes through sleeve and when it contacts concrete or masonry. Grout with fire proof material around all pipe penetrations through slabs and walls full length of penetrations. Provide chrome plated brass escutcheons, set tight on the pipe and to the wall where pipes are exposed in finished areas. Provide clamping collar or membrane flange where pipe or drains penetrate waterproof membrane.

3.6 PIPING SYSTEM SUPPORTS

A. Pipe Supports: Factory-fabricated by Elcen, Fee and Mason, Grinnel or Unistrut; no chains or perforated straps permitted. Provide concrete inserts, beam clamps, channel framing, hanger rods and accessories required for proper support. Ramset or explosive type anchors may not be used without written permission by the State.

B. Pipe Hangers: Steel clevis hanger with adjustable hanger rod; 3/8" for pipe 2" and smaller, 1/2" for pipe 2-1/2" through 3-1/2" and 5/8" for pipe 4" and larger. Groups of lines may be supported from steel channel pipe clamp.

3.7 DRAINAGE, WASTE AND VENT PIPING SYSTEMS

Slope drain lines at 1/4 inch per foot unless otherwise indicated. Install hubless cast-iron pipe in accordance with CISPI pamphlet 100-1972.

3.8 FIELD QUALITY CONTROL

Test plumbing systems in accordance with the Uniform Plumbing Code. Perform tests in the presence of, and to the satisfaction of inspectors having jurisdiction over the work. Ask for final inspection by the County of Maui after tests and adjustments have been performed.

A. Test drainage systems in accordance with Section 318 of the Plumbing Code.

B. Test equipment to demonstrate its operation and compliance with the specification.

3.9 TESTING AND INSPECTION

A. Contractor shall furnish all equipment for tests and any required retests and pay for all cost of repairing any damage resulting from such tests. Contractor shall adjust systems until they are approved. Tests shall be performed in the presence of, and to the satisfaction of State and the County of Maui.

B. Sanitary piping shall be tested in accordance with the Plumbing Code. Sanitary drains shall be tested with a minimum of 10 feet of water for 15 minutes. Water piping shall be tested.

C. Defective Work: If results of tests show defects, such defective work or material shall be replaced and inspection and tests repeated. Repairs to piping shall be made with new material. No caulking of screwed joints or holes will be accepted. Installation shall be repaired by skilled mechanics of the trade involved at no extra expense to the State.

D. Protection to Fixtures, Materials and Equipment: Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water and chemical or mechanical injury. Upon completion of all work, the fixtures, materials and equipment shall be thoroughly cleaned, repainted, adjusted and operated.

E. Chlorination: Domestic water lines shall be sterilized with chlorine before acceptance of work. Sterilize water system for 24 hours with 100 ppm chlorine introduced into the lines in an approved manner. Dosage of chlorine shall not be less than 50 ppm. After a contact period of not less than eight (8) hours, the system shall be flushed with clean water until the residual chlorine content is not greater than 0.2 ppm. All valves in the lines being sterilized shall be opened and closed several times during the contact period. A certificate shall be furnished.

3.10 CLEANING AND ADJUSTING

At the completion of the work, all parts of the installation shall be thoroughly cleaned. Equipment, pipe valves, and fittings shall be cleaned of grease and metal cuttings, and sludge that may have accumulated by operation of the system for testing. Any stoppage or discoloration or other damage to parts of the building, its finish, or furnishing, due to the Contractor's failure to properly clean the piping system shall be repaired by the Contractor without cost to the State. Touch-up with matching paint all damaged factory finishes.

3.11 FINAL CONNECTIONS TO EQUIPMENT

Plumbing Contractor shall obtain all information from the State necessary to make final connections to equipment. Final connections shall include hot and cold water individual fixture shut-off valves, pressure reducing valves/regulators, P-traps, vacuum breakers, unions, waste and indirect waste connections, strainers, water hammer arresters, backflow preventers. Provide control wiring and conduit for all items as required.

3.12 INSTRUCTIONS

Instruct the State's representative in the proper operation and maintenance of the systems. Review the maintenance manuals with the State. Submit a list of manufacturer's warranties for the equipment furnished.

END OF SECTION

SECTION 16060 - GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rod electrodes.

2. Wire.

3. Mechanical connectors.

1.2 REFERENCES

A. Institute of Electrical and Electronics Engineers:

1. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.

2. IEEE 1100 - Recommended Practice for Powering and Grounding Electronic Equipment.

B. International Electrical Testing Association:

NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

C. National Fire Protection Association:

1. NFPA 70 - National Electrical Code.

2. NFPA 99 - Standard for Health Care Facilities.

1.3 SYSTEM DESCRIPTION

A. Grounding systems use the following elements as grounding electrodes:

1. Metal underground water pipe.

2. Concrete-encased electrode.

3. Rod electrode.

1.4 PERFORMANCE REQUIREMENTS

Grounding System Resistance: 25 ohms maximum.

1.5 SUBMITTALS

Test Reports: Indicate overall resistance to ground.

1.6 CLOSEOUT SUBMITTALS

Project Record Documents: Record actual locations of components and grounding electrodes.

1.7 QUALITY ASSURANCE

Provide grounding materials conforming to requirements of NEC, IEEE 142, and UL labeled.

1.8 PRE-INSTALLATION MEETINGS

Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

D. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

1.10 COORDINATION

Complete grounding and bonding of building reinforcing steel prior concrete placement.

PART 2 - PRODUCTS

2.1 ROD ELECTRODES

A. Product Description:

1. Material: Copper.

2. Diameter: 3/4 inch.

3. Length: 10 feet.

B. Connector: U-bolt clamp.

2.2 WIRE

A. Material: Stranded copper.

B. Grounding Electrode Conductor: Copper conductor bare.

C. Bonding Conductor: Copper conductor bare.

2.3 MECHANICAL CONNECTORS

Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

PART 3 - EXECUTION

3.1 EXAMINATION

Verify final backfill and compaction has been completed before driving rod electrodes.

3.2 PREPARATION

Remove paint, rust, mill oils, and surface contaminants at connection points.

3.3 INSTALLATION

A. Install in accordance with IEEE 142.

B. Install rod electrodes at locations as indicated on Drawings. Install additional rod electrodes to achieve specified resistance to ground.

C. Install grounding and bonding conductors concealed from view.

D. Install grounding electrode conductor and connect to reinforcing steel in foundation footing. Electrically bond steel together.

E. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

F. Install continuous grounding using underground cold water system and building steel as grounding electrode. Where water piping is not available, install artificial station ground by means of driven rods or buried electrodes.

G. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.

H. Install branch circuits feeding isolated ground receptacles with separate insulated grounding conductor, connected only at isolated ground receptacle, ground terminals, and at ground bus of serving panel.

I. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC. Install from grounding bus of serving panel to

ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment. Ground conduits by means of grounding bushings on terminations at panelboards with installed number 12 conductor to grounding bus.

J. Grounding electrical system using continuous metal raceway system enclosing circuit conductors in accordance with NEC.

K. Permanently attach equipment and grounding conductors prior to energizing equipment.

3.4 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13.

C. Perform ground resistance testing in accordance with IEEE 142.

D. Perform continuity testing in accordance with IEEE 142.

E. When improper grounding is found on receptacles, check receptacles in entire project and correct. Perform retest.

END OF SECTION

SECTION 16075 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Nameplates.
2. Labels.
3. Wire markers.
4. Underground Warning Tape.

1.2 CLOSEOUT SUBMITTALS

Project Record Documents: Record actual locations of tagged devices; include tag numbers.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept identification products on site in original containers. Inspect for damage.

C. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

D. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.

B. Install labels and nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

PART 2 - PRODUCTS

2.1 NAMEPLATES

A. Product Description: Laminated three-layer plastic with engraved white letters on black contrasting background color.

B. Letter Size:

1. 1/8 inch high letters for identifying individual equipment and loads.

2. 1/4 inch high letters for identifying grouped equipment and loads.

C. Minimum nameplate thickness: 1/8 inch.

2.2 LABELS

Labels: Embossed adhesive tape, with 3/16 inch black letters on white background.

2.3 WIRE MARKERS

A. Description: Thermoset or heat shrink tubing type wire markers.

B. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number.

2. Control Circuits: Control wire number as indicated on shop drawings.

2.4 UNDERGROUND WARNING TAPE

Description: 4 inch wide plastic tape, detectable type, colored red with suitable warning legend describing buried electrical lines.

PART 3 - EXECUTION

3.1 PREPARATION

Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install identifying devices after completion of painting.

B. Nameplate Installation:

1. Install nameplate parallel to equipment lines.

2. Install nameplate for each electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners, or adhesive.

3. Install nameplates for each control panel and major control components located outside panel with corrosive-resistant mechanical fasteners, or adhesive.

4. Secure nameplate to equipment front using screws, rivets, or adhesive.

5. Secure nameplate to inside surface of door on recessed panelboard in finished locations.

6. Install nameplates for the following:

a. Switchboards.

b. Panelboards.

c. Transformers.

d. Service Disconnects.

e. Control Panels.

C. Label Installation:

1. Install label parallel to equipment lines.

2. Install label for identification of individual control device stations.

3. Install labels for permanent adhesion and seal with clear lacquer.

D. Wire Marker Installation:

1. Install wire marker for each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.

E. Underground Warning Tape Installation:

1. Install underground warning tape along length of each underground conduit, raceway, or cable 6 to 8 inches below finished grade, directly above buried conduit, raceway, or cable.

END OF SECTION

SECTION 16123 - BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.1 SUMMARY

Section includes building wire and cable; nonmetallic-sheathed cable; direct burial cable; service entrance cable; armored cable; metal clad cable; and wiring connectors and connections.

1.2 REFERENCES

A. International Electrical Testing Association:

1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 SYSTEM DESCRIPTION

A. Product Requirements: Provide products as follows:

1. Solid or stranded conductor for feeders and branch circuits 10 AWG and smaller.
2. Stranded conductors for control circuits.
3. Conductor not smaller than 12 AWG for power and lighting circuits.
4. Conductor not smaller than 16 AWG for control circuits.
5. 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 100 feet.
6. 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet.

1.4 CLOSEOUT SUBMITTALS

Project Record Documents: Record actual locations of components and circuits.

1.5 QUALIFICATIONS

Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 FIELD MEASUREMENTS

Verify field measurements are as indicated on Drawings.

1.7 COORDINATION

A. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.

B. Wire and cable routing indicated is approximate unless dimensioned. Include wire and cable lengths within 10 ft of length shown.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

A. Product Description: Single conductor insulated wire.

B. Conductor: Copper.

C. Insulation: NFPA 70; Type XHHW insulation for feeders and branch circuits larger than 2 AWG; Type THHN/THWN insulation for feeders and branch circuits 4 AWG and smaller.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify interior of building has been protected from weather.

B. Verify mechanical work likely to damage wire and cable has been completed.

C. Verify raceway installation is complete and supported.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

A. Route wire and cable to meet Project conditions.

B. Neatly train and lace wiring inside boxes, equipment, and panelboards.

C. Identify and color code wire and cable under provisions of Section 16075. Identify each conductor with its circuit number or other designation indicated.

D. Special Techniques--Building Wire in Raceway:

1. Pull conductors into raceway at same time.

2. Install building wire 4 AWG and larger with pulling equipment.

E. Special Techniques - Wiring Connections:

1. Clean conductor surfaces before installing lugs and connectors.

2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.

4. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.

5. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.

6. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

F. Install solid or conductor for feeders and branch circuits 10 AWG and smaller.

G. Install stranded conductors for branch circuits 10 AWG and smaller. However, when stranded conductors are used in lieu of solid, then install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.

3.4 WIRE COLOR

A. General

1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:

a. Black and red for single phase circuits at 120/240 volts.

b. Black, red, and blue for circuits at 120/208 volts single or three phase.

c. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.

2. For wire sizes 8 AWG and larger, identify wire with colored tape at terminals, splices and boxes. Colors are as follows:

a. Black and red for single phase circuits at 120/240 volts.

b. Black, red, and blue for circuits at 120/208 volts single or three phase.

c. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.

B. Neutral Conductors: White. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.

C. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.

D. Feeder Circuit Conductors: Uniquely color code each phase.

E. Ground Conductors:

1. For 6 AWG and smaller: Green.

2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.

3.5 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION

SECTION 16130 - RACEWAY AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

Section includes conduit and tubing, surface raceways, wireways, outlet boxes, pull and junction boxes, and handholes.

1.2 REFERENCES

A. American National Standards Institute:

1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
3. ANSI C80.5 - Aluminum Rigid Conduit - (ARC).

B. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
4. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
5. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
6. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.3 SYSTEM DESCRIPTION

A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.

B. Underground More than 5 feet outside Foundation Wall: Provide thickwall nonmetallic conduit. Provide concrete or nonmetallic handhole.

C. Underground Within 5 feet from Foundation Wall: Provide thickwall nonmetallic conduit.

D. In or Under Slab on Grade: Provide thickwall nonmetallic conduit. Provide cast or nonmetallic metal boxes.

E. Outdoor Locations, Above Grade: Provide rigid steel and thickwall nonmetallic conduit. Provide cast metal or nonmetallic outlet, pull, and junction boxes.

F. In Slab Above Grade: Provide thickwall nonmetallic conduit. Provide cast and nonmetallic]boxes.

G. Wet and Damp Locations: Provide rigid steel and thickwall nonmetallic conduit. Provide cast metal or nonmetallic outlet, junction, and pull boxes. Provide flush mounting outlet box in finished areas.

H. Concealed Dry Locations: Provide electrical metallic tubing. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

I. Exposed Dry Locations: Provide rigid steel, electrical metallic tubing, and thickwall nonmetallic conduit. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

1.4 DESIGN REQUIREMENTS

Minimum Raceway Size: 3/4 inch unless otherwise specified.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents:

1. Record actual routing of conduits 2 inch trade size and larger.

2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Product storage and handling requirements.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.7 COORDINATION

Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

PART 2 - PRODUCTS

2.1 METAL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Fittings and Conduit Bodies: NEMA FB 1; all steel fittings.

2.2 PVC COATED METAL CONDUIT

A. Product Description: NEMA RN 1; rigid steel conduit with external PVC coating, 20 mil thick.

B. Fittings and Conduit Bodies: NEMA FB 1; steel fittings with external PVC coating to match conduit.

2.3 FLEXIBLE METAL CONDUIT

A. Product Description: Interlocked steel construction.

B. Fittings: NEMA FB 1.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Product Description: Interlocked steel construction with PVC jacket.

B. Fittings: NEMA FB 1.

2.5 ELECTRICAL METALLIC TUBING (EMT)

A. Product Description: ANSI C80.3; galvanized tubing.

B. Fittings and Conduit Bodies: NEMA FB 1; steel, compression type.

2.6 NONMETALLIC CONDUIT

A. Product Description: NEMA TC 2; Schedule 40 PVC.

B. Fittings and Conduit Bodies: NEMA TC 3.

2.7 OUTLET BOXES

A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.

1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required.

2. Concrete Ceiling Boxes: Concrete type.

B. Nonmetallic Outlet Boxes: NEMA OS 2.

C. Cast Boxes: NEMA FB 1, Type FD, cast feralloy. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.

D. Wall Plates for Finished Areas: As specified in Section 16140.

E. Wall Plates for Unfinished Areas: Furnish gasketed cover.

2.8 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:

1. Material: Galvanized cast iron.

2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

C. In-Ground Cast Metal Box: NEMA 250, Type 6, [outside] [inside] flanged, recessed cover box for flush mounting:

1. Material: Galvanized cast iron.

2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.

3. Cover Legend: "ELECTRIC".

D. Fiberglass or Concrete composite Handholes: Die-molded, glass-fiber or concrete composite hand holes:

1. Cable Entrance: Pre-cut 6 inch x 6 inch cable entrance at center bottom of each side.

2. Cover: Glass-fiber or concrete composite, weatherproof cover with nonskid finish.

PART 3 - EXECUTION

3.1 EXAMINATION

Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 INSTALLATION

A. Ground and bond raceway and boxes in accordance with Section 16060.

B. Fasten raceway and box supports to structure and finishes.

C. Identify raceway and boxes in accordance with Section 16075.

D. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.3 INSTALLATION - RACEWAY

A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.

B. Arrange raceway supports to prevent misalignment during wiring installation.

C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

D. Group related raceway; support using conduit rack. Construct rack using steel channel [provide space on each for 25 percent additional raceways].

E. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports

F. Do not attach raceway to ceiling support wires or other piping systems.

G. Construct wireway supports from steel channel.

H. Route exposed raceway parallel and perpendicular to walls.

I. Route raceway installed above accessible ceilings parallel and perpendicular to walls.

J. Route conduit in and under slab from point-to-point.

K. Maximum Size Conduit in Slab Above Grade: 3/4 inch. Do not cross conduits in slab larger than 1/2 inch trade size.

L. Maintain clearance between raceway and piping for maintenance purposes.

M. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.

N. Cut conduit square using saw or pipe cutter; de-burr cut ends.

O. Bring conduit to shoulder of fittings; fasten securely.

P. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.

Q. Install conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

R. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install factory elbow or hydraulic one-shot bender to fabricate bends in metal conduit larger than 2 inch size.

S. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.

T. Install fittings to accommodate expansion and deflection where raceway crosses seismic, control, and expansion joints.

U. Install suitable pull string or cord in each empty raceway except sleeves and nipples.

V. Install suitable caps to protect installed conduit against entrance of dirt and moisture.

W. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.

X. Close ends and unused openings in wireway.

3.4 INSTALLATION - BOXES

A. Install wall mounted boxes at elevations to accommodate mounting heights as indicated on Drawings.

B. Adjust box location up to 10 feet prior to rough-in to accommodate intended purpose.

C. Orient boxes to accommodate wiring devices oriented as specified in Section 16140.

D. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

E. In Accessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

F. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

G. Do not install flush mounting box back-to-back in walls; install with minimum 6 inches separation. Install with minimum 24 inches separation in acoustic rated walls.

H. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

I. Install stamped steel bridges to fasten flush mounting outlet box between studs.

J. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

K. Install adjustable steel channel fasteners for hung ceiling outlet box.

L. Do not fasten boxes to ceiling support wires or other piping systems.

M. Support boxes independently of conduit.

N. Install gang box where more than one device is mounted together. Do not use sectional box.

O. Install gang box with plaster ring for single device outlets.

3.5 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods.

B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

C. Locate outlet boxes to allow luminaires positioned as indicated on Drawings.

D. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

3.6 ADJUSTING

A. Adjust flush-mounting outlets to make front flush with finished wall material.

B. Install knockout closures in unused openings in boxes.

3.7 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 16140 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

Section includes wall switches; wall dimmers; receptacles; multioutlet assembly; and device plates and decorative box covers.

1.2 REFERENCES

A. National Electrical Manufacturers Association:

1. NEMA WD 1 - General Requirements for Wiring Devices.
2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SUBMITTALS

Product Data: Submit manufacturer's catalog information showing dimensions, colors, and configurations.

1.4 QUALIFICATIONS

Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 - PRODUCTS

2.1 WALL SWITCHES

A. Product Description: NEMA WD 1, Heavy-Duty, AC only general-use snap switch.

B. Body and Handle: Ivory nylon with toggle handle.

C. Ratings:

1. Voltage: 120-277 volts, AC.
2. Current: 20 amperes.

D. Ratings: Match branch circuit and load characteristics.

2.2 RECEPTACLES

A. Product Description: NEMA WD 1, Heavy-duty general use receptacle.

B. Device Body: Ivory nylon.

C. Configuration: NEMA WD 6, type as indicated on Drawings.

D. Convenience Receptacle: Type 5-20.

E. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

2.3 WALL PLATES

A. Decorative Cover Plate: Smooth 430 stainless steel.

B. Jumbo Cover Plate: Smooth 430 stainless steel.

C. Weatherproof Cover Plate: Stainless steel plate with hinged and gasketed device cover.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify outlet boxes are installed at proper height.

B. Verify wall openings are neatly cut and completely covered by wall plates.

C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install devices plumb and level.

B. Install switches with OFF position down.

C. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

D. Install receptacles with grounding pole on bottom.

E. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.

F. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

G. Connect wiring devices by wrapping solid conductor around screw terminal. Install stranded conductor for branch circuits 10 AWG and smaller. When stranded conductors are used in lieu of solid, use crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under device screws.

H. Use jumbo size plates for outlets installed in masonry walls.

I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.4 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Verify each receptacle device is energized.

D. Test each receptacle device for proper polarity.

E. Test each GFCI receptacle device for proper operation.

3.5 ADJUSTING

Adjust devices and wall plates to be flush and level.

3.6 CLEANING

Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 16210 - ELECTRICAL UTILITY SERVICES

PART 1 - GENERAL

1.1 SUMMARY

Section includes arrangement with Utility Company for permanent electric service; payment of Utility Company charges for service; service provisions; and utility metering equipment.

1.2 SYSTEM DESCRIPTION

A. Utility Company: Maui Electric Company.

B. System Characteristics: 480Y/277 volts, three phase, four-wire, 60 Hertz.

C. Service Entrance: Underground.

D. Underground Service Provisions: Underground service entrance to building service entrance equipment.

1. Utility Raceway Connection: At Utility Company's handhole.

2. Utility Service-Entrance Conductor Connection: At Utility Company's pad-mounted transformer.

1.3 SUBMITTALS

Submit Utility-Company-prepared drawings.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with Utility Company written requirements.

B. Maintain one copy of each document on site.

1.5 FIELD MEASUREMENTS

Verify field measurements are as indicated on Utility Company drawings.

1.6 COORDINATION

A. Coordinate with utility company, relocation of overhead or underground lines interfering with construction. Where power lines are to be relocated, bill utility costs, directly to Owner.

B. Contact utility company regarding charges related to service installation. Include utility charges in this contract.

C. Utility charges for service installation will be paid by Contractor.

PART 2 - PRODUCTS

2.1 UTILITY METERS

Furnished by Utility Company.

2.2 UTILITY METER BASE

Product Description: Meter base current transformer rated 20 amperes continuous duty with 13 jaws and provisions for test switches.

2.3 METERING TRANSFORMER CABINET

Padlocking and sealing.

2.4 TRANSFORMER PAD

Product Description: Cast-in-place concrete transformer pad sized as indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

Verify service equipment is ready to be connected and energized.

3.2 INSTALLATION

A. Install service entrance conduits to service entrance equipment. Connect Utility Company transformer secondary to service entrance equipment. Current transformers and current transformer meter and wiring to be provided by Utility Company

B. Install cast-in-place concrete pad for Utility Company transformer.

END OF SECTION

SECTION 16411 - ENCLOSED SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

Section includes nonfusible switches.

1.2 REFERENCES

A. National Electrical Manufacturers Association:

1. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

B. International Electrical Testing Association:

1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 SUBMITTALS

Product Data: Submit switch ratings and enclosure dimensions.

1.4 CLOSEOUT SUBMITTALS

Project Record Documents: Record actual locations of enclosed switches and ratings of installed fuses.

1.5 QUALIFICATIONS

Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 - PRODUCTS

2.1 NONFUSIBLE SWITCH ASSEMBLIES

A. Product Description: NEMA KS 1, Type HD with externally operable handle interlocked to prevent opening front cover with switch in ON position enclosed load interrupter knife switch. Handle lockable in OFF position.

B. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.

1. Interior Dry Locations: Type 1.

2. Exterior Locations: Type 4X (316L stainless steel).

3. Industrial Locations: Type 4X (316L stainless steel).

C. Service Entrance: Switches identified for use as service equipment are to be labeled for this application. Furnish solid neutral assembly and equipment ground bar.

D. Furnish switches with entirely copper current carrying parts.

2.2 SWITCH RATINGS

Switch Rating: Horsepower rated for AC or DC as indicated on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install enclosed switches plumb.

B. Height: 5 feet to operating handle.

C. Install engraved plastic nameplates in accordance with Section 16075.

3.2 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.5.

END OF SECTION

SECTION 16441 - SWITCHBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes main and distribution switchboards.

B. Related Sections:

1. Section 16060 - Grounding and Bonding.
2. Section 16075 - Electrical Identification.
3. Section 16210 - Electrical Utility Services: Utility metering equipment.

1.2 REFERENCES

A. American National Standards Institute:

1. ANSI C12.1 - Code for Electricity Metering.
2. ANSI C39.1 - Requirements, Electrical Analog Indicating Instruments.

B. Institute of Electrical and Electronics Engineers:

1. IEEE C57.13 - Standard Requirements for Instrument Transformers.
2. IEEE C62.41 - Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.

C. National Electrical Manufacturers Association:

1. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.
2. NEMA FU 1 - Low Voltage Cartridge Fuses.
3. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
4. NEMA PB 2 - Deadfront Distribution Switchboards.
5. NEMA PB 2.1 - General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or Less.

D. International Electrical Testing Association:

1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 SUBMITTALS

A. Shop Drawings: Indicate front and side views of enclosures with overall dimensions shown; conduit entrance locations and requirements; nameplate legends; size and number of bus bars for each phase, neutral, and ground; and switchboard instrument details.

B. Product Data: Submit electrical characteristics including voltage, frame size and trip ratings, fault current withstand ratings, and time-current curves of equipment and components.

C. Test Reports: Indicate results of factory production and field tests.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations, configurations, and ratings of switchboards and their components on single line diagrams and plan layouts.

B. Operation and Maintenance Data: Submit spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.5 QUALIFICATIONS

Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Product storage and handling requirements.

B. Deliver in 48 inch maximum width shipping splits, individually wrapped for protection and mounted on shipping skids.

C. Accept switchboards on site. Inspect for damage.

D. Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.

E. Handle in accordance with NEMA PB 2.1. Lift only with lugs provided. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 - Product Requirements.

B. Conform to NEMA PB 2 service conditions during and after installation of switchboards.

1.8 FIELD MEASUREMENTS

Verify field measurements prior to fabrication.

1.9 SEQUENCING

Sequence Work to avoid interferences with building finishes and installation of other products.

1.10 MAINTENANCE MATERIALS

Furnish two of each key.

PART 2 - PRODUCTS

2.1 DISTRIBUTION SWITCHBOARDS

A. Product Description: NEMA PB 2, enclosed switchboard with electrical ratings and configurations as indicated on Drawings.

B. Device Mounting:

1. Main Section: Panel mounted.

2. Distribution Section: Panel mounted.

3. Auxiliary Section: Individually mounted and compartmented.

C. Bus:

1. Material: Copper with tin plating, standard size.

2. Connections: Bolted, accessible from front only for maintenance.

3. Insulation: Fully insulate load side bus bars.

D. Ground Bus: Insulated, extend length of switchboard.

E. Line and Load Terminations: Accessible from front only of switchboard, suitable for conductor materials and sizes as indicated on Drawings.

F. Utility Metering Compartment: Furnish metering transformer compartment for Utility Company's use, in accordance with Utility Company requirements.

G. Pull Section: Size as required by EUSERC. Arrange as indicated on Drawings.

H. Future Provisions: Fully equip spaces for future devices with bussing and bus connections, insulated and braced for short circuit currents. Furnish continuous current rating as indicated on Drawings.

I. Enclosure: Type 3R (316L stainless steel)

J. Align sections at front and rear.

K. Switchboard Height: 91 inches, excluding floor sills, lifting members and pull boxes.

L. Finish: Manufacturer's standard light gray enamel over external surfaces. Coat internal surfaces with minimum one coat corrosion-resisting paint, or plate with cadmium or zinc.

2.2 MOLDED CASE CIRCUIT BREAKER

A. Product Description: NEMA AB 1, molded-case circuit breaker.

B. Field-Adjustable Trip Circuit Breaker: Circuit breakers with frame sizes 200 amperes and larger have mechanism for adjusting long time, short time, continuous current, short time/long time pickup current setting for automatic operation.

C. Field-Changeable Ampere Rating Circuit Breaker: Circuit breakers with frame sizes 200 amperes and larger have changeable trip units.

D. Current Limiting Circuit Breaker: Circuit breaker indicated as current-limiting have automatically-resetting current limiting elements in each pole. Let-through Current and Energy: Less than permitted for same size Class RK-5 fuse.

E. Solid-State Circuit Breaker: Electronic sensing, timing, and tripping circuits for adjustable current settings; [ground fault trip with [integral ground fault sensing] [zero sequence type ground fault sensor]]; instantaneous trip; and adjustable short time trip.

F. Current Limiter: Designed for application with molded case circuit breaker.

1. Coordinate limiter size with trip rating of circuit breaker to prevent nuisance tripping and to achieve interrupting current rating specified for circuit breaker.

2. Interlocks trip circuit breaker and prevent closing circuit breaker when limiter compartment cover is removed or when one or more limiter is not in place or has operated.

2.3 GROUND FAULT DEVICES

A. Ground Fault Sensor: Ground return type.

B. Ground Fault Relay: Adjustable ground fault sensitivity from 200 to 1200 amperes, time delay. Furnish monitor panel with lamp to indicate relay operation, TEST and RESET control switches.

2.4 SOURCE QUALITY CONTROL

Furnish shop inspection and testing in accordance with NEMA PB 2.

PART 3 - EXECUTION

3.1 EXAMINATION

Verify surface is suitable for switchboard installation.

3.2 INSTALLATION

A. Install in accordance with NEMA PB 2.1.

B. Tighten accessible bus connections and mechanical fasteners after placing switchboard.

C. Install fuses in each switch and coordinate sizes with connected load.

D. Install engraved plastic nameplates in accordance with Section 16075.

E. Install breaker circuit directory.

F. Ground and bond switchboards in accordance with Section 16060.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.1.

3.4 ADJUSTING

A. Adjust operating mechanisms for free mechanical movement.

B. Tighten bolted bus connections.

C. Adjust circuit breaker trip and time delay settings.

3.5 CLEANING

Touch up scratched or marred surfaces to match original finish.

END OF SECTION

SECTION 16442 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes distribution and branch circuit panelboards, electronic grade branch circuit panelboards, and load centers.

B. Related Sections:

1. Section 16060 - Grounding and Bonding.

2. Section 16075 - Electrical Identification

1.2 REFERENCES

A. Institute of Electrical and Electronics Engineers:

1. IEEE C62.41 - Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.

B. National Electrical Manufacturers Association:

1. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.

2. NEMA FU 1 - Low Voltage Cartridge Fuses.

3. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.

4. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.

5. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

6. NEMA PB 1 - Panelboards.

7. NEMA PB 1.1 - General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.

C. International Electrical Testing Association:

1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

D. National Fire Protection Association:

1. NFPA 70 - National Electrical Code.

E. Underwriters Laboratories Inc.:

1. UL 67 - Safety for Panelboards.

2. UL 1283 - Electromagnetic Interference Filters.

3. UL 1449 - Transient Voltage Surge Suppressors.

1.3 SUBMITTALS

A. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

B. Product Data: Submit catalog data showing specified features of standard products.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of panelboards and record actual circuiting arrangements.

B. Operation and Maintenance Data: Submit spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.5 QUALIFICATIONS

Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 MAINTENANCE MATERIALS

Furnish two of each panelboard key. Panelboards keyed alike to Owner's current keying system.

PART 2 - PRODUCTS

2.1 DISTRIBUTION PANELBOARDS

A. Product Description: NEMA PB 1, circuit breaker type panelboard.

B. Panelboard Bus: Copper, current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard.

C. Minimum integrated short circuit rating: As indicated on Drawings].

D. Molded Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Furnish circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.

E. Molded Case Circuit Breakers with Current Limiters: NEMA AB 1, circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.

F. Current Limiting Molded Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size NEMA FU 1, Class RK-5 fuse.

G. Circuit Breaker Accessories: Trip units and auxiliary switches as indicated on Drawings.

H. Enclosure: NEMA PB 1, Type 1, 6 inches deep, 20 inches wide, cabinet box.

I. Cabinet Front: Surface door-in-door type, fastened with hinge and latch, [hinged door with flush lock, metal directory frame, finished in manufacturer's standard gray enamel.

2.2 BRANCH CIRCUIT PANELBOARDS

A. Product Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.

B. Panelboard Bus: Copper, current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard.

C. Minimum Integrated Short Circuit Rating: As indicated on Drawings].

D. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits, Type HACR for air conditioning equipment circuits, Class A ground fault interrupter circuit breakers as indicated on Drawings. Do not use tandem circuit breakers.

E. Current Limiting Molded Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size NEMA FU 1, Class RK-5 fuse.

F. Enclosure: NEMA PB 1, Type 1.

G. Cabinet Box: 6 inches deep, 20 inches wide.

H. Cabinet Front: Surface cabinet front with concealed trim clamps, concealed hinge, metal directory frame, and flush lock keyed alike. Finish in manufacturer's standard gray enamel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards in accordance with NEMA PB 1.1.

B. Install panelboards plumb.

C. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.

D. Install filler plates for unused spaces in panelboards.

E. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes to balance phase loads.

F. Install engraved plastic nameplates in accordance with Section 16075.

G. Ground and bond panelboard enclosure according to Section 16060. Connect equipment ground bars of panels in accordance with NFPA 70.

3.2 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform circuit breaker inspections and tests listed in NETA ATS, Section 7.6.

C. Perform switch inspections and tests listed in NETA ATS, Section 7.5.

D. Perform controller inspections and tests listed in NETA ATS, Section 7.16.1.

3.3 ADJUSTING

Measure steady state load currents at each panelboard feeder; rearrange circuits in panelboard to balance phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

SECTION 16461 - DRY TYPE TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

Section includes two-winding transformers; shielded transformers; autotransformers; and buck-and-boost transformers.

1.2 REFERENCES

A. National Electrical Manufacturers Association:

1. NEMA ST 1 - Specialty Transformers (Except General Purpose Type).

2. NEMA ST 20 - Dry Type Transformers for General Applications.

B. International Electrical Testing Association:

1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 SUBMITTALS

A. Product Data: Submit outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.

B. Test Reports: Indicate loss data, efficiency at 25, 50, 75 and 100 percent rated load, and sound level.

1.4 CLOSEOUT SUBMITTALS

Project Record Documents: Record actual locations of transformers.

1.5 QUALIFICATIONS

Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Product storage and handling requirements.

B. Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.

PART 2 - PRODUCTS

2.1 TWO-WINDING TRANSFORMERS

A. Product Description: NEMA ST 20, factory-assembled, air-cooled, dry type transformers, ratings as indicated on Drawings.

B. Primary Voltage: 480 volts, 1 phase.

C. Secondary Voltage: 120/240 volts, 1 phase.

D. Insulation system and average winding temperature rise for rated kVA as follows:

1. 1-15 kVA: Class 185 with 115 degrees C rise.

E. Case temperature: Do not exceed 35 degrees C rise above ambient at warmest point at full load.

F. Winding Taps:

1. Transformers Less than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.

2. Transformers 15 kVA and Larger: NEMA ST 20.

G. Sound Levels: NEMA ST 20.

H. Basic Impulse Level: 10 kV.

I. Ground core and coil assembly to enclosure by means of visible flexible copper grounding strap.

J. Mounting:

1. 1-15 kVA: Suitable for wall or floor mounting.

K. Coil Conductors: Continuous copper windings with terminations brazed or welded.

L. Enclosure: NEMA ST 20, Type 1 ventilated. Furnish lifting eyes or brackets.

M. Isolate core and coil from enclosure using vibration-absorbing mounts.

N. Nameplate: Include transformer connection data [and overload capacity based on rated allowable temperature rise].

2.2 SOURCE QUALITY CONTROL

Production test each unit according to NEMA ST20.

PART 3 - EXECUTION

3.1 EXAMINATION

Verify mounting supports are properly sized and located including concealed bracing in walls.

3.2 INSTALLATION

A. Set transformer plumb and level.

B. Use flexible conduit, 2 feet minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

C. Support transformers.

1. Mount wall-mounted transformers using integral flanges or accessory brackets furnished by manufacturer.

2. Mount floor-mounted transformers on vibration isolating pads suitable for isolating transformer noise from building structure.

3. Mount trapeze-mounted transformers as indicated on Drawings.

D. Provide seismic restraints.

E. Install grounding and bonding in accordance with Section 16060.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.2.1.

3.4 ADJUSTING

Measure primary and secondary voltages and make appropriate tap adjustments.

END OF SECTION

SECTION 16510 - INTERIOR LUMINAIRES

PART 1 - GENERAL

1.1 SUMMARY

Section includes interior luminaires, lamps, ballasts, and accessories.

1.2 REFERENCES

A. American National Standards Institute:

1. ANSI C82.1 - American National Standard for Lamp Ballast-Line Frequency Fluorescent Lamp Ballast.

2. ANSI C82.4 - American National Standard for Ballasts-for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).

1.3 SUBMITTALS

A. Shop Drawings: Indicate dimensions and components for each luminaire not standard product of manufacturer.

B. Product Data: Submit dimensions, ratings, and performance data.

1.4 QUALIFICATIONS

Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.5 FIELD MEASUREMENTS

Verify field measurements prior to fabrication.

1.6 MAINTENANCE MATERIALS

A. Furnish two of each plastic lens type.

B. Furnish one case replacement lamps for each lamp type installed.

C. Furnish two of each ballast type.

PART 2 - PRODUCTS

2.1 INTERIOR LUMINAIRES

Product Description: Complete interior luminaire assemblies, with features, options, and accessories as scheduled.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install suspended luminaires using pendants supported from swivel hangers. Install pendant length required to suspend luminaire at indicated height.

B. Support luminaires larger than 2 x 4 foot size independent of ceiling framing.

C. Locate recessed ceiling luminaires as indicated on Drawings.

D. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prevent movement.

E. Exposed Grid Ceilings: Support surface-mounted luminaires on grid ceiling directly from building structure.

F. Install recessed luminaires to permit removal from below.

G. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.

H. Install clips to secure recessed grid-supported luminaires in place.

I. Install wall-mounted luminaires at height as scheduled.

J. Install accessories furnished with each luminaire.

K. Connect luminaires to branch circuit outlets provided under Section 16130 using flexible conduit.

L. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

M. Install specified lamps in each luminaire.

N. Ground and bond interior luminaires in accordance with Section 16060.

3.2 FIELD QUALITY CONTROL

Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.3 ADJUSTING

Aim and adjust luminaires as indicated on Drawings.

3.4 CLEANING

A. Remove dirt and debris from enclosures.

B. Clean photometric control surfaces as recommended by manufacturer.

C. Clean finishes and touch up damage.

3.5 PROTECTION OF FINISHED WORK

Relamp luminaires having failed lamps at Substantial Completion.

END OF SECTION

SECTION 16520 - EXTERIOR LUMINAIRES

PART 1 - GENERAL

1.1 SUMMARY

Section includes exterior luminaries, poles, and accessories.

1.2 REFERENCES

A. American National Standards Institute:

1. ANSI C82.1 - American National Standard for Lamp Ballast-Line Frequency Fluorescent Lamp Ballast.

2. ANSI C82.4 - American National Standard for Ballasts-for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).

3. ANSI O5.1 - Wood Poles, Specifications and Dimensions.

1.3 SUBMITTALS

A. Shop Drawings: Indicate dimensions and components for each luminaire not standard Product of manufacturer.

B. Product Data: Submit dimensions, ratings, and performance data.

C. Samples: Submit two color chips 3 x 3 inch in size illustrating luminaire finish color where indicated in luminaire schedule.

1.4 QUALIFICATIONS

Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Product storage and handling requirements.

B. Store and handle solid wood poles in accordance with ANSI O5.1.

1.6 COORDINATION

Furnish bolt templates and pole mounting accessories to installer of pole foundations.

PART 2 - PRODUCTS

2.1 LUMINARIES

Product Description: Complete exterior luminaire assemblies, with features, options, and accessories as scheduled.

2.2 METAL POLES

A. Material and Finish: As indicated on Drawings.

B. Section Shape and Dimensions: As indicated on Drawings.

C. Height: As indicated on Drawings.

D. Base: Nonbreakaway type.

E. Accessories:

1. Handhole.

2. Anchor bolts.

F. Loading Capacity Ratings:

1. Steady Wind: 120 miles per hour, minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

Verify foundations are ready to receive fixtures.

3.2 INSTALLATION

A. Install concrete bases for lighting poles at locations as indicated on Drawings.

B. Install poles plumb. Install double nuts to adjust plumb. Grout around each base.

C. Install lamps in each luminaire.

D. Bond and ground luminaries, metal accessories, and metal poles in accordance with Section 16060. Install supplementary grounding electrode at each pole.

3.3 FIELD QUALITY CONTROL

A. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

B. Measure illumination levels to verify conformance with performance requirements.

C. Take measurements during night sky, without moon or with heavy overcast clouds effectively obscuring moon.

3.4 ADJUSTING

Aim and adjust luminaries to provide illumination levels and distribution as indicated on Drawings.

3.5 CLEANING

A. Clean photometric control surfaces as recommended by manufacturer.

B. Clean finishes and touch up damage.

3.6 PROTECTION OF FINISHED WORK

Relamp luminaries having failed lamps at Substantial Completion.

END OF SECTION