SECTION 05 50 00 - METAL FABRICATIONS

NOTE: This guide specification covers the basic requirements for Metal Fabrications.

Incorporate this information into the specifications for your project. For any deviations, please discuss with your designated LAWA representative.

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes structural support for restroom counter tops, ceiling hung toilet partitions and miscellaneous steel trim.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance:

1. **Counter Tops and Vanities:** Provide countertop and vanity framing capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections, or of exhibiting excessive deflections in any of the components making up the countertops and vanities:

    a. All deadloads.
    b. 500 pound live load placed on the countertop and vanity.
    c. Deflection at Midspan: L/500 times span or 1/8” whichever is less.

2. **Tube Framing for Partial Height Walls**: Provide tube framing for partial height walls capable of withstanding a deflection not to exceed 2L/1440 of the wall height when subjected to a positive and negative pressure of 5 psf.

1.3 SUBMITTALS

A. Product Data: Submit product data for the following:

1. Paint products.

B. Shop Drawings: Submit shop drawings detailing the fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1. For installed products indicated to comply with design loads, include structural analysis data, for information only, signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project for a minimum of 5 years, with a record of successful in-service performance, with sufficient production capacity to produce required units without causing delay in the work.

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

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

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.3, "Structural Welding Code--Sheet Steel."
3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

D. Determination of existing structure to accommodate new loads.

1.5 STORAGE, DELIVERY AND HANDLING

A. Store metal fabrications in a dry, well-ventilated, weather tight place. Deliver and handle so as to prevent any type of damage to the fabricated work.

1.6 PROJECT CONDITIONS

A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

1.7 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Cold Finished Steel Bars: ASTM A108, grade as selected by fabricator.

C. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500, or hot formed steel tubing complying with ASTM A 501.

D. Steel Pipe: ASTM A 53, standard weight (Schedule 40) minimum, unless otherwise indicated or required to satisfy the performance requirements; finish as follows:

1. Black finish, unless otherwise indicated.
2. Galvanized finish for exterior installations and where indicated.

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

2.3 PAINT

A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

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

C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FASTENERS

A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

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

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

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

F. Plain Washers: Round, carbon steel, ASME B18.22.1 (ASME B18.22M).

G. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1 (ASME B18.21.2M).

H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Indoor Expansion Anchor Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Exterior Expansion Anchor Material: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M).

I. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.5 FABRICATION, GENERAL

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

1. Welded connections may be used where bolted connections are shown.

B. Shear and punch metals cleanly and accurately. Remove burrs.

C. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Weld corners and seams continuously along entire line of contact to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices and fasteners to secure metal fabrications rigidly in place and to support indicated loads.

F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

H. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

I. Remove sharp or rough areas on exposed traffic surfaces.

J. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous. Make up threaded connections tight so that threads are entirely concealed.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports indicated and as necessary to complete the Work and which are not a part of the structural framework, including but not limited to countertop and vanities, ceiling hung toilet compartments, framing for partial height walls, mechanical and electrical equipment.

B. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

C. **Framing for Ceiling Hung Toilet Compartments:** Provide framing for ceiling hung toilet compartments, coordinated with the partitions and including provisions for partition anchorage as required to sustain imposed loads and to limit deflections to L/360 between hangers, fabricated from the following.

1. Structural Steel Shapes, Plates and Bars: ASTM A36/A36M.

2. Modular Structural Framing System: ASTM A569; modular, structural quality steel pre-formed "U" channel framing system with continuous open slot prepared to receive attachment nuts, bolts, straps, threaded rods, beam clamps, hanger rods support brackets and other accessories. Provide manufacturers standard corrosion resistant finish.
3. Provide steel rods, ½" diameter, spaced not more than 36" o.c. Thread rods to receive anchor and stop nuts. Fit hangers with wedge shape washers for full bearing on sloping flanges of support beam.
4. Coordinate installation with toilet compartment manufacturer's written instructions and recommendations.

D. **Countertop and Vanity Framing:** Custom fabricate countertop and vanity framing, using steel shapes and plates, and cold finished mild steel bars at exposed conditions, for support framing and plywood, to the thicknesses, sizes and shapes shown, and as required to produce work of adequate strength and durability, without objectionable deflections. Use proven details of fabrication, as required, to achieve proper assembly and alignment of the various components of the work.

2.7 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from structural-steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches (150 mm) from each end, 6 inches (150 mm) from corners, and 24 inches (600 mm) o.c., unless otherwise indicated.

C. **Surface Applied Corner Guards:** Provide stainless steel corner guards fabricated from angles of sizes shown, or if not shown, of minimum 3-1/2" x 3-1/2" x ¼" thick equal leg angles with ¼" wide taper legs. Drill and countersink legs of angles, for fastening to substrates indicated, with holes spaced 24" on center. Provide corner guard lengths of 42" if not otherwise indicated.

2.8 FINISHES, GENERAL

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

B. Finish metal fabrications after assembly.

2.9 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces by removing oil, grease, and similar contaminants in accordance with SSPC -SP 1 "Solvent Cleaning," followed with the SSPC surface-preparation specifications listed below and environmental exposure conditions of installed metal fabrications. Surface preparation shall be done after fabrication and immediately prior to shop painting. Apply shop coat of paint within 4 hours after cleaning and before rust bloom occurs.

1. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

C. Apply a minimum of one coat of shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be field welded, and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Dry Film Thickness of Primer: 2.5 to 3.0 mils, dry film thickness. Apply paint thoroughly and evenly to dry surfaces, free from holidays and pinholes, in accordance with manufacturers directions.

D. Stainless Steel

1. Material – Stainless Steel, Type 304
2. Finish – No. 6
3. Corner Radius – 1/8"
4. Taper – ¼" from leg edges
5. Mounting – flat head countersunk screws through shop drilled countersunk holes.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors. Drill holes for bolts to the exact diameter of the bolt. Provide screws threaded full length to the screw head.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

E. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements .

B. Ceiling Hung Toilet Partitions: Anchor supports securely to, and rigidly brace from, overhead building structure.

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop
painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

END OF SECTION 05 50 00

SECTION 05 75 30.13 – COLUMN COVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Column covers with metal and glass finish with LED Light Panel System.

> **NOTE:** LAWA has developed this specification standard for column covers in order to provide a unifying design for the public areas of the terminals while providing long term durability and ease of maintenance.

1.2 PERFORMANCE REQUIREMENTS

A. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 ACTION SUBMITTALS

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

B. Shop Drawings: Show fabrication and installation details for column covers.

1. Include plans, elevations, component details, and attachments to other work.
2. Indicate materials and profiles of each column cover, fittings, joinery, finishes, fasteners, anchorages, and accessory items.
3. Indicate LED light panel.

C. Samples for Verification:

1. Stainless Steel: For each type of exposed finish required, prepared on 12-inch square Samples of metal of same thickness and material indicated for the Work.
2. Laminated Glass with Colored Interlayer: 18 inches square.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show dimensions of structural columns, fireproofing (if any), attachments, and necessary clearances.

B. Product Certificates: For glass and glazing products, from manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For stainless-steel finish to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Source Limitations for Glass: Obtain laminated glass from single source from single manufacturer.

C. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Construct one mockup of each type of column cover.
2. Approved mockups may not become part of the completed Work.
3. All mockups shall be constructed at the jobsite.

D. Preinstallation Conference: Conduct conference at Project site.

E. Column Cover installation shall commence only upon receiving written LAWA approval of the Mock Up.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver column covers wrapped in protective coverings and strapped together in suitable packs or in heavy-duty cartons. Remove protective coverings before they stain or bond to finished surfaces.

B. Store products on elevated platforms in a dry location.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls, columns, beams, and other construction contiguous with column covers by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 COORDINATION

A. Coordinate installation of anchorages for column covers. Installation of anchors shall not damage the column reinforcement. Furnish setting drawings, templates, and directions for installing anchorages, including concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Coordinate installation of column covers with adjacent construction to ensure that wall assemblies, flashings, trim, and joint sealants, are protected against damage from the effects of weather, age, corrosion, and other causes.

1.10 WARRANTY

A. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METAL

A. General: Provide sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections where exposed to view on finished units.

B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness.

2.2 GLASS AND GLAZING MATERIALS

A. Bent Laminated Glass: ASTM C 1464, Kind BL, and ASTM C 1172, Kind LA (laminated annealed), Condition A (uncoated), Type I (transparent), Quality-Q3 with two plies of glass and polyvinyl butyral interlayer not less than 0.060 inch thick.

1. Glass Color: Clear.
2. Interlayer Color: White.
3. Glass Plies: 6.0 mm thick, each.

NOTE: The bent glass is comprised of 3/16 inch Starphire / .060 #4640/ 3/16 Starphire, flat polish all edges. Glass shall comply with CPSC CFR 1201 Cat II.

B. Glazing Cement and Accessories for Structural Glazing: Glazing cement, setting blocks, shims, and related accessories as recommended or supplied by column cover manufacturer for installing structural glazing.

2.3 ILLUMINATION

A. LED Light Panel System: Molded clear acrylic (PMMA) .3125" thick lens, .125" channel around edge, edges, or perimeter, .0625" x .0625" wire, mesh grid overlay, strings of LEDs in channel around edge, edges, or perimeter with flat metal led covers, flat white plastic sheet on top sides covered with white plastic tape, and low-voltage wire extruding from corner, side, ore rear of panel with barrel connector.

B. Manufacturer:
   1. E Connect: 740 Flower Avenue, Venice, CA 90291, Telephone: 310.616.5055

C. UL Approved.

2.4 MISCELLANEOUS MATERIALS

A. Sealants, Interior: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834; of type and grade required to seal joints in column covers; and as recommended in writing by column covers manufacturer.

   1. Sealants shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Fasteners: Fabricated from same basic metal and alloy as fastened metal unless otherwise indicated. Do not use metals that are incompatible with materials joined.

   1. Provide concealed fasteners for interconnecting column covers items and for attaching them to other work unless otherwise indicated.

C. Nonstructural Anchors: Provide metal expansion sleeve anchors of type, size, and material necessary for type of load and installation indicated, as recommended by manufacturer, unless otherwise indicated.

D. Anchor Materials for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.

E. Isolation Coating: Manufacturer's standard bituminous paint.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble column covers items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Coordinate dimensions and attachment methods of column covers items with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

C. Form metal to profiles indicated, in maximum lengths to minimize joints. Produce flat, flush surfaces without cracking or grain separation at bends. Fold back exposed edges of unsupported sheet metal to form a 1/2-inch wide hem on the concealed side, or ease edges to a radius of approximately 1/32 inch and support with concealed stiffeners.

D. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide surface flatness equivalent to stretcher-leveled standard of flatness and sufficient strength for indicated use.

1. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.

E. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce column covers items as needed to attach and support other construction.

F. Provide support framing, mounting and attachment clips, splice sleeves, fasteners, and accessories needed to install column cover items.

2.6 GLAZING PANEL FABRICATION

A. General: Fabricate to sizes and shapes required; provide for proper edge clearance and bite on glazing panels.

1. Clean-cut or flat-grind edges at butt-glazed sealant joints to produce square edges with slight chamfers at junctions of edges and faces
2. Grind smooth exposed edges, including those at open joints, to produce square edges with slight chamfers at junctions of edges and faces.

B. Glass Column Covers: Factory-bond glass to base and top-rail channels in manufacturer's plant using glazing cement to comply with manufacturer's written specifications.

2.7 COLUMN COVERS

A. Snap-Together Type: Form column covers to shapes indicated from metal of type and minimum thickness indicated below. Return vertical edges and bend to form hook that will engage continuous mounting clips.

1. 304 Stainless-Steel Sheet: 11 gauge

a. Finish: custom decorative/textured.

2. Form returns at vertical joints to provide hairline V-joints.
3. Fabricate column covers with reveals at horizontal joints produced by forming returns on mating ends of metal column cover sections. Provide snap-in metal filler strips at reveals. Locate horizontal joints as indicated.
4. Fabricate base rings, intermediate reveals, and ceiling rings to match column cover metal finish.

B. Glass Column Covers: Factory-bond glass to base and top-rail channels in manufacturer's plant using glazing cement to comply with manufacturer's written specifications.

2.8 GENERAL FINISH REQUIREMENTS

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

B. Complete mechanical finishes of flat sheet metal surfaces before fabrication where possible. After fabrication, finish all joints, bends, abrasions, and other surface blemishes to match sheet finish.

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

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of column covers.

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

3.2 INSTALLATION

A. Locate and place column covers level and plumb and in alignment with adjacent construction. Perform cutting, drilling, and fitting required to install column covers.

1. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where needed to protect metal surfaces.

C. Form tight joints with exposed connections accurately fitted together.

D. Install concealed gaskets, joint fillers, sealants, and insulation, as the Work progresses, to make interior column covers soundproof and lightproof as applicable to type of fabrication indicated.

E. Corrosion Protection: Apply bituminous paint or other permanent separation materials on concealed surfaces where metals would otherwise be in direct contact with substrate materials that are incompatible or could result in corrosion or deterioration of either material or finish.

3.3 ADJUSTING AND CLEANING

A. Unless otherwise indicated, clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and drying with soft cloths.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

C. Clean and polish glass as recommended in writing by manufacturer. Wash exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion.

3.4 PROTECTION

A. Protect finishes of column covers from damage during construction period with temporary protective coverings approved by column cover manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 05 75 30.13

SECTION 06 61 16 - SOLID SURFACING MATERIAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies solid polymer fabrications for the self-draining countertop with integral sink.

1.2 SUBMITTALS

A. Manufacturer's Data: Submit copies of manufacturer's specifications and installation instructions for solid polymer fabrications.

B. Samples: Submit three 6" x 6" samples of solid polymer fabrication material in each color specified.

C. Shop Drawings: Submit shop drawings indicating dimensions, component sizes, fabrication details, attachment provisions and coordination requirements with adjacent work, include rough-in dimensions for mechanical trades.

D. Maintenance Data: Submit manufacturer’s care and maintenance data, including repair and cleaning instructions.

1.3 PRODUCT HANDLING

A. Protect solid polymer fabrications against damage during transportation, storage, during installation and until completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Solid Polymer Fabrication Resin Material:

1. Product and Manufacturer: Corian; Dupont, Terra Collection, Sahara Color, unless otherwise directed by LAWA.

B. Bonding Adhesives: Two part adhesive with color matching solid polymer fabrication and of type as recommended by solid polymer fabrication manufacturer for joining aprons, end and backsplashes to tops.

2.2 FABRICATION

A. Factory fabricate components to achieve required shapes, sizes, and profiles shown, without cracks, spalling, pits, surface porosity, chipped areas, or blisters.

1. Form all toilet and bath room and vanity countertops to 3/4" minimum thickness in one piece lengths. Provide molded bowls, formed from same material as countertop but from color(s) indicated, adhesively-bonded to countertops where indicated. Provide integral or adhesively-bonded 3/4" thick backsplashes and aprons where indicated. Form edges to profiles shown. If required, use 2 sheets of countertop sheet material laminated together using manufacturer's standard adhesive to form edges. Laminated sections shall be in close contact throughout. Adhesive stains will not be permitted.

    a. Bowls shall be formed to include provisions for drainage and overflow.
    b. Location of overflow drain shall not interfere with handicap under bowel knee clearances.

2. Provide separate end splashes of height to match backsplashes unless otherwise indicated.
3. Countertops shall be factory cored for plumbing fittings and toilet accessories.
4. Public Restrooms shall have countertops that are self-draining and monolithic with ¼" slope to integral sink.
5. Sink bowl shall not be located any closer than 4" from splashguard.
6. Faucets shall be located 45° to the left of the bowl centerline.
7. Soap Dispenser shall be located 45° to the right of the bowl centerline
8. Lavatory overflow drain shall be at the front of the bowl, out of view and integral to the bowl.

B. Radius corners and edges.

C. Finish exposed surfaces with sandpaper followed by abrasive pad for final surfacing in accordance with solid polymer manufacturers written instructions.

NOTE: Provide self-draining counter top with integral sink with a 4" minimum back splash and a 4" drip front skirt.

2.3 MISCELLANEOUS MATERIALS

A. Sealants: Sanitary Silicone Sealant in one color as selected by Architect from manufacturers standards.

B. Steel Framing for Countertops: Refer to Section 05 50 00 'Metal Fabrications'.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify all measurements in the field. Coordinate the work of other trades with the Work of this Section.

3.2 INSTALLATION

A. Provide a competent and experienced superintendent to supervise, coordinate and expedite the Work continuously.

B. Uncrate solid polymer fabrications and attach to substrates where indicated. Install components plumb, true and level, scribed to adjacent finishes in accordance with the accepted shop drawings and product installation data. Form field joints, if any, using manufacturer's recommended adhesive, with joints inconspicuous in finished work. Keep components and hands clean when making joints. Remove adhesives, sealants, and other stains. Remove and replace stained units which cannot be cleaned.

D. Make plumbing connections to toilet room countertops and vanities in accordance with Division 15 work.

E. Prepare joints and place sealants as indicated.

F. Regularity Requirements: The counter top installation shall comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA) Accessible Guidelines for Buildings and Facilities and the City of Los Angeles Building Code.

3.3 CLEANING

A. At a time as directed by the LAWA, remove all temporary protection and leave the installation clean and free of any imperfections.

NOTE: This guide specification covers the basic requirements for Solid Surfacing Material Fabrication.

Incorporate this information into the specifications for your project. For any deviations, please discuss with your designated LAWA representative.

END OF SECTION 06 61 16

SECTION 06 61 16 - SOLID SURFACING MATERIAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies solid polymer fabrications for the self-draining countertop with integral sink.

1.2 SUBMITTALS

A. Manufacturer's Data: Submit copies of manufacturer's specifications and installation instructions for solid polymer fabrications.

B. Samples: Submit three 6" x 6" samples of solid polymer fabrication material in each color specified.

C. Shop Drawings: Submit shop drawings indicating dimensions, component sizes, fabrication details, attachment provisions and coordination requirements with adjacent work, include rough-in dimensions for mechanical trades.

D. Maintenance Data: Submit manufacturer’s care and maintenance data, including repair and cleaning instructions.

1.3 PRODUCT HANDLING

A. Protect solid polymer fabrications against damage during transportation, storage, during installation and until completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Solid Polymer Fabrication Resin Material:

1. Product and Manufacturer: Dupont, Corian Terra Collection
    a. Approved Equal subject to review and approval by LAWA

B. Bonding Adhesives: Two part adhesive with color matching solid polymer fabrication and of type as recommended by solid polymer fabrication manufacturer for joining aprons, end and backsplashes to tops.

2.2 FABRICATION

A. Factory fabricate components to achieve required shapes, sizes, and profiles shown, without cracks, spalling, pits, surface porosity, chipped areas, or blisters.

1. Form all toilet and bath room and vanity countertops to 3/4" minimum thickness in one piece lengths. Provide molded bowls, formed from same material as countertop but from color(s) indicated, adhesively-bonded to countertops where indicated. Provide integral or adhesively-bonded 3/4" thick backsplashes and aprons where indicated. Form edges to profiles shown. If required, use 2 sheets of countertop sheet material laminated together using manufacturer's standard adhesive to form edges. Laminated sections shall be in close contact throughout. Adhesive stains will not be permitted.

   a. Bowls shall be formed to include provisions for drainage and overflow.
   b. Location of overflow drain shall not interfere with handicap under bowel knee clearances.

2. Provide separate end splashes of height to match backsplashes unless otherwise indicated.
3. Countertops shall be factory cored for plumbing fittings and toilet accessories.
4. Public Restrooms shall have countertops that are self-draining and monolithic with ¼" slope to integral sink.
5. Sink bowl shall not be located any closer than 4" from splashguard.
6. Faucets shall be located 45° to the left of the bowl centerline.
7. Soap Dispenser shall be located 45° to the right of the bowl centerline
8. Lavatory overflow drain shall be at the front of the bowl, out of view and integral to the bowl.

B. Radius corners and edges.

C. Finish exposed surfaces with sandpaper followed by abrasive pad for final surfacing in accordance with solid polymer manufacturers written instructions.

NOTE: Provide self-draining counter top with integral sink with a 6" minimum back splash and a 4" drip front skirt.

2.3 MISCELLANEOUS MATERIALS

A. Sealants: Sanitary Silicone Sealant in one color as selected by Architect from manufacturers standards.

B. Steel Framing for Countertops: Refer to Section 05 50 00 'Metal Fabrications'.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify all measurements in the field. Coordinate the work of other trades with the Work of this Section.

3.2 INSTALLATION

A. Provide a competent and experienced superintendent to supervise, coordinate and expedite the Work continuously.

B. Uncrate solid polymer fabrications and attach to substrates where indicated. Install components plumb, true and level, scribed to adjacent finishes in accordance with the accepted shop drawings and product installation data. Form field joints, if any, using manufacturer's recommended adhesive, with joints inconspicuous in finished work. Keep components and hands clean when making joints. Remove adhesives, sealants, and other stains. Remove and replace stained units which cannot be cleaned.

D. Make plumbing connections to toilet room countertops and vanities in accordance with Division 15 work.

E. Prepare joints and place sealants as indicated.

F. Regularity Requirements: The counter top installation shall comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA) Accessible Guidelines for Buildings and Facilities and the City of Los Angeles Building Code.

3.3 CLEANING

A. At a time as directed by the LAWA, remove all temporary protection and leave the installation clean and free of any imperfections.

NOTE: This guide specification covers the basic requirements for Solid Surfacing Material Fabrication.

Incorporate this information into the specifications for your project. For any deviations, please discuss with your designated LAWA representative.

END OF SECTION 06 61 16

SECTION 07 54 19 - SINGLE PLY PVC REROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. All roofing areas, flashings, penetrations and equipment shall be included in the work under this section.

B. Furnish materials and perform labor as specified and as necessary to complete the specified reroofing, including but not limited to these major items:

1. Removal and disposal of existing single ply, built-up or cap sheet roofing material from specified roofs and walls and reroofing with a California Title 24 compliant 60 mil single ply PVC membrane over insulation and Dens Deck underlayment board. Color to be designated from factory available colors.
2. Removal and disposal of existing coating at rotunda dome and reroofing with a California Title 24 compliant 80 mil single ply felt-backed PVC membrane adhered over the concrete substrate.
3. Roofing shall be fully adhered in all sections. Except system shall be mechanically attached on the landside canopies and penthouses.
4. Installation of tapered insulation and crickets behind equipment or elsewhere as required to correct inadequate drainage. (See tapered insulation plans.)
5. Installation of new cast iron drains and overflow drains.
6. Water testing of existing drains.
7. Installation of walkway pads.
8. Installation of new metal ladders where designated.
9. Installation of new PVC expansion joints to replace existing metal expansion joints.
10. NOTE: The entire roof surface shall be washed after completion of installation.
11. NOTE: Owner to oversee the work shall utilize City and/or private inspection services.
12. NOTE:. Tear-off and disposal of asbestos containing materials must be performed in accordance with governing codes and regulations.

1.2 PERFORMANCE REQUIREMENTS

A. General: Provide and install specified membrane and its base flashings that remain watertight, do not pond water, resist thermal movement and resist exposure to weather without failure.

B. Factory Mutual Research Corporation (FM) – Norwood, MA

1. Class 1-90

C. Underwriters Laboratories, Inc. (UL) – Northbrook, IL

1. Class A Assembly

D. Solar Reflectance Index (SRI)

1. Solar Reflective Index of 104

E. Accelerated Weathering – ASTM G154

1. Minimum 5000 hours without cracking, crazing or discoloration.

1.3 REFERENCES

A. American Society for Testing & Materials (ASTM)

B. Federal Specifications (FS)

C. Underwriters 1 Laboratories (UL)

D. Factory Mutual (FM)

E. Los Angeles Research Report (LARR)

1.4 QUALITY ASSURANCE

A. Compliance to Specifications

1. Roofing foreman shall have a copy of these specifications on the job at all times during application and shall refer to same for proper application methods.
2. Whenever specification items found herein are less stringent than the roofing manufacturer's published specifications, the manufacturer's minimum *requirements* shall be followed. Owner will invite the roofing manufacturer's representative to the pre-construction conference, and the representative will visit the work in progress.
3. Written specifications submitted to the roofing contractor do not relieve the roofing contractor of his obligation to thoroughly check the size, substrate, slope and other conditions of the roof.
4. Contractor must provide product data submittals of roofing materials and components including MSDS information and physical samples of materials at the pre-construction conference, for the purpose of review and approval by NRC prior to the start of the work.

B. Regulatory Requirements

1. Fire Regulations: Roofing contractor shall be responsible for meeting fire regulations. A certified fire extinguisher of adequate size shall be located on the roof near the work.
2. Roof Membrane Attachment: Membrane attachment shall conform to roofing manufacturer, California Building Code, Factory Mutual and shall include upgrades to modify attachment for special requirements in area where building is located.
   a. Minimum attachment shall conform to FM I-90.
3. Safety barriers shall be erected around chute to dumpster for demolition, and ladder to roof level. A person shall be on the ground to watch at all times when work is in progress

at roof edges above. Warning tape shall be placed at material storage location and roof edges where roofing is in progress.

4. Roofing contractor shall be responsible to meet OSHA and Cal-OSHA requirements for safety of all involved and around buildings. Workers shall be properly restrained from falling when working near building edges.
5. Hazardous materials shall be disposed of according to government regulations. See hazardous materials report.
6. Roofing contractor shall obtain any required permits from the City of Los Angeles as needed.

C. Quality Control

1. National Roofing Consultants (NRC), 118 Lincoln Ave, Pomona CA 91767, Phone (909) 620-0177, will provide periodic quality control inspections.
2. Responsibility for Payment: Owner will provide and make payment to NRC for all daily observation, however, the roofing contractor will be responsible (by whatever arrangements are mutually agreed upon between the roofing contractor and the Airport) for observation costs incurred as the result of unapproved time delays and observation costs incurred when work is not performed as scheduled.
3. At option of and where designated by the NRC representative, 1-1/2" sample welds shall be taken by roofing contractor each morning and afternoon prior to commencing application. Areas from which test cuts have been taken shall be repaired in manner directed by NRC representative and manufacturer representative as part of the work
4. Coordination
    a. a. Job Conference: Prior to commencement of work Owner representative 1 shall arrange a conference to be held at the job site to review specifications and to walk deck. Roofing contractor, manufacturer representative, Owner representative, and NRC representative are to be in attendance.
    b. Notification: The roofing contractor shall give 72 hours prior notice to consulting service before starting application and shall notify the same each time work is to be performed. Lack of notification of work schedule changes shall result in compensation for NRC's lost time and expenses at the contractor's expense.
    c. Final/Punch List
        (1) Consulting service and Owner representative shall be notified upon completion of roof and shall return and do final/punch list.

D. Roofing Contractor’s Qualifications

1. Bidder must include, with bid, a letter from manufacturer stating that bidder is certified to install manufacturer's product.
2. Bidder must include a minimum of three (3) similar projects within the last two (2) years with the names of contacts. Failure to submit list may disqualify bid.
3. Job Experience: The roofing contractor installing the system shall have a minimum of two (2) years of experience successfully applying the same or similar materials. The roofing contractor shall only use skilled workmen who are familiar with the products and application methods.

E. Coordination

1. Contractor is required to attend a pre-construction conference with the Inspector and Owners representative and material manufacturer representative, which will establish start date.

1.5 SUBMITTALS

A. Necessary items pertaining to Section 1.04A4.

B. Necessary items pertaining to Section 1.04E1.

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver all materials in their original containers with seals unbroken and manufacturer label and product identification clearly legible on each package.

B. Storage: Store materials at site on end on pallets and under cover and maintain in dry condition.

1.7 PROJECT CONDITIONS

A. Moisture: Wet materials shall not be applied nor shall roofing application proceed when moisture is on roof or deck.

B. Water tightness: Roofing contractor shall be responsible for maintaining roof in a watertight condition at all times. Interior damage caused by leakage during roof application shall be the responsibility of the roofing contractor.

C. Building Protection

1. Tear-off and debris transit must not disturb operations of the building. Enclosed chutes and other methods shall be used to contain dust and debris.
2. The building exterior must be protected from damage, markings, or spillage by the use of tarpaulins or protective sheeting.
3. The contractor will be responsible for damage to grass, shrubs, trees or 1 grounds including curbs and sidewalks. Protective covers shall be utilized under any equipment that would damage or stain any surface.

D. Clean Up: Premises shall be kept clean **daily** during application and left clean when roof is completed.

1.8 SEQUENCING AND SCHEDULING

A. Time Limitation: Roofing contractor shall complete a minimum of 3,500 sq. ft. per day over continuous working days, weekend days and inclement weather days excepted.

B. Roofing contractor shall inform Owner representative and receive approval for start date, work duration time, material and equipment storage area and vehicle, equipment and pedestrian traffic pattern.

1.9 GUARANTEE

A. Roofing Contractor's Guarantee

1. Roofing contractor shall provide to Los Angeles World Airports a written guarantee against defects of workmanship and to maintain roof in a watertight condition for a period of five (5) years from final acceptance of product by Los Angeles World Airports.

B. Manufacturer’s Warranty

1. Provide manufacturer's 20-year NDL warranty to provide repairs or correction of roof stemming from material defects, contractor workmanship and ordinary wear and tear of elements.
2. Warranty shall not exclude ponding water of any kind.

PART II PRODUCTS

2.1 MATERIALS

A. Membrane

1. The roofing system shall be a fully adhered, reinforced polyvinyl chloride (PVC) membrane. Non-fleece backed for attachment over Dens Deck/insulation. Material components shall all be from one (1) manufacturer, shall have a U/L Class A fire rating, and shall be manufacturer’s current published specification.
2. Color: To be designated

B. Approved Manufacturers and Products

1. Manufacturer shall confirm that the actual (not nominal) polymer thickness of the product supplied for this project is minimum 58 mils (78 for 80 mil) for roofing and 58 mils (78 for 80 mil) for flashing. Polymer thickness variance shall not exceed plus-or-minus three mils (3 thousandths of an inch), with at least 45% of the overall polymer thickness above the reinforcement scrim. Standard ASTM plus-or-minus tolerance for membrane thickness is not acceptable.
2. Manufacturer shall confirm that the actual (not nominal) weight of the membrane to be installed for field and flashing achieves the minimum weight requirement within this specification.

3. Roofing system shall have been manufactured directly by the Manufacturer with the current formulation in use for the past 15 years minimum (pigments may vary).
4. No "Private Label" or third party membrane manufacturers will be approved as alternates or substitutes.
5. Manufacturers
   a. Sika Sarnafil: Contact Paul Phillips 1 (310) 528-3348
   b. Or other approved equal
6. Products
   a. Sika Sarnafil: G410-60
   b. Or other approved equal

C. SUMMARY OF MATERIALS: Materials shall not be less than the following per 100 square feet.

Base Bid:

1. Insulation: Polyisocyanurate (R-30 where required)	086 lbs
2. Fire Retardant Underlayment (1/4")	111.0 lbs
3. Adhesive	011.0 lbs
4. Single Ply Membrane	032.2 lbs
TOTAL APPROXIMATE WEIGHT	240.2 lbs

D. STANDARDS: All materials shall conform to the following

1. PVC Membrane: 60 mils (minimum) tan, heat-welded polyvinyl chloride sheet roofing with polyester reinforced membrane, 80 mil felt-backed where required to adhere to concrete at rotunda dome. ASTM D4434.
2. Paint: Dunn-Edwards Flex Tex W-321 or approved equal; color to match existing.
3. Coping Sealant: One (1) part silicone sealant, Dow 795, or Sika Sikasil WS-295.
4. Membrane Adhesive: Manufacturer's recommended adhesive.
5. Termination Bar: 16-gauge extruded VOC compliant aluminum.
6. Walk Pad: 1/8" thick polyester reinforced PVC protection mat, embossed to increase slip resistance, and tinted green so that it can be differentiated from the membrane.
7. Walk Pad Adhesive: solvent-based elastomeric adhesive.
8. Flashing Membrane: PVC membrane of specified thickness to be used for flashing.
9. Miscellaneous Materials: Materials required or supplied by the manufacturer.
10. Metal Edge: 24-gauge PVC clad aluminum metal edge with 4" flange and face with 1/2" drip edge.
11. Tapered Insulation: Tapered polyisocyanurate, minimum 1/2" per foot or twice the roof slope, whichever is greater.
12. Coping Lap Sealant: Elastomeric silicone, one part; Dow 795 or GE Silpruf SCS 2000 or Sika Sikasil WS-295.
13. Pipe Supports: Cooper B-Line Dura Block rubber supports, Miro Industries pipe supports or Erico-Caddy EZ Series pipe stands.
14. Underlayment Board: 1/4" GP Dens Deck Prime (1/2" on walls) fire retardant gypsum board or manufacturers required fire retardant gypsum board.
15. Penetration Seal: Pre-fabricated polymer curb with self-leveling, pourable sealant. Chem Curb by Chem Link, (800) 826-1681.
16. Insulation and Underlayment Adhesive: Manufacturers recommended two-part low-rise foam adhesive.
17. Roof System Insulation: R-30 polyisocyanurate with fiberglass facers, ASTM C209.

18. Drains: 3" diameter J.R. Smith 1010 or 1020 cast iron body with combination membrane flashing clamp and low silhouette cast iron dome. Include leaders and all associated fittings.
19. Miscellaneous Sheet Metal: 24-gauge Kynar-coated aluminum.

PART III EXECUTION

3.1 PREPARATION OF SURFACES

A. All Sections

1. All roofing materials shall be removed from deck and walls and deck shall be thoroughly cleaned. Drive nails flush. Deck shall be clean, smooth and dry.
2. At rotunda dome, blast or grind surface to remove existing coating.

B. Wet Lightweight Insulating Fill

1. Cut out and discard wet lightweight insulating fill down to the steel substrate.
2. Fill in the entire removal area with manufacturer’s recommended insulation to match the existing fill thickness. Secure insulation using foam adhesive.
3. Install Dens Deck Prime underlayment board per manufacturer’s guidelines.

C. Provide water cutoffs or otherwise complete terminations and base flashings and seals to prevent water from entering completed work at the end of the day or when rain is eminent. Remove and discard temporary seals before beginning work on adjoining roofing.

3.2 UNUSED JACKS, PIPES, PADS, ETC.

A. Remove from roof and level off. Fill large opening flush with deck level. Cover smaller holes with 24-gauge sheet metal, nailed solid. It is the roofing contractor's responsibility to identify all items to be removed before submitting bid.

3.3 EXAMINATION

A. Verify that roof penetrations are in place and secured.

B. Verify that wood blocking, curbs and nailers are securely anchored to the substrate.

C. Verify that substrate is visibly dry and free of moisture.

D. Verify that contaminants that will impair adhesion of roofing components have been removed.

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

3.4 OUTLETS

A. Drains

1. Water test all drains and downspouts before and after application to assure unrestricted flow.
2. PVC membrane shall extend into drain bowl and a minimum of 1" beyond inside rim of bowl.
3. Discard existing plastic drain domes or missing drain domes and replace with new specified cast iron drain domes.
4. Install new drains where specified or replace entire drain when existing drain is damaged or new drain doem and/or clamping ring cannot be obtained.

B. Scuppers

1. Provide new fully soldered clald metal scuppers and seal within the membrane per manufacturer's requirements. Extend scupper a minimum of 1-1/2" beyond face of wall and seal around outside with elastomeric sealant.

3.5 FLASHINGS

A. Pipe or Conduit Penetrations

1. Remove and discard metal flashings and apply aluminum tape around penetrations, if required, or use cone or prefabricated boot. Seal tape with PVC flashing membrane and clamp off top with a hose clamp. Seal the clamp with specified 1 sealant. Include replacement of missing or damaged existing vandal-proof caps in base bid. Roofer shall replace all other broken safety caps damaged as a result of his work, at his own expense.

B. Multiple (nested) Penetrations

1. At Freon lines, 4" conduits or other multiple penetrations, provide Chem Curb penetration seals installed per manufacturers requirements.

3.6 PARAPETS

A. Walls

1. Install wood nailers on top of wall if missing.
2. Install 1/2" Dens Deck or manufacturers felt fabric, fully adhered and sealed on the face of the wall.
3. Install fully adhered membrane on walls extending over the top of the wall to the back side. Secure per manufacturer requirements.

B. Base Flashings

1. Install (adhere) roofing membrane to the base of the wall, and then secure to deck with termination bar. Install flashing on wall to the bottom of the reglet with proper adhesive.

Secure top of flashing with termination bar. Install face-mounted two-piece reglet where none exists and then seal top with specified sealant.

C. Copings

1. Carefully remove metal copings or cap flashings and save for reuse. After application of wall covering, replace metal and/or tiles in a straight, clean, secure and watertight manner. Seal between and laps with elastomeric sealant as stated in these specifications.
2. Seal external coping laps with a 1/8" thick application of sealant straddled across lap, neatly applied and taped to avoid over application.

3.7 EQUIPMENT

A. Air-Conditioners

1. Units on wood sleepers
   a. Discard wood sleepers and build new pads extending 10" above roof membrane. These shall be blocked 2' on center and covered with 3/4" plywood and 26-gauge galvanized sheet metal caps with 2" counter-flashings. Roofing contractor shall be responsible for extension of lines and ducts, and repair to any lines broken during application of the roofing. All electrical and HVAC work shall be completed by qualified personnel possessing appropriate California license.
   b. Add sheet metal extensions to existing counter-flashings where necessary to properly counter-flash the top of the base flashing.

B. B. Exhaust Fans

1. Lift hoods and apply membrane over curb to the back side and secure.
2. After reinstallation, seal hood corners with elastomeric sealant.

C. Curbs

1. Curbs 4" and lower shall be removed and replaced with curbs extending 10" above roof membrane. Roofing contractor shall be responsible for extension of lines and ducts, and repair to any lines broken during application of the roofing. All electrical and HVAC work shall be completed by qualified personnel possessing appropriate California license.

3.8 INSULATION AND COVER BOARD

A. Insulation

1. Over structural concrete, gypsum, or LWIF, insulation will be adhered in foam adhesive approved by manufacturer.
2. Over metal deck first layer of insulation will be mechanically attached using fasteners approved by the manufacturer.
3. Do not install wet, damaged or warped insulation boards.
4. Install boards with staggered joints in one direction.
5. Install boards snug. Gaps between boards shall not exceed 1/4". Fill gaps in excess of

1/4" with foam.

6. Secure tapered insulation with additional specified fasteners per manufacturer requirements.

B. Underlayment Board

1. Install boards over rigid insulation using manufacturers approved foam adhesive.
2. Install boards over tapered insulation crickets using manufacturer's approved foam adhesive.
3. Apply additional fasteners around perimeters and in corners. Also apply additional fasteners at vertical transitions as required by manufacturer.

3.9 ROOFING MEMBRANE

A. The system is to be fully adhered. Secure tapered insulation with additional specified fasteners per manufacturer requirements. Adhere felt-backed membrane directly to concrete at rotunda. Adjacent sheets shall have minimum lap areas of 6" side and 3" end. When machine welding, welds shall be 1-1/2" and 2" when hand welding. Welding equipment shall be provided by or approved by manufacturer. Use half width rolls to conform to manufacturer's requirements around roof perimeters. All completed welded seams shall be checked after cooling using a round screwdriver or other suitable blunt object. Visible evidence that welding is proceeding acceptably is smoke during the welding process, shiny membrane and an uninterrupted flow of black material from the edge of completed joints**.**

3.10 PIPES ON ROOF

A. Replace existing wood sleepers with new specified pipe supports. Leave supports standing freely on roof surface on buffer pads of membrane.

3.11 WALK PADS (where required – see diagram)

A. Install fully adhered/welded PVC walk pads. Pads shall be adhered with adhesive except for 2" around the perimeter, which shall be fully heat welded.

3.12 CLEAN-UP/TOUCH-UP/CLOSE-OUT

A. Paint all new and existing metal (or use Kynar-coated metal), including new counter-flashings with specified coating or paint in a minimum of two (2) coats. Color to be designated.
B. Protect membrane from damage and wear during remainder of roof installation period. When remaining installation will not affect finished sections, inspect membrane for deterioration and damage and correct.
C. Water test all drains in the presence of the NRC representative to assure free flow. Rout drains with restricted flow.
D. Perform Owner representative and manufacturer final inspections.

E. Correct deficiencies or remove membrane that does not comply 1 with manufacturer requirements. Clear membrane of quality control observer's pencil or crayon markings. Membrane shall be free of damage or any condition that may prohibit or delay warranty implementation.
F. After final inspections, Owner representative shall determine an appropriate time for a complete pressure beauty washing of the membrane to locate any potential leaks. Washing shall be completed with the applicator present to repair any identified problems.
G. Clean spillage or traffic marring using cleaning agents and procedures recommended by the manufacturer.

END OF SECTION 07 54 19

28 June 2012 Source: LAX T5 Roof Replacement

SECTION 08 11 13 – HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes hollow metal doors and frames.

> **NOTE:** The integration of the existing LAWA Security System into the new steel door and frame may be required. The Contractor shall be responsible for the total and complete coordination of the security system components of the work.

1.2 SUBMITTALS

A. Product Data: Submit product data for each product indicated. Include material descriptions, core descriptions, label compliance, sound and fire-resistance ratings, and finishes for each type of door and frame specified.

B. Shop Drawings: Submit door and frame schedule using same reference designations indicated on Drawings. Include opening size(s), handing of doors, frame throat dimensions, details of each frame type, elevations of door design types, details of construction, location and installation requirements of door hardware and reinforcements, hardware group numbers, details of joints and connections, fire label requirements including fire rating time duration, maximum temperature rise requirements, and smoke label requirements.

> **NOTE:** On the shop drawings, indicate the routing of electrical conduit with related dimensions and locations of required cutouts in doors and frames that are to accept electric hardware devices.

C. Construction Samples: Submit approximately 18 by 24 inches (450 by 600 mm) construction samples, representing the required construction of doors and frames for Project.

1. Doors: Show vertical-edge, top, and bottom construction; insulation; face stiffeners; and hinge and other applied hardware reinforcement. Include glazing stops if applicable.
2. Welded Frames: Show profile, welded corner joint, welded hinge reinforcement, dust-cover boxes, floor and wall anchors, stops, and silencers. Include glazing stops if applicable.
3. Frames: Show profile, corner joint, welded hinge reinforcement, wall anchors, stops, and silencers.

D. Certificate of Compliance for Fire Rated Doors: Provide copies of Certificate of Compliance for all fire rated door assemblies, all smoke and draft control door assemblies, and all temperature rise rated door assemblies.

E. Oversize Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each door and frame assembly has been constructed to comply with design, materials, and construction equivalent to requirements for labeled construction.

1.3 QUALITY ASSURANCE

A. Hollow Metal Door and Frame Standard: Comply with the applicable provisions and recommendations of the following publications by Hollow Metal Manufacturers Association (HMMA) Div. of National Association of Architectural Metal Manufacturers (NAAMM), unless more stringent requirements are indicated in the Contract Documents:

1. HMMA "Hollow Metal Manual".
2. HMMA 861 "Guide Specifications for Commercial Hollow Metal Doors and Frames".

B. Manufacturer Qualifications: A firm experienced in manufacturing hollow metal doors and frames similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 or UL 10C "Standard for Positive Pressure Fire Tests of Door Assemblies"**.** Fire classification labels at all doors with fire ratings greater than 20 minutes shall indicate the temperature rise developed on the unexposed surface of the door after the first 30 minutes of fire exposure.

1. Provide metal labels permanently fastened on each door which is within the size limitations established by the LADBS.
2. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.
3. Positive Pressure Rated Door Assemblies: Where indicated provide positive pressure rated fire rated door assemblies. Sizes and configurations as shown on the drawings. Installed door assemblies shall be in accordance with door manufacturers certified assemblies.

    a. Test Pressure: Test according to NFPA 252 or UL 10C**.** After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches (1000 mm) or less above the sill**.**
4. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

D. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257 or UL 9.

E. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and Project site storage.

B. Inspect doors and frames, on delivery, for damage. Tool marks, rust, blemishes, and other damage on exposed surfaces will not be acceptable. Remove and replace damaged items as directed by Architect. Store doors and frames at building site in a dry location, off the ground, and in such a manner as to prevent deterioration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Hollow Metal Doors and Frames:

a. Ceco Door Products; an Assa Abloy Group Company.
b. Curries Company; an Assa Abloy Group Company.
c. Steelcraft; an Ingersoll-Rand Company.

2.2 MATERIALS

A. Specified Gage Thickness: All specified gauge thicknesses are Manufacturer's Standard Gauge.

B. Hot-Rolled Steel Sheets: ASTM A 1008/A 1008M, CS (commercial steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Cold-Rolled Steel Sheets: ASTM A 1011/A 1011M, CS (commercial steel), Type B, free from scale, pitting, coil breaks, surface blemishes, buckles, waves, or other defects, exposed (matte) dull finish, suitable for exposed applications.

D. Inserts, Bolts, and Fasteners: Galvanized steel.

1. Expansion Bolts and Shields: FS FF-S-325, Group III, Type 1 or 2.
2. Machine Screws: FS FF-S-92, carbon steel, Type III cross recessed, design I or II recess, style 2C flat head.

E. Filler: Sound deadening and heat retarding mineral fiber insulating material.

2.3 DOORS

A. General: Provide flush-design doors, 1-3/4 inches (44 mm) thick, of seamless hollow construction, unless otherwise indicated. Construct doors with sheets joined at their vertical

edges by continuous welding the full height of the door, with no visible seams on their faces or vertical edges, and all welds ground and finished flush.

1. Visible joints or seams around glazed panel inserts are permitted.
2. For single-acting swing doors, bevel both vertical edges 1/8 inch in 2 inches (3 mm in 50 mm).
3. For double-acting swing doors, round vertical edges with 2-1/8-inch (54-mm) radius.

NOTE: For the doors, make provisions for the installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replace. Provide all cutouts and reinforcements required for these steel doors to accept security system components.

All new restrooms entrances doors shall provide the clearance width necessary to accommodate a 42" wide wheelchair.

B. Interior Door Core Construction: Doors shall be stiffened by continuous vertically formed steel sections which, upon assembly, shall span the full thickness of the interior space between door faces. These stiffeners shall be 0.026-inch (0.6-mm) minimum thickness, spaced so that the vertical interior webs shall be not more than 6 inches (150 mm) apart and spot welded to face sheets a maximum of 5 inches (127 mm) o.c. Place filler between stiffeners for full height of door.

C. Fire Door Cores: A continuous mineral fiberboard core permanently bonded to the inside face of the outer face sheet unless otherwise required to provide fire-protection and temperature-rise ratings indicated.

D. Astragals: As required by NFPA 80 to provide fire ratings indicated.

E. Top and Bottom Channels: Spot weld metal channels, having a thickness of not less than thickness of face sheet, not more than 6 inches (150 mm) o.c. to face sheets.

1. Reinforce tops and bottoms of doors with inverted horizontal channels of same material as face sheet so flanges of channels are even with bottom and top edges of face sheets.

F. Hardware Reinforcement: Fabricate reinforcing from the same material as door to comply with the following. Offset reinforcement so that faces of mortised hardware items are flush with door surfaces.

1. Hinges and Pivots: 7 gauge (0.167 inch) (4.2 mm) thick by 1-1/2 inches (38 mm) wide by 9 inches (229 mm).
2. Lock Front, Strike, and Flushbolt Reinforcements: 12 gauge (0.093 inch) (2.3 mm) thick by size as required by hardware manufacturer.
3. Lock Reinforcement Units: 14 gauge (0.067 inch) (1.7 mm) thick by size as required by hardware manufacturer.
4. Closer Reinforcements: 12 gauge (0.093 inch) (2.3 mm) thick one piece channel by size as required by hardware manufacturer.
5. Other Hardware Reinforcements: As required for adequate strength and anchorage.

6. In lieu of reinforcement specified, hardware manufacturers recommended reinforcing units may be used.
7. Exit Device Reinforcements: 0.250 inch (6.35 mm) thick by 10 inches (245 mm) high by 4 inches (101 mm) wide centered on exit device case body, unless otherwise recommended by exit device manufacturer.

G. Electrical Requirements: Make provisions for installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replaced.

1. Provide all cutouts and reinforcements required for hollow metal doors to accept security system components.
2. Doors with Electric Hinges and Pivots: Provide with metal conduit or raceway to permit wiring from electric hinge or pivot to other electric door hardware.

    a. Hinge Location: Center for doors less than 90 inches (2286 mm) tall or second hinge from door bottom for doors greater than 90 inches (2286 mm); top or bottom electric hinge locations shall not be permitted.

H. Interior Hollow Metal Doors:

1. Typical Interior Doors: Flush design with 18 gauge (0.042-inch-) (1.06-mm-) thick cold-rolled stretcher-leveled steel face sheets and other metal components from hot- or cold-rolled steel sheets.
2. Extra Heavy Use Doors: Flush design with 14 gauge (0.067-inch-) (1.7-mm-) thick cold-rolled, stretcher-leveled steel face sheets and other metal components from hot- or cold-rolled steel sheets. Provide only where indicated.

2.4 FRAMES

A. Fabricate hollow metal frames, formed to profiles indicated, with full 5/8 inch (16 mm) stops, and of the following minimum thicknesses.

1. For interior use, form frames from cold- rolled steel sheet of the following thicknesses:

    a. Openings up to and Including 48 Inches (1200 mm) Wide: **16 gauge** (0.053 inch) (1.3 mm).
    b. Openings More Than 48 Inches (1200 mm) Wide: **14 gauge** (0.067 inch) (1.7 mm).

NOTE: For the frames, make provisions for installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replace. Provide all cutouts and reinforcements required for steel frames to accept security system components. Provide welded sheet metal boxes with metal conduit or raceway to permit wiring from electric hinge to other electric door hardware.

B. Provide frames either saw mitered and full (continuously) profile welded, or machine mitered and full (continuously) profile welded, on back side at frame corners and stops with edges straight and true. Grind welds smooth and flush on exposed surfaces.

C. Hardware Reinforcement: Fabricate reinforcements from same material as frame to comply with the following. Offset reinforcement so that faces of mortised hardware items are flush with surface of the frame.

1. Hinges and Pivots: 7 gauge (0.167 inch) (4.2 mm) thick by 1-1/4 inches (32 mm) wide by 10 inches (254 mm).
2. Strike, Surface Mounted Hold Open Arms, and Flushbolt Reinforcements: 12 gauge (0.093 inch) (2.3 mm) thick by size as required by hardware manufacturer.
3. Closer Reinforcements: 12 gauge (0.093 inch) (2.3 mm) thick one piece channel by size as required by hardware manufacturer.
4. Other Hardware Reinforcements: As required for adequate strength and anchorage.

D. Electrical Requirements: Make provisions for installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replaced.

1. Provide all cutouts and reinforcements required for hollow metal frames to accept security system components.
2. Frames with Electric Hinges and Pivots: Provide welded on UL listed back boxes with metal conduit or raceway to permit wiring from electric hinge or pivot to other electric door hardware.

a. Hinge Location: Center for doors less than 90 inches (2286 mm) tall or second hinge from door bottom for doors greater than 90 inches (2286 mm); top or bottom electric hinge locations shall not be permitted.

E. Mullions and Transom Bars for Sidelights, Transoms, and Borrowed Light Frames: Provide closed or tubular mullions and transom bars where indicated. Fasten mullions and transom bars at crossings and to jambs by butt welding. Reinforce joints between frame members with concealed clip angles or sleeves of same metal and thickness as frame.

F. Jamb Anchors: Locate jamb anchors above hinges and directly opposite on strike jamb as required to secure frames to adjacent construction. At metal stud partitions locate the additional jamb anchor below the top hinge.

1. Masonry Construction: Adjustable, corrugated or perforated, anchors to suit frame size; formed of same material and gauge thickness as frame; at non-rated frames use friction fit T-shaped anchors, at rated frames use anchors consisting of spot welded strap and adjustable anchor; with leg not less than 2 inches (50 mm) wide by 10 inches (250 mm) long. Furnish at least the number of anchors per jamb according to the following frame heights:

a. Two anchors per jamb up to 60 inches (1500 mm) in height.
b. Three anchors per jamb from 60 to 90 inches (1500 to 2250 mm) in height.
c. Four anchors per jamb from 90 to 96 inches (2250 to 2400 mm) in height.
d. One additional anchor per jamb for each 24 inches (600 mm) or fraction thereof more than 96 inches (2400 mm) in height.

2. Metal-Stud Partitions: Metal channel stud zee anchor sized to match stud width, welded to back of frames, formed of same material and gauge thickness as frame. Provide at least the number of anchors for each jamb according to the following heights:

a. Three anchors per jamb up to 60 inches (1500 mm) in height.
b. Four anchors per jamb from 60 to 90 inches (1500 to 2250 mm) in height.
c. Five anchors per jamb from 90 to 96 inches (2250 to 2400 mm) in height.
d. One additional anchor per jamb for each 24 inches (600 mm) or fraction thereof more than 96 inches (2400 mm) in height.

3. In-Place Concrete or Masonry: Anchor frame jambs with minimum 3/8-inch- (9-mm-) diameter countersunk flat head bolts into expansion shields or inserts 6 inches (150 mm) from top and bottom of each jamb with intermediate anchors spaced a maximum of 26 inches (650 mm) o.c. Soffit face of frame shall be punched and dimpled to accept countersunk bolt head. Reinforce frame with spacer to prevent bowing. Bolt head shall be set slightly below soffit face, filled and ground smooth at time of installation.

G. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, formed of same material as frame, 12 gauge (0.093 inch) (2.3 mm) thick, and punched with two holes to receive two (2) 0.375 inch (9.5 mm) fasteners. Where floor fill or setting beds occur support frame by adjustable floor anchors bolted to the structural substrate. Terminate bottom of frames at finish floor surface. Weld floor anchors to frames with at least 4 spot welds per anchor.

H. Head Strut Supports: Provide 3/8-by-2-inch (9-by-50-mm) vertical steel struts extending from top of frame at each jamb to supporting construction above. Bend top of struts to provide flush contact for securing to supporting construction above by bolting, welding, or other suitable anchorage. Provide adjustable wedged or bolted anchorage to frame jamb members to permit height adjustment during installation. Adapt jamb anchors at struts to permit adjustment.

I. Head Reinforcement: For frames more than 48 inches (1200 mm) wide in masonry wall openings, provide continuous steel channel or angle stiffener, 12 gauge (0.093 inch) (2.3 mm) thick for full width of opening, welded to back of frame at head. Head reinforcements shall not be used as a lintel or load bearing member for masonry.

J. Spreader Bars: Provide removable spreader bar across bottom of frames, tack welded to jambs and mullions to serve as bracing during shipment and handling and to hold frames in proper position until anchorage and adjacent construction have been completed.

K. Door Silencer Holes: Drill strike jamb stop to receive three silencers on single door frames and for two silencers on double door frames. Insert plastic plugs in holes to keep holes clear during installation.

L. Plaster Guards and Removable Access Plates: Provide 26 gauge (0.016-inch-) (0.4-mm-) thick plaster guards or dust-cover boxes of same material as frame, welded to frame at back of hardware cutouts to close off interior of openings and prevent mortar or other materials from obstructing hardware operation. Provide removable access plates in the heads of frames to receive overhead concealed door closers.

2.5 STOPS AND MOLDINGS

A. Provide continuous stops and moldings around glazed panels where indicated.

B. Form fixed stops and moldings integral with frame, on the exterior (non-secured) side of the frame.

C. Provide removable stops and moldings formed of 20 gauge (0.032-inch-) (0.8-mm-) thick steel sheets matching hollow metal frames. Secure with countersunk oval head machine screws spaced uniformly not more than 12 inches (300 mm) o.c. Form corners with butted or mitered hairline joints.

D. Coordinate rabbet width between fixed and removable stops with type of glass or panel and type of installation indicated.

2.6 HOLLOW METAL FRAMES

A. Provide hollow metal door frames to be used as both door buck and trim, formed to profiles shown, of minimum **16 gauge** (0.053 inch) (1.3 mm) thick cold rolled steel.

1. Frames shall be splined, tabbed, and miter fit, knockdown type compatible with adjacent construction conditions.
2. Accurately machine, file, and fit exposed connections with hairline joints.
3. Typical Anchorage: Frames shall be provided with concealed mechanical compression anchors at top of each jamb and each jamb shall be prepared and provided with provision for anchorage at floor line of jamb return face.
4. Miter and anchorage type subject to acceptance of Architect.

B. Mortise, reinforce, drill and tap frames for mortise type hardware. Provide internal reinforcement for surface type hardware which is to be field drilled and tapped per requirements hereinbefore specified for welded frames and including silencers. Locate hardware in frames to match location specified and in accordance with the hardware schedule and templates.

2.7 FABRICATION

A. Fabricate doors and frames rigid, neat in appearance, and free of defects, warp, wave, and buckle. Accurately form metal to sizes and profiles indicated. Accurately machine, file, and fit exposed connections with hairline joints. Weld exposed joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

B. Exposed Fasteners: Provide countersunk flat heads for exposed screws and bolts, unless otherwise indicated.

C. Hardware Preparation: Prepare doors and frames to receive hardware, including cutouts, reinforcement, mortising, drilling, and tapping, according to final hardware schedule and templates provided by hardware supplier. Secure reinforcement by spot welding. Comply with applicable requirements of ANSI/BHMA A156.115 and A156.115W specifications for door and frame preparation for hardware. Factory reinforce doors and frames to receive surface-applied

hardware. Factory drill and tap for surface-applied hardware, except at pushplates and kickplates provide reinforcing only.

1. Locate hardware according to HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames" or otherwise directed by LAWA.

2.8 STEEL SHEET FINISHES

A. General: Clean, treat and prime surfaces of fabricated hollow metal door and frame work, inside and out, whether exposed or concealed in the construction.

B. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale, shavings, filings, and rust, if present, complying with SSPC-SP 3, "Power Tool Cleaning,"

C. Factory Priming for Field-Painted Finish: Apply shop primer immediately after surface preparation and pretreatment. Apply a sufficient number of coats, baked on, to obtain uniformly smooth exposed surfaces. Touch up surfaces having runs, smears, or bare spots.

1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, corrosion-inhibiting, lead- and chromate-free, universal primer complying with ANSI A250.10 acceptance criteria; compatible with substrate and field-applied finish paint system indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install doors and frames according to the referenced standards, the Architect reviewed shop drawings, and manufacturer's written recommendations and installation instructions.

B. Frames: Install frames where indicated. Extend frame anchorages below fills and finishes. Coordinate the installation of built-in anchors for wall and partition construction as required with other work.

1. Frames: Install frames in locations shown, in perfect alignment and elevation, plumb, level, straight and true, and free from rack.
2. Welded Frames:

a. Set masonry anchorage devices where required for securing frames to in-place concrete or masonry construction.

1) Set anchorage devices opposite each anchor location as specified and anchorage device manufacturer's written instructions. Leave drilled holes rough, not reamed, and free of dust and debris.

b. Placing Frames: Set frames accurately in position; plumb; align, and brace securely until permanent anchors are set.

1) At concrete or masonry construction, set frames and secure in place with machine screws and masonry anchorage devices. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
2) Anchor bottom of frames to floors through floor anchors with threaded fasteners.
3) Field splice only at approved locations indicated on the shop drawings. Weld, grind, and finish as required to conceal evidence of splicing on exposed faces.
4) Remove spreader bars only after frames are properly set and secured. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

3. At fire-rated openings, install frames according to NFPA 80.
4. Existing Frames (Salvaged from Alteration Work): Install salvaged existing frames in locations indicated.

C. Doors:

1. Non-Fire Rated Doors: Fit non-fire-rated doors accurately in their respective frames, with the following clearances:

   a. Jambs and Head: 3/32 inch (2 mm).
   b. Meeting Edges, Pairs of Doors: 1/8 inch (3 mm).
   c. Bottom: 3/8 inch (9 mm), if no threshold or carpet.
   d. Bottom: 1/8 inch (3 mm), at threshold or carpet.

2. Fire-Rated Doors: Install with clearances as specified in NFPA 80.
3. Smoke Control Doors: Install according to NFPA 105.
4. Existing Doors (Salvaged from Alteration Work): Install salvaged existing doors in locations indicated.

D. Glazing: Comply with installation requirements in Division 08 Section “Glazing” and with hollow metal manufacturers written instructions.

1. Secure stops with countersunk flat or oval head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) o.c. from each corner.

E. Apply hardware in accordance with hardware manufacturer’s instructions. Drill and tap for machine screws as required. Do not use self tapping sheet metal screws. Adjust door installation to provide uniform clearance at head and jambs, and to contact stops uniformly. Adjust hardware items just prior to final inspection. Leave work in complete and proper operating condition.

1. Field cut existing hollow metal doors and frames indicated to receive new hardware. Field cutting shall be executed in a workmanlike manner and shall not void the existing door and frame labeling.

3.2 ADJUSTING AND CLEANING

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

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

C. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise defective.

D. Institute protective measures required throughout the remainder of the construction period to ensure that hollow metal doors and frames will be without damage or deterioration, at time of substantial completion.

END OF SECTION 08 11 13

SECTION 08 11 19 - STAINLESS-STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stainless-steel, hollow-metal doors.
2. Stainless-steel, hollow-metal frames.

NOTE: The integration of the existing LAWA Security System into the steel door and frame work may be required. The Contractor shall be responsible for the total and complete coordination of the security system components of the work.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Verification:

1. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches (75 by 125 mm).
2. Doors: Include section of vertical-edge, top, and bottom construction; core construction; glazing; and hinge and other applied hardware reinforcement.
3. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

D. Schedule: Provide a schedule of stainless-steel, hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with a door hardware schedule.

1.3 INFORMATIONAL SUBMITTALS

A. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of stainless-steel, hollow-metal door and frame assembly.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain stainless-steel, hollow-metal work from single source from single manufacturer.

B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

C. Smoke- and Draft-Control Door Assemblies: At corridors, smoke barriers, and smoke partitions, provide assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies that are listed and labeled, by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite. Install in compliance with NFPA 80.

E. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

B. Shipping Spreaders: Deliver welded frames with two removable spreader bars across bottom of frames, tack welded or mechanically attached to jambs and mullions.

C. Store doors and frames under cover at Project site. Place units in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (100-mm-) high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber.

1. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for stainless-steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 STAINLESS-STEEL DOORS AND FRAMES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Ambico Limited.
2. Ceco Door Products; an ASSA ABLOY Group company.
3. CURRIES Company; an ASSA ABLOY Group company.
4. Steelcraft; an Ingersoll-Rand company.

NOTE: Make provisions for installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replace. Provide all cutouts and reinforcements required for steel doors to accept security system components.

2.2 STAINLESS-STEEL DOORS

A. Description: Stainless-steel doors, not less than 1-3/4 inches (44 mm) thick, of seamless, hollow-metal construction. Construct doors with smooth, flush surfaces without visible joints or seams on faces.

1. Face Sheets: Fabricate from 0.078-inch- (1.98-mm-) thick, stainless-steel sheet.
2. Core Construction: Fabricate doors with core indicated.

a. Welded Steel-Stiffened Core: vertical stiffeners extending full-door height, spaced not more than 6 inches (152 mm) apart, spot welded to face sheets a maximum of 5 inches (127 mm) o.c. Fill spaces between stiffeners with mineral-fiber insulation.
b. Laminated Core: foam-plastic insulation fastened to face sheets with waterproof adhesive.
c. Fire-Rated Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

3. Vertical Edges for Single-Acting Doors: Beveled 1/8 inch in 2 inches (3 mm in 50 mm).
4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch (54-mm) radius.
5. Moldings for Glazed Lites in Doors: 0.038-inch- (0.95-mm-) thick stainless steel.
6. Loose Stops for Glazed Lites in Doors: 0.038-inch- (0.95-mm-) thick stainless steel.
7. Top and Bottom Channels: Closed with continuous channels, 0.062-inch- (1.59-mm-) thick stainless steel.
   a. Securely fastened using adhesive.
8. Hardware Reinforcement: Fabricate according to ANSI/NAAMM-HMMA 866 with reinforcing plates from stainless steel.
9. Electrical Hardware Enclosures: Provide enclosures and junction boxes within doors for electrically operated door hardware, interconnected with UL-approved, 1/2-inch- (12.7-mm-) diameter conduit and connectors.
   a. Where indicated for installation of wiring, provide access plates to junction boxes, fabricate from same material and thickness as face sheet and fasten with at least four security fasteners spaced not more than 6 inches (152 mm) o.c.

B. Performance: Level A, ANSI A250.4.

C. Materials:

1. Stainless-Steel Sheet: ASTM A 240/A 240M, austenitic stainless steel, Type 304 or 316 as indicated.
2. Steel Sheet: ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, Commercial Steel (CS), Type B.
3. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
4. Foam-Plastic Insulation: Manufacturer's standard polystyrene board insulation with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within door.
5. Mineral-Fiber Insulation: Insulation composed of rock-wool fibers, slag-wool fibers, or glass fibers.

D. Stainless-Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
   a. Run grain of directional finishes with long dimension of each piece.

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

c. Directional Satin Finish: No. 4.

2.3 STAINLESS-STEEL PANELS

A. Provide stainless-steel panels of same construction, materials, and finish as specified for adjoining stainless-steel doors.

NOTE: Make provisions for installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replace. Provide all cutouts and reinforcements required for steel doors to accept security system components. Provide welded on sheet metal boxes with metal conduit or raceway to permit wiring from electric hinge to other electric door hardware.

2.4 STAINLESS-STEEL FRAMES

A. Description: Fabricate stainless-steel frames of construction indicated, with faces of corners mitered and contact edges closed tight.

1. Door Frames: Saw mitered and full (continuously) welded.

   a. Weld frames according to HMMA 820.

2. Sidelight Transom and Borrowed-Light Frames: Saw mitered and full (continuously) welded.
3. Door Frames for Openings 48 Inches (1219 mm) Wide or Less: Fabricate from 0.078-inch- (1.98-mm-) 0.109-inch- (2.78-mm-) thick, stainless-steel sheet.
4. Door Frames for Openings More Than 48 Inches (1219 mm) Wide: Fabricate from 0.109-inch- (2.78-mm-) thick, stainless-steel sheet.
5. Borrowed-Light Frames: Fabricate from 0.078-inch- (1.98-mm-) thick, stainless-steel sheet.
6. Sidelight and Transom Frames: Fabricate from stainless-steel sheet of same thickness as adjacent door frame.
7. Glazing and Panel Stops: Formed integral with stainless-steel frames, minimum 5/8 inch (16 mm) high, unless otherwise indicated.
8. Loose Stops for Glazed Lites and Panels: 0.038-inch- (0.95-mm-) thick stainless steel.
9. Hardware Reinforcement: Fabricate according to ANSI/NAAMM-HMMA 866 with reinforcing plates from stainless steel.
10. Head Reinforcement: 0.109-inch- (2.78-mm-) thick, stainless-steel channel or angle stiffener for openings widths more than 48 inches (1219 mm).
11. Jamb Anchors:

    a. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.062-inch- (1.59-mm-) thick stainless steel with corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.156 inch (4.0 mm) thick.

b. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.050-inch- (1.27-mm-) thick stainless steel.
c. Compression Type for Slip-on Frames: Fabricate adjustable compression anchors from stainless steel.
d. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter, stainless-steel bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

12. Floor Anchors: Not less than 0.078-inch- (1.98-mm-) thick stainless steel, and as follows:

    a. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
    b. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (50-mm) height adjustment. Terminate bottom of frames at finish floor surface.

13. Ceiling Struts: Minimum 3/8-inch-thick by 2-inch- (9.5-mm-thick by 50-mm-) wide from stainless steel.
14. Plaster Guards: Not less than 0.019-inch- (0.48-mm-) thick stainless steel.

B. Performance: Level A, ANSI A250.4.

C. Materials:

1. Stainless-Steel Sheet: ASTM A 240/A 240M, austenitic stainless steel, Type 304 or 316 as indicated.
2. Steel Sheet: ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, Commercial Steel (CS), Type B.
3. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
4. Frame Anchors: Stainless-steel sheet. Same type as door face.
5. Frame Anchors: Steel sheet, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
6. Inserts, Bolts, and Anchor Fasteners: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Alloy Group 1 or 4) for bolts and nuts.
7. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

D. Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

    a. Run grain of directional finishes with long dimension of each piece.
    b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
    c. Directional Satin Finish: No. 4.

2.5 ACCESSORIES

A. Glazing: Comply with requirements in Section 088000 "Glazing."

B. Grout: Comply with ASTM C 476, with a slump of not more than 4 inches (102 mm) as measured according to ASTM C 143/C 143M.

C. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

D. Mineral Fiber Insulation: Insulation composed of rock-wool fibers, slag-wool fibers, or glass fibers.

2.6 FABRICATION

A. Stainless-Steel Door Fabrication: Stainless-steel doors to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal.

1. Seamed Edge Construction: Both vertical door edges joined by visible, continuous interlocking seam (lock seam) full height of door.
2. Seamed Edge Construction: Both vertical door edges joined by visible seam that is projection, spot, or tack welded on inside edges of door at minimum 6 inches (152 mm) o.c.
3. Seamless Edge Construction: Door face sheets joined at vertical edges by continuous weld extending full height of door; with edges ground and polished, providing smooth, flush surfaces with no visible seams.
4. Exterior Doors: Close top edges flush and seal joints against water penetration. Provide weep-hole openings in bottom of exterior doors to permit moisture to escape.
5. Stops and Moldings: Factory cut openings in doors. Provide stops and moldings around glazed lites. Form corners of stops and moldings with butted or mitered hairline joints.

    a. Glazed Lites: Provide fixed stops and moldings welded on secure side of door.
    b. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

6. Hardware Preparation: Factory prepare stainless-steel doors to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in Section 087100 "Door Hardware."

    a. Reinforce doors to receive nontemplated mortised and surface-mounted door hardware.

7. Locate hardware as indicated, or if not indicated, according to HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames."
8. Tolerances: Fabricate doors to tolerances indicated in ANSI/NAAMM-HMMA 866.

B. Stainless-Steel Frame Fabrication: Fabricate stainless-steel frames to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

1. Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated from same thickness metal as frames.
2. Mullions Rails and Transom Bars: Provide closed tubular members with no visible face seams or joints. Fasten members at crossings and to jambs by butt welding according to joint designs in HMMA 820.

    a. Provide false head member to receive lower ceiling where frames extend to finish ceilings of different heights.

3. Provide countersunk, flat-, or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
5. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:

        1) Two anchors per jamb up to 60 inches (1524 mm) in height.
        2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) in height.
        3) Four anchors per jamb from 90 to 96 inches (2286 to 2438 mm) in height.
        4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof more than 96 inches (2438 mm) in height.

    b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:

        1) Three anchors per jamb up to 60 inches (1524 mm) in height.
        2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) in height.
        3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) in height.
        4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof more than 96 inches (2438 mm) in height.
        5) Two anchors per head for frames more than 42 inches (1066 mm) wide and mounted in metal-stud partitions.

    c. Compression Type: Not less than two anchors in each jamb.

d. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.

6. Head Reinforcement: For frames more than 48 inches (1219 mm) wide, provide continuous head reinforcement for full width of opening, welded to back of frame at head.
7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction.

   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

8. Stops and Moldings: Provide stops and moldings around glazed lites and solid panels where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

   a. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of door or frame.
   b. Multiple Glazed Lites: Provide fixed and removable stops and moldings such that each lite is capable of being removed independently.
   c. Coordinate rabbet width between fixed and removable stops with type of glazing or panel and type of installation indicated.

9. Hardware Preparation: Factory prepare stainless-steel frames to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in Section 087100 "Door Hardware."

   a. Reinforce frames to receive nontemplated mortised and surface-mounted door hardware.
   b. Locate hardware as indicated, or if not indicated, according to HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames."

10. Plaster Guards: Weld guards to frame at back of hardware mortises and mounting holes in frames to be grouted.
11. Tolerances: Fabricate frames to tolerances indicated in ANSI/NAAMM-HMMA 866.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stainless-steel doors and frames.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations of stainless-steel, door-frame connections before frame installation.

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

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation and with installation spreaders in place, adjust and securely brace stainless-steel door frames for squareness, alignment, twist, and plumb to the following tolerances:

1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive nontemplated mortised and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install stainless-steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with ANSI/NAAMM-HMMA 866 and manufacturer's written instructions.

B. Stainless-Steel Frames: Install stainless-steel frames of size and profile indicated.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

    a. At fire-protection-rated openings, install frames according to NFPA 80.
    b. Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install frames with removable glazing stops located on secure side of opening.
    d. Install door silencers in frames before grouting.
    e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    f. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

g. Apply corrosion-resistant coating to backs of grout-filled frames.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with postinstalled expansion anchors.

   a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors, if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
4. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
5. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
6. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.
7. Grouted Frames: Solidly fill space between frames and substrate with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
8. Installation Tolerances: Adjust stainless-steel frames for squareness, alignment, twist, and plumb to the following tolerances:

   a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Stainless-Steel Doors: Fit non-fire-rated doors accurately in frames with the following clearances:

1. Non-Fire-Rated Doors:

   a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
   b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
   c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
   d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors according to NFPA 105.

D. Glazing: Install glazing in sidelights, transoms, and borrowed lights to comply with installation requirements in Section 088000 "Glazing."

1. Secure stops with countersunk, flat-, or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c., and not more than 2 inches (50 mm) o.c. from each corner.

3.4 ADJUSTING AND CLEANING

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

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

C. Stainless-Steel Touchup: Immediately after erection, smooth any abraded areas of stainless steel and polish to match undamaged finish.

END OF SECTION 08 11 19

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes door hardware.

NOTE: All door hardware for public rest rooms shall be stainless steel.

1.2 SUBMITTALS

A. Product Data: Submit product data including installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples: Submit samples of exposed door hardware for each type indicated below, in specified finish. Tag with full description for coordination with the Door Hardware Schedule.

1. Door Hardware: As follows:

   a. Locks and latches.
   b. Operating trim.

2. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.

C. Door Hardware Schedule: Submit door hardware schedule prepared by or under the supervision of door hardware supplier. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware. The Architect's review of schedule shall neither be construed as a complete check nor shall it relieve the Contractor of responsibility for errors, deviations, or omissions from the specified requirements to provide complete door hardware for the project.

1. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.

2. Content: Include the following information:

   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.

f. Mounting locations for door hardware. Supply templates to door and frame manufacturer(s) to enable proper and accurate sizing and locations of cutouts for hardware. Detail conditions requiring custom extended lip strikes, or other special or custom conditions.
g. Door and frame sizes and materials.
h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.

D. Keying Schedule: Submit keying schedule prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

E. Warranties: Submit special warranties specified in this Section.

F. Fire-Rated Door Assembly Testing: Submit a written record of each fire door assembly to LAWA and to the LADBS for future building inspections.

NOTE: Perform a field survey of each opening prior to submitting shop drawings. Verify the appropriateness of the assigned hardware group for the designated opening.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Supplier Qualifications: Door hardware supplier, who has completed a minimum of three (3) projects over the last 5 years which were similar in material, design and extent to that indicated for the project and which have resulted in construction with a record of successful in service performance, and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedules.

C. Source Limitations: Obtain each type of door hardware from a single manufacturer, unless otherwise indicated.

D. Regulatory Requirements: Comply with the following:

1. Provide hardware items complying with the applicable provisions for accessibility and usability by the disabled and handicapped in compliance with Americans with

Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG),".
2. NFPA 101: Comply with applicable provisions for means of egress doors.
3. Electrified Door Hardware: Listed and classified by Underwriter's Laboratories, Inc. or by a testing agency acceptable to authorities having jurisdiction, as suitable for the purpose indicated.
4. LADBS requirements.

E. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by Underwriter's Laboratories, Inc. for fire ratings indicated, based on testing according to NFPA 252. Provide only door hardware items that are identical to items tested by UL for the types and sizes of doors required. In case of conflict between type of hardware specified and type required for accessibility or fire protection, furnish type required by NFPA and UL. Doors indicated in fire rated partitions and walls shall be positive latching and self-closing, with smoke gaskets where required by applicable codes.

1. Wherever exit device hardware is required on doors, comply with UL 305. Furnish hardware to door manufacturer for installation at factory. Provide supplementary label, "Fire Exit Hardware", on each exit device to certify that panic hardware has been panic load tested with door.

F. Keying Conference: Conduct conference at Project site to comply with LAWA requirements. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
1. The degree of security required,
2. Preliminary key system schematic diagram.
3. LAWA Requirements for key control system.
4. Address for delivery of keys to LAWA.

G. Pre-Installation Conference: Conduct conference at Project site to comply with LAWA keying and security requirements. Review methods and procedures related to electrified door hardware including, but not limited to, the following:

1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
2. Review sequence of operation for each type of electrified door hardware.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review required testing, inspecting, and certifying procedures.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

1.5 COORDINATION

A. Templates: Furnish templates and door hardware schedules, coordinated for the application of door hardware items with door and frame details, to door opening fabricators and trades performing door opening work to permit the preparation of doors and frames to receive the specified door hardware. Where the door hardware item scheduled is not adaptable to the finished size of door opening members requiring door hardware, submit an item having a similar operation and quality to the Architect for review. Each door hardware item shall be fabricated to templates.

NOTE: Coordinate the layout and installation of electrified door hardware with connections to power supplies, fire alarms systems and detection devices, access control system, security system and the building control system.

B. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.6 WARRANTY

A. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:

1. Faulty operation of door hardware.
2. Deterioration of metals, metal finishes, and other materials beyond normal use.

B. Warranty Period for Electromagnetic Locks: Five years from date of Substantial Completion.

C. Warranty Period for Manual Closers: Ten years from date of Substantial Completion.

D. Warranty Period for Concealed Floor Closers: Five years from date of Substantial Completion.

E. Warranty Period for Exit Devices: Five years from date of Substantial Completion.

F. Warranty Period for Other Hardware: Two years from date of Substantial Completion.

G. Warranty for Mortised Mechanical Lock and Latchsets: Ten years from date of Substantial Completion.

H. Warranty for Heavy Duty Cylindrical Mechanical Lock and Latchsets: Seven years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in this Section, door hardware sets are keyed to each scheduled door in the door and frame schedule, and the Door Hardware Schedule.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturer's products.
2. The hardware supplier shall review each hardware set and compare it with the door types, details, and sizes as shown and verify each hardware item for function, hand, backset, and method of fastening through shop drawing submittals.

ITEM	MANUFACTURER	ACCEPTABLE SUB
Hinges and Electric Hinges	(STN) Stanley	Hager, Zero, Select
Key System	(SCH) Schlage	Owner's Standard
Locks	(SCH) Schlage	Owner's Standard
Exit Devices	(VON) Von Duprin	Owner's Standard
Flush Bolts/Dust Proof Strike	(IVE) Ives	
Coordinator	(IVE) Ives	
Closers	(LCN) LCN	Owner's Standard
Push & Pull Plates	(IVE) Ives	Rockwood, Trimco
Kickplates/Moplates	(IVE) Ives	Rockwood, Trimco
Magnetic Catches	(ROC) Rockwood	
Magnetic Holder	(RIX) Rixson	Or Equal
Stops & Holders	(IVE) Ives	Rockwood, Trimco
Power Supply	(VON) Von Duprin	
Power Transfer	(VON) Von Duprin	
Thresholds	(PEM) Pemko	Zero, NGP,
Astragals/Seals/ Bottoms	(PEM) Pemko	Zero, NGP
Silencers	(IVE) Ives	
Decals	(VON) Von Duprin	
Door Contacts	(GES) General Electric Security	Flair
Electric Strike	(FAS) Folger Adam Security	Von Duprin
Cyberlock Cylinder	(VID) Videx Key System	
Bottom Rail Lock	(ARC) Adams Rite	
Floor Stop & Miscellaneous	(TRM) Trimco	Rockwood

2.2 HINGING METHODS

A. Conventional Hinges: **High strength stainless steel** pins with concealed bearings.

2.3 LOCKS AND LATCHES

A. Mortise Lock and Latch Sets: Heavy duty, commercial, mortise bodies complying with BHMA A156.13 Series 1000, Grade 1, with throughbolted lever trim. Furnish mortise type, field reversible without disassembly, field multifunctional without opening lock cases, lock and latch sets with 1 or 2 piece anti-friction deadlocking stainless steel latchbolts having a minimum 3/4 inch (19 mm) throw, 2-3/4 inches (70 mm) backset, and UL listed for 3 hour doors. All lock and latch sets, to be furnished complete with heavy 0.109 inch (2.77 mm) (12 gage) wrought steel zinc dichromate or chrome plated case, trim, adjustable beveled square cornered armored fronts, cold forged steel or stainless steel hubs, and 6 pin cylinders. Conceal fastenings, washers and bushings. Provide wrought, or black plastic, box strikes for each lock and latch set. Provide brass, bronze or stainless steel strikes with curved lips of sufficient length to protect frames. Provide solid forged or cast levers with wrought roses. Where electro-mechanical locksets are scheduled provide transformers properly sized for conversion of power supply to the power characteristics of the electromechanical locksets. Where electro-mechanical locksets are scheduled provide request to exit (REX) monitoring feature.

1. *Chassis: cold-rolled steel, handing field-changeable without disassembly.*
2. *Latchbolts: 3/4 inch throw stainless steel anti-friction type.*
3. *Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable. Provide security design independent breakaway spindles. Breakage of outside lever shall not allow access to inside lever's hubworks to gain wrongful entry.*
4. *Thumbturns: accessible design not requiring pinching or twisting motions to operate.*
5. *Deadbolts: stainless steel 1-inch throw.*
6. *Electric operation: Manufacturer-installed continuous duty solenoid.*
7. *Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.*
8. *Scheduled Lock Series and Design: Schlage L series, 03A design.*
9. *Certifications:*
   a) *ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.*
   b) *ANSI/ASTM F476-84 Grade 31 UL Listed.*

2.4 EXIT DEVICES

A. Exit Devices: Exit devices and exit device accessories shall conform to BHMA A156.3, Grade 1. Trim shall be wrought construction and commercial plain design with straight, beveled or

smoothly rounded sides, corners and edges. Keyed devices shall be furnished less cylinders. Cylinders shall be as herein specified keyed to building system.

B. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to the LADBS, for panic protection, based on testing according to UL 305.

1. *Independent lab-tested 1,000,000 cycles.*
2. *Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.*
3. *0.75-inch throw deadlocking latchbolts.*
4. *End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.*
5. *No exposed screws to show through glass doors.*
6. *Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.*
7. *Releasable in normal operation with 15-lb. maximum operating force per UBC Standard 10-4, and with 32 lb. maximum pressure under 250-lb. load to the door.*
8. *Flush end cap design as opposed to typical "bottle-cap" design end cap.*
9. *Comply with CBC Section 1003.3.1.9.*

C. Specific features:

1. *Non-Fire Rated Devices: cylinder dogging.*
2. *Lever Trim: Breakaway type, forged brass or bronze escutcheon min .130" thickness, compression spring drive, match lockset lever design.*
3. *Rod and latch guards with sloped full-width kickplates for doors fitted with surface vertical rod devices with bottom latches.*
4. *Fire-Labeled Devices: UL label indicating "Fire Exit Hardware". Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.*
5. *Delayed Egress Devices: Function achieved within single exit device component, including latch, delayed locking device, request-to-exit switch, nuisance alarm, remote alarm, key switch, indicator lamp, relay, internal horn, door position input, external inhibit input plus fire alarm input. NFPA 101 "Special Locking Arrangement" compliant.*
6. *Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.*

2.5 CYLINDERS AND KEYING

A. Cores for Bored Cylindrical Locksets: Provide key-in lever 6 pin cores for all bored cylindrical locksets, keyed into base building system, as manufactured by the bored lockset manufacturer.

B. Cylinders: Full faced, interchangeable cylinders with square shouldered (not tapered) compression rings, 6 pin cylinders, standard threaded, keyed into building system, with cams to suit lock functions. Provide cylinders for installation into all locks.

1. 1100 Series Flexible Head Mortise Cylinder; Corbin Russwin Architectural Hardware (CR).
2. Series 40 Adjustable Front Cylinder; Sargent Manufacturing Company (SGT).
3. 30-001 full-faced mortised cylinder with 36-083 compression rings; Schlage Lock Company (SCH).

C. Keying System: Final keying to determine lock cylinders, keyed alike sets, level of keying, master key groups, grandmaster keying system shall be as directed by the LAWA. Supplier and Contractor shall meet with the LAWA and obtain final instructions in writing. Provide 2 nickel silver keys for each lock, and 6 keys for each grandmaster and masterkey system. Provide 2 blank keys for each lock for the LAWA's convenience in making additional keys.

1. Temporary Cylinders: Provide temporary cylinders in locks during construction and as may be necessary for security or as may be requested by the LAWA. All temporary cylinders shall be individually keyed as required and subject to a single master key.

D. Key Control System: Furnish a key control system with complete accessories including key gathering envelopes, labels, reserve pattern key tags with self-locking key clips, key receipt forms, key receipt holders, 3 way visible card index, temporary key markers and permanent key markers.

2.6 STRIKES

A. Strikes for Locks and Latches: All strikes for locks and latches shall be provided by the lock and latch manufacturer unless otherwise specified or scheduled, refer to Article 'Locks and Latches'.

B. Dustproof Floor Strikes: Complying with BHMA A156.16, Type L04251, L04021 or L14021, one of the following:

1. No. 80; Door Controls International.
2. DP2; H.B. Ives.
3. 3910; Triangle Brass Manufacturing Company, Inc. (TBM).
4. 570; Rockwood Manufacturing Company (RM).

C. Electric Strikes: Complying with BHMA A156.5, Grade 1. Mortised type for devices mounted in hollow metal frames. Unless otherwise required to interphase with the security access system furnish in 24 volt DC continuous voltage for silent operation. Provide each strike with extended lips as required to suit jamb conditions and fail secure function. Remote electrical control from card reader or control panel will unlock strike jaw, releasing latchbolt of the deadlatch, so door can be opened without operating latch by key cylinders from outside of secured room. Electric strikes shall be UL listed for up to 3 hour fire door assemblies.

1. 6200 Series Electric Strikes; Von Duprin.

2.7 CLOSERS

A. Surface-Mounted Closers: Closers shall be certified by ETL laboratories and the manufacturer to a minimum of 8,000,000 cycles and meet BHMA A156.4, Grade 1. Closers used in conjunction with overhead stops and holders shall be templated and coordinated to function properly. Properly detail closers to meet application requirements by providing drop plates, brackets, etc. to meet application and installation requirements as indicated. Comply with manufacturers recommendations for size of door closer depending on size of door, stack pressure conditions, and anticipated frequency of use. Closers shall have adjustable spring power, full rack and pinion, independent closing speed and latch regulating V-slotted valves, fully hydraulic with a high strength cast iron cylinder and solid forged steel arms, bore diameter of 1-1/2 inches (38.1 mm), pinion shaft diameter of 5/8 inches (15.87 mm), adjustable back check, cushion and built-in stop feature where scheduled, hold open arms where scheduled, delayed action where scheduled, arm finish to match closer cover finish scheduled. Provide metal covers of clean line design with plated or primed for paint finish as scheduled and that require removal in order to make adjustments to closer.

1. *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.*
2. *ISO 2000 certified. Units stamped with date-of-manufacture code.*
3. *Independent lab-tested 10,000,000 cycles.*
4. *Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.*
5. *Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.*
6. *Adjustable to open with not more than 5.0lbs pressure to open at exterior doors and 5.0lbs at interior doors. As allowed per California Building Code, Section 1133B.2.5, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15lbs.*
7. *Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.*
8. *Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.*
9. *Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.*
10. *Exterior doors do not require seasonal adjustments in temperatures from 120^{o} F to –30^{o} F, furnish data on request.*
11. *Non-flaming fluid, will not fuel door or floor covering fires.*
12. *Pressure Relief Valves (PRV): unsafe, not permitted.*

2.8 PROTECTIVE TRIM UNITS

A. Kick and Armor Plates: Fabricate protection plates from minimum 0.050 inch (1.3 mm) thick **stainless steel**, beveled top and 2 sides (B3E), square corners, complying with BHMA A156.6, and fastened with oval head Phillips fasteners countersunk into plate surface.

1. Series 8400; H. B. Ives (IVS).
2. K1050 Doorplate Series; Rockwood Manufacturing Company (RM).
3. KA050-2 Armor Plate and KOO50 for Kickplates; Triangle Brass Manufacturing Company, Inc. (TBM).

B. Size: Furnish kick and armor plates sized 2 inches (51 mm) less than door width. Furnish kickplates 12 inches (305 mm) high, furnish armor plates 48 inches (1219 mm) high unless otherwise indicated. Provide protective plates with cutouts for locks, louvers and windows to the extent indicated. Mount protective plates flush with bottom of door.

2.9 OTHER HARDWARE

A. Automatic Flush Bolts: Low operating force design, “LBR” type where scheduled.

B. Overhead Stops: **Stainless steel** (100 series). Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.

C. Door Stops: Provide stops to protect walls, casework or other hardware.

1. Unless otherwise noted in Hardware Sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90^{o} stop / 95^{o} deadstop. Note degree of opening in submittal.

D. Seals: Finished to match adjacent frame color. Resilient seal material: polypropylene, nylon brush, or solid high-grade neoprene. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material’s thickness and durability. Proposed substitutions: submit for approval.

1. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
2. Non-corroding fasteners at in-swinging exterior doors.
3. Fire-rated Doors, Resilient Seals: UL10C / UBC Standard 7-2 compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.

C. Thresholds: Comply with CBC Section 1133B.2.4.1.

1. Exteriors: Seal perimeter to exclude water and vermin. Use butyl-rubber or polyisobutylene sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
2. Fire-rated openings, 90min or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, request direction from Architect.
3. Fire-rated openings, 3hour duration: Thresholds, where scheduled, to extend full jamb depth.
4. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.

D. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.

E. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.

2.10 FABRICATION

A. Manufacturer's Nameplate: Provide each door hardware item without exposed manufacturers labels, names, or designs.

B. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips oval-head screws with finished heads to match surface of door hardware item being attached. Machine screws and expansion shields shall be used for attaching hardware to concrete and masonry. Use throughbolts for renovation work only where existing door blocking and reinforcements are unknown.

1. Concealed Fasteners: All new doors and door frames have been specified with adequate blocking and reinforcement provisions to eliminate exposed throughbolting of hardware items. Doors installed with exposed throughbolts will be rejected and replaced by the Contractor at no cost to the Owner. Where through bolts are used on existing doors provide sleeves for each through bolt.

2.11 FINISHES

A. Designations: The abbreviations used to schedule hardware finishes are generally BHMA (Federal Standards where indicated in parenthesis) designations. Comply with base material and finish requirements indicated by the following:

1. BHMA 600 (USP): Primed for painting.
2. BHMA 626 (US26D): Satin chromium plated.
3. BHMA 630 (US32D): Satin stainless steel.

PART 3 - EXECUTION

3.1 PREPARATION

A. Hardware for fire door assemblies shall be installed in accordance with NFPA 80. Hardware for smoke and draft control door assemblies shall be installed in accordance with NFPA 105. Install hardware for non-labeled and non-smoke and draft door assemblies in accordance with BHMA A156.115 for steel doors and frames, BHMA A156.115-W series for wood doors, and hardware manufacturers installation instructions for doors and frames fabricated from other than steel or wood.

1. All modifications to fire doors and frame for electric and mortised hardware shall be made by the respective door and frame manufacturers.

B. Smoke Seals at S Labeled Door Assemblies: Provide and install smoke seals at S labeled doors in accordance with door manufacturers instructions.

3.2 INSTALLATION

A. Mounting Heights: Mount door hardware units at the following heights, unless specifically indicated on the drawings or required to comply with LADBS regulations:

1. Locate levers, key cylinders, t-turn pieces, touchbars and other operable portions of latching hardware between 30 inches to 44 inches above the finished floor, per CBC Section 1133B.2.5.1.
2. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.

B. Install each door hardware item to comply with manufacturer's written instructions. Install overhead surface closers for maximum degree of opening obtainable. Place on room side of corridor doors, stair side of stair doors, secondary corridor side of doors between corridors. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be finished, coordinate removal, storage, and reinstallation of surface protective trim units. Do not install surface-mounted items until finishes have been completed on substrates involved.

C. Existing frames and doors scheduled to receive new hardware: carefully remove existing hardware, tag and bag, and turn over to LAWA.

1. Metal doors/frames: Weld or fasten with screws: filler pieces in existing hardware cut-outs and mortises not scheduled for re-use by new hardware. Leave surfaces smooth - - no applied patches.
2. Remove unused existing floor closers, fill empty floor closer cavities with concrete.

D. Do not install permanent key cylinders in locks until the time of preliminary acceptance by the Owner. At the time of preliminary acceptance, and in the presence of LAWA, permanent key all lock cylinders. Record and file all keys in the key control system, and turn system over to LAWA for sole possession and control.

E. Key control storage system shall be installed where directed by the LAWA.

3.3 ADJUSTING

A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every hardware component. Replace hardware components that cannot be adjusted to operate as intended. Adjust door control devices to compensate for building stack pressures, final operation of forced air mechanical equipment and to comply with referenced accessibility requirements.

1. Test each electrical hardware item to determine if devices are properly functioning. Wiring shall be tested for correct voltage, current carrying capacity, and proper grounding. Stray voltages in wiring shall be eliminated.
2. Coordinate with electrical installation for interface and connection with life safety and security systems.

B. Fire-Rated Door Assembly Testing: Upon completion of the installation, test each fire door assembly in the project to confirm proper operation of its closing device and that it meets all criteria of a fire door assembly as per NFPA 80 2007 Edition. The inspection of the fire doors is to be performed by individuals with knowledge and understanding of the operation components of the type of door being subjected to testing. A written record shall be maintained and transmitted to LAWA and be made available to the LADBS. The record shall list each fire door assembly throughout the project, and include each door number, an itemized list of hardware set components at each door opening, and each door location in the facility.

3.4 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation. Clean hardware components as necessary to restore proper finish. Provide protection during the progress of the work and maintain conditions that ensure door hardware is in perfect working order and without damage or deterioration at time of Substantial Completion.

END OF SECTION 08 71 00

SECTION 09 22 16 – NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes non-structural metal framing assemblies.

1.2 ASSEMBLY PERFORMANCE REQUIREMENTS

1. Typical Walls: Wall assemblies shall be constructed for deflection not to exceed 1/240 of the wall height when subjected to a positive and negative pressure of 5 psf (239 kPa).

2. Walls with Tile or Stone Finish: Wall assemblies to receive tile finishes shall be constructed for deflection not to exceed 1/360 of the wall height when subjected to a positive and negative pressure of 5 psf (239 kPa). L/600 where supporting stone.

3. Ceilings, bulkheads, soffits, ceiling transitions, ledges, and coves shall be constructed for a deflection not to exceed 1/360 of the distance between supports.

4. Partitions Enclosing Pressurized Mechanical Rooms: Provide metal framing systems of base metal thickness and spacing capable of limiting lateral deflections to L/240 when subjected to a 15 psf uniform lateral load or the design value induced by the mechanical system, whichever is greater.

1.3 SUBMITTALS

A. Product Data: Submit product data for each product indicated.

B. Evaluation Reports: Provide LARR identification numbers for Metal Studs, Fasteners, and Suspension Ceilings.

C. Provide Structural Calculations signed by a licensed California Civil or Structural engineer.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For non-structural metal framing assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

B. Sound Transmission Characteristics: For non-structural metal framing faced with gypsum wallboard materials and having STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

C. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 PRE-INSTALLATION MEETING

A. Prior to start of the non-structural metal framing Work, and at the Contractors direction, meet at the site and review the installation procedures and coordination with other Work. Meeting shall include Contractor, Architect and major material manufacturer as well as the Installer and other subcontractors whose Work must be coordinated with the non-structural metal framing and the gypsum wallboard Work.

1.7 PROJECT CONDITIONS

A. Comply with ASTM C754 requirements or wallboard material manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to the Los Angeles Department of Building and Safety.

2.2 STEEL SUSPENDED CEILING FRAMING

A. Components, General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article 'Assembly Performance Requirements'.

B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.

C. Hanger Attachments to Overhead Decks: Suitable for application indicated, fabricated from corrosion-resistant materials, with eyepins, clips or other devices for attaching hangers and capable of sustaining, without failure, a load equal to 10 times that imposed by the complete ceiling system.

D. Hangers: As follows:

1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch (4.12-mm) diameter.

2. Rod Hangers: ASTM A 510 (ASTM A 510M), mild carbon steel.

   a. Diameter: 1/4-inch (6.34-mm).
   b. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.

3. Flat Hangers: Commercial-steel sheet, ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized.

   a. Size: 1 by 3/16 inch (25.4 by 4.76 mm) by length indicated.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch (1.37 mm), a minimum 1/2-inch- (12.7-mm-) wide flange, with manufacturer's standard corrosion-resistant zinc coating.

F. Furring Channels (Furring Members): Commercial-steel sheet with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating.

1. Cold Rolled Channels: 0.0538-inch (1.37-mm) bare steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flange, 3/4 inch (19.1 mm) deep.

2. Steel Studs: ASTM C 645, 0.0312 inch (0.79 mm) minimum base metal thickness and minimum depth as required to suit deflection criteria.

3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22.2 mm) deep.

   a. Minimum Base Metal Thickness: 0.0312 inch (0.79 mm).

4. Resilient Furring Channels: 1/2-inch- (12.7-mm-) deep members designed to reduce sound transmission.

G. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.3 STEEL PARTITION AND SOFFIT FRAMING

A. General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article 'Assembly Performance Requirements'.

1. In areas where top of partitions are dependent on ceiling system for lateral support, coordinate design and installation to comply with the above deflection limitation.
2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating.

B. Steel Studs and Runners: ASTM C 645, in minimum depth indicated in partition type details.
1. Minimum Base Metal Thickness:

   a. Typical: As required to comply with deflection criteria.
   b. Partitions Supporting Wall Mounted Casework: 16 gauge (0.053 inch) (1.3 mm) minimum thickness.

c. 18 gauge minimum, galvanized metal studs @ 16” oc max at all Restroom, Janitor, and mechanical rooms.

2. Depth: As indicated.

C. Deflection Track: ASTM C645 top runner with custom fabricated flanges with depths sized to accommodate roof and floor deck live and dead load deflections but not less than 2 inch (50.8 mm) deep flanges. Steel sheet top runner manufactured to prevent cracking of gypsum board applied to interior partitions resulting from deflection of structure above; in thickness indicated for studs and in width to accommodate depth of studs; one of the following:

1. CEMCO; CST, slotted Track.
2. Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
3. MBA Building Supplies; Slotted Deflecto Track
4. Steel Network Incl; VertiClip SLD or VertiTrack VTD Series.
5. Superior metal Trim; Superior Flex Track System (SFT)
6. Telling Industries; Vertical Slip Track.

D. Firestop Track: ASTM C645 top runner with custom fabricated flanges with depths sized to accommodate roof and floor deck live and dead load deflections but not less than 2 inch (50.8 mm) deep flanges. Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs; one of the following:

1. CEMCO; FAS Track
2. Fire Trak Corp; Fire Trak System
3. Metal-Lite, Inc; The System
4. The Steel Network, Inc: VertiClip SLD Series or VertiTrack VTD Series, Durham, NC. ,

E. Flat Strap and Backing Plate: 36 -inch (914-mm) wide steel sheet for blocking and bracing required for the attachment of surface mounted items and accessories indicated.

1. Minimum Base Metal Thickness: 0.040 inch (1.024mm) (18 gauge)

F. Cold-Rolled Channel Bridging: For channel bridging for fixture attachment or lateral bracing provide 0.0538-inch (1.37-mm) bare steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flange:

1. Depth: 1-1/2 inches (38.1 mm).
2. Clip Angle: 1-1/2 by 1-1/2 inch (38.1 by 38.1 mm), 0.068-inch- (1.73-mm-) thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
2. Depth: 7/8 inch (22.2 mm).

H. Resilient Furring Channels: 1/2-inch- (12.7-mm-) deep, steel sheet members designed to reduce sound transmission.

I. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members securely to substrates involved; complying with the recommendations of the gypsum board manufacturers for applications indicated.

> **NOTE:** On the drawings, indicate the locations for each type of metal framing, fasteners, furring or suspension system with the required spacing and corresponding thickness with their related LARR number.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Acoustical Sealant for Exposed and Concealed Joints: Non-sag, paintable, non-staining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to which non-structural metal framing attaches or abuts, installed door frames and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (600 mm) o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of the non-structural metal framing and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLING STEEL FRAMING, GENERAL

A. General: Install steel framing to comply with ASTM C754, ASTM C840 and the gypsum board manufacturers recommendations, where standards conflict the more stringent shall apply.

B. Install supplementary framing, blocking, backerplates and bracing at locations in gypsum board assemblies which are indicated to support fixtures, equipment services, heavy trim, grab bars,

toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."

C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.

1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.

    a. Use deep-leg deflection track where indicated.
    b. Use proprietary firestop track where indicated.

3.4 INSTALLING STEEL SUSPENDED CEILING FRAMING

A. Suspended Ceiling Framing:

1. Suspend ceiling hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
3. Attach hangers to structural members. Do not support ceilings from or attach hangers to permanent metal forms, steel deck tabs, steel roof decks, ducts, pipes, or conduit.
4. Secure wire hangers by looping and wire-tying, to eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
5. Secure rod and flat hangers to structure, including intermediate framing members, by attaching to devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member and transversely between parallel members.

C. Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

D. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards unless more stringent spacings are recommended by the gypsum board manufacturer.

E. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

A. Install continuous runners (tracks) sized to match studs at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction. Secure runners to substrates with fasteners spaced a maximum of 24 inches (600 mm) o.c. unless closer spacing is recommended by the framing manufacturer for the floor and ceiling construction involved. Provide fasteners at all corners and ends of runner tracks.

1. Where studs are installed directly against exterior walls, install foam gasket isolation strip between studs and wall.

B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.

C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings and at partial height partitions. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

1. Cut studs 1/2 inch (13 mm) short of full height to provide perimeter relief.
2. For fire-resistance-rated and STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
3. Terminate partition framing at suspended ceilings where indicated.
4. Terminate partial height partition framing as indicated.

D. Install steel studs and furring in sizes and at spacing indicated but not less than that required by the referenced steel framing installation standard to comply with maximum deflection and minimum loading requirements specified, unless more stringent requirements are recommended by the gypsum board manufacturer:

1. Space studs 16 inches (400 mm) o.c., unless otherwise indicated.

E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.

F. Install backerplates for support of wall mounted items.

G. Curved Partitions:

1. Cut top and bottom track (runners) through leg and web at 2-inch (50-mm) intervals for arc length. In cutting lengths of track, allow for uncut straight lengths of not less than 12 inches (300 mm) at ends of arcs.
2. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.

3. Support outside (cut) leg of track by clinching steel sheet strip, 1-inch- (25-mm-) high-by-thickness of track metal, to inside of cut legs using metal lock fasteners.
4. Begin and end each arc with a stud, and space intermediate studs equally along arcs at stud spacing recommended in writing by gypsum board manufacturer for radii indicated. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches (150 mm) o.c.

H. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

1. Install two studs at each jamb, unless otherwise indicated. Install one additional stud no more than 6 inches (150 mm) from jamb studs at single doors greater than 48 inches (1200 mm) and at all pairs of doors.
2. Install cripple studs at head adjacent to each jamb stud. Provide runner track and typical studs above door openings with studs spaced not more than 24 inches (600 mm) o.c.
3. At all welded frames with fixed anchor clips secure stud reinforcing to jamb anchor clips with not less than two self tapping screws per clip.
4. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

I. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

J. Isolation Strip Attachment: Where partitions abut exterior wall window mullions, and partition filler panels are not indicated, adhesively attach isolation strips to window mullions. Center isolation strips on mullion to form a continuous, sound resistant and lightproof, recessed joint seal for the entire length of the interface between the partition studs and trim members and the vertical window mullions.

3.6 CLEANING AND PROTECTION

A. Clean floors of all non-structural metal framing debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.

B. Provide final protection and maintain conditions that ensure non-structural metal framing Work remains without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes gypsum board assemblies.

1.2 SUBMITTALS

A. Product Data: Submit product data for each product indicated.

B. Samples: Submit full size samples in 12-inch- (300-mm-) long lengths for each exposed trim accessory indicated.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

C. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

D. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.

E. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.5 PRE-INSTALLATION MEETING

A. Prior to start of each type of gypsum wallboard system, and at the Contractors direction, meet at the site and review the installation procedures and coordination with other Work. Meeting shall include Contractor, Architect and major material manufacturer as well as the Installer and other subcontractors whose Work must be coordinated with the gypsum wallboard Work.

1.6 PROJECT CONDITIONS

A. Comply with ASTM C840 requirements or wallboard material manufacturer's written recommendations, whichever are more stringent.

B. Installation of wallboard joint treatments shall not start until the space to receive wall board joint treatments is heated to maintain a continuous and uniform temperature of not less than 55 degrees F, from one week prior to beginning of joint treatment until joint treatment is completed and thoroughly dry. Ventilation, either natural or supplied by fans, circulators or air conditioning systems shall be provided to remove excess moisture during joint treatment. Temperature requirements may be waived only on recommendation of wallboard materials manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to authorities having jurisdiction.

2.2 INTERIOR GYPSUM WALLBOARD

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Gypsum Wallboard: ASTM C 36 or ASTM C1396/C1396M.

1. Regular Type:

   a. Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.
   b. Long Edges: Tapered.
   c. Location: Vertical surfaces, unless otherwise indicated.

2. Type X:

   a. Thickness: 5/8 inch (15.9 mm).
   b. Long Edges: Tapered.
   c. Location: Where required for fire-resistance-rated assembly.

NOTE: On the drawings indicate the locations for each type of gypsum board and tile backing units using the same terminology as in these specifications. On the drawings place UL or LARR numbers for all fire rated gypsum and cementitious backer unit assemblies.

C. Flexible Gypsum Wallboard for Curved Surfaces: ASTM C 36 or ASTM C1396/C1396M, manufactured to bend to fit tight radii and to be more flexible than standard regular-type panels of the same thickness.

1. Thickness: 1/4 inch (6.4 mm).
2. Long Edges: Tapered.
3. Location: Apply in double layer at curved assemblies.

D. Sag-Resistant Gypsum Wallboard for Interior Ceilings: ASTM C 36 or ASTM C1396/C1396M, manufactured to have more sag resistance than regular-type gypsum board.

1. Thickness: 1/2 inch (12.7 mm).
2. Long Edges: Tapered.
3. Location: Ceiling surfaces.

NOTE: Use Impact Resistant Gypsum Board in areas susceptible to high abuse and the use of alternative materials is not feasible. Use a minimum of 20 gauge metal framing as support.

2.3 TILE BACKING PANELS

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Water-Resistant Gypsum Backing Board: ASTM C 630/C 630M or ASTM C1396/C1396M.

1. Core: 5/8 inch (15.9 mm).

C. Cementitious Backer Units: ANSI A118.9, in thickness indicated.

1. Thickness: 1/2 inch (12.7 mm).

NOTE: For adhesive applied ceramic tile in rest rooms, use cementitious back units as a sub-strate. When using water-resistant gypsum backing board at tile applications, the metal studs shall be spaced at 16 inches on center.When using water resistant backing board on ceilings spacing of supports shall be 12 inches on center.

2.4 TRIM ACCESSORIES

A. Interior Steel Trim Accessories: ASTM C 1047; formed metal sheet steel zinc coated by hot dipped process. Shapes indicated below by reference to Fig. 1 designations in ASTM C1047.

1. Cornerbead: Use at outside corners.

2. LC-Bead with both face and back flanges to receive joint compound; use at exposed panel edges.
3. U-Bead with face and back flanges; face flange formed to be left without application of joint compound: Use where indicated.
4. Curved-Edge Cornerbead: With notched or flexible flanges; use at curved openings.
5. Expansion (Control) Joint: One-piece control joint formed with V-shaped slot, with removable strip covering slot opening. Use where indicated.

B. Aluminum Trim Accessories: Extruded aluminum trim with 1/4 inch (6.35 mm) diameter holes in fins for attachment to wallboard or studs; longest lengths available in profiles indicated; primed for finish painting; sized for scheduled wallboard thickness shown.

2.5 JOINT TREATMENT MATERIALS

A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of the wallboard products and joint treatment materials for each application indicated.

B. Joint Tape:

1. Interior Gypsum Wallboard over Metal Studs: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, flanges of trim accessories, and fasteners, use setting-type taping compound.
3. Second coat: For filling over tape, beads and fasteners. Use setting-type, sandable topping compound.
4. Third coat: For finishing over tape, beads and fasteners. Use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

1. Water-Resistant Gypsum Backing Board: Use setting-type taping and setting-type, sandable topping compounds.
2. Cementitious Backer Units: As recommended by manufacturer.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne

sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound Attenuation Blankets, and Fire Resistive Insulation for Installation Within Gypsum Wallboard Partitions: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

NOTE: Sound insulation is required in all rest room walls.

E. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to which gypsum board assemblies attach or abut, installed door frames and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS

A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840, GA-216, and the gypsum wallboard manufacturer's recommendations, where standards conflict, the more stringent shall apply.

B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

C. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints or avoid them entirely.

    a. Stagger abutting end joints not less than one framing member in alternate courses of board.
    b. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

D. Multilayer Application:

1. On Partitions/Walls: Apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

2. On Ceilings: Apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply base layers in same sequence. Apply base layers at right angles to framing members and offset face layer joints 1 framing member, 16 inches minimum, from parallel base joints, unless otherwise indicated or required by fire-resistance-rated assembly.

E. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

F. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.

G. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

H. Curved Partitions:

1. Install panels horizontally and unbroken, to the extent possible, across curved surface plus 12 inches (300 mm) long straight sections at ends of curves and tangent to them.
2. Wet gypsum panels on surfaces that will become compressed where curve radius prevents using dry panels. Comply with gypsum board manufacturer's written recommendations for curve radii, wetting methods, stacking panels after wetting, and other preparations that precede installing wetted gypsum panels.
3. On convex sides of partitions, begin installation at one end of curved surface and fasten gypsum panels to studs as they are wrapped around curve. On concave side, start fastening panels to stud at center of curve and work outward to panel ends. Fasten panels to framing with screws spaced 12 inches (300 mm) o.c.
4. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.
5. Allow wetted gypsum panels to dry before applying joint treatment.

I. Tile Backing Panels:

1. Water-Resistant Gypsum Backing Board: For substrates indicated to receive thin-set tile, install water-resistant gypsum backing board panels, unless otherwise indicated. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.
2. Cementitious Backer Unit Application: ANSI A108.11 at showers and where otherwise indicated.

J. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

K. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions.

L. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

M. Attach gypsum panels to framing provided at openings and cutouts.

N. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Fit gypsum panels around ducts, pipes, and conduits.
2. Where partitions intersect open exterior and interior wall kickers, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by the wall kickers and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
3. Where chase walls are shown, provide bracing between parallel rows of studs. Unless otherwise shown, provide gypsum wallboard braces no less than 1/2-inch- (12.7-mm-) thick x 12-inches- (300-mm-) wide and cut to width of chase. Locate at quarter points in wall height between each pair of parallel studs. Fasten with not less than 3 screws at each stud.

O. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

P. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

Q. Cut openings in wallboard for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges will be covered by plates and escutcheons. Cut both face and back paper. Do not install electrical outlets back to back on opposing sides of partitions.

R. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.

1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.
2. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.
3. Install fasteners not less than 3/8-inch- (9.5-mm-) from ends or edges of wallboard sheets, spacing fasteners opposite each other on adjacent ends or edges.
4. Begin fastening from center of wallboard and proceed toward edges and corners.
5. Apply pressure on surface of wallboard adjacent to fasteners being driven to ensure that wallboard will be secured tightly to supporting members.

    a. Drive fastener with shank perpendicular to face of board.
    b. Drive screws with a power screwdriver as recommended by wallboard manufacturer. Set heads of screws slightly below surface of paper without cutting paper.

3.3 INSTALLING TRIM ACCESSORIES

A. General: Fasten trim accessories according to manufacturer's written instructions for type, length, and spacing of fasteners.

B. Install corner beads at external corners.

C. Install interior trim accessories where edge of gypsum panels would otherwise be exposed or semiexposed. Provide interior trim accessories with face flange formed to receive joint compound.

D. Install aluminum trim accessories where indicated.

E. Install control joints in locations indicated and where directed by the Architect for visual effect, or if not indicated or directed by the Architect, provide control joints in accordance with ASTM C 840 which is as follows:

1. Where a partition, wall or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.

2. Where a wall or a partition runs in an uninterrupted straight plane exceeding 30 linear feet (9,100 mm).

3. Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 feet (15,000 mm) and total area between control joints does not exceed 2500 square feet (230 m^2).

4. Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 linear feet (9,100 mm) and total area between control joints does not exceed 900 square feet (84 m^2).

5. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.

3.4 FINISHING GYPSUM BOARD ASSEMBLIES

A. General: Apply joint treatment at gypsum board joints, flanges of interior trim and aluminum trim accessories, interior angles, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration and levels of gypsum board finish indicated. Produce surfaces free of tool marks and ridges ready for decoration of type indicated. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Cementitious Backer Units: Finish according to manufacturer's written instructions.

E. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:

1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile and where indicated.
3. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.
4. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface where wallboard is indicated to receive wall coverings, semi-gloss and high gloss paints, and Italian plaster.

3.5 CLEANING AND PROTECTION

A. Clean floors of all wallboard debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.

B. Provide final protection and maintain conditions that ensures gypsum board assemblies remain without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 29 00

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes ceramic and porcelain tile.

1.2 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.3 SUBMITTALS

A. Product Data: Submit product data for each product used.

B. Samples: Submit samples showing full range of color and texture variations expected.

1. Full size units of each type, composition, color, and finish of tile.
2. Assembled samples with grouted joints for each color grout and for each type, composition, color, and finish of tile.
3. Thresholds in 6-inch (150-mm) lengths, each type.

C. Test Reports: Submit test reports from qualified independent, L.A. City Approved testing laboratory indicating and interpreting test results relative to compliance of tile products with requirements specified for slip resistance.

D. Maintenance instructions: Submit maintenance instructions for each type of product installed.

1.4 QUALITY ASSURANCE

A. Installer: Engage an installer, with a minimum of 5 years of successful commercial tile installations similar in material, design, and scope to that indicated.

B. Source Limitations for Tile: Obtain tile from one source or producer, and from same production run and of consistent quality in appearance and physical properties for each contiguous area.

C. Field-Constructed Sample Installations: Before installing tile, erect sample installations for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build sample installations to comply with the following requirements, using materials indicated for final unit of Work.

1. Locate sample installations on site, in locations and size indicated or, if not shown or indicated, as directed by LAWA but not less than 100 sq. ft. (9.29 sq. m) area for floors, and not less than 100 sq. ft. (9.29 sq. m) area for walls.
2. Retain and maintain sample installations during construction in undisturbed condition as a standard for judging completed unit of Work.
3. Approved sample installations may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.

B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

B. Maintain temperatures at 50°F or more in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

1.7 EXTRA MATERIALS

A. Provide attic stock equal to the following for each type, color, pattern, and size (or fraction thereof) of tile provided for the project. Supply in manufacturer=s unopened containers, identified with name, brand type, grade, class and all other qualifying information, to a location where directed by LAWA.

1. 2% of amount installed but not less than one box.

PART 2 - PRODUCTS

2.1 TILE PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

B. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.

C. Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing where applicable.

D. Floor Tiles

1. Manufacturers: “Crossville”; Daltile; or Approved Equal
2. Size: 12” x 12”

E. Wall Tiles

1. Manufacturers: “Crossville”; Daltile; or Approved Equal
2. Size: 6” x 6” Minimum

F. Wall base tiles shall be one piece self-coved tile with inside corner and outside corner base tiles.

2.2 ACCESSORY MATERIALS

A. Thresholds: Fabricate to provide transition between adjacent floor finishes. Bevel edges at 1:2 slope, limit height of bevel to 1/2 inch (12.7 mm) or less, and finish bevel to match face of threshold.

1. Marble Thresholds: ASTM C 503 with a minimum abrasion resistance of 12 per ASTM C 1353 or ASTM C 241 and with honed finish.

a. Description: Uniform, fine- to medium-grained white stone with gray veining.

B. Waterproofing for all Wet Areas and Existing Concrete Slabs on Grade.

1. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.10; one of the following:

a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.

b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane.

c. MAPEI Corporation; Mapelastic 400.

NOTE: All wet areas such as but not limited to kitchens and rest rooms and all existing concrete slabs on grade, shall incorporate a waterproofing membrane as part of the floor assembly. Indicate relevant waterproofing details on the drawings. The waterproofing membrane shall extend up the wall, a minimum of 3 feet, behind all wall hung plumbing fixtures and 12 inches high at all walls without plumbing fixtures.

Provide penetration waterproofing details where partitions or other built-ins are attached to a wall system that has a waterproofing layer.

2.3 SETTING AND GROUTING MATERIALS

A. Manufacturers:

1. Custom Building Products.
2. LATICRETE International Inc.
3. MAPEI Corporation.

B. Source Limitations: For each tile installation, obtain compatible formulations of setting and grouting materials containing latex or latex additives from a single manufacturer.

C. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A and as specified below:

1. Reinforcing Wire Fabric: Galvanized, flat, welded wire fabric, 2" x 2" x 0.062 inch (50.8 x 50.8 mm x 1.57 mm) diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

2. Latex Additive: Manufacturer's standard styrene-butadiene-rubber water emulsion, serving as replacement for all gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed Portland Cement and aggregate mortar bed.

D. Latex-Portland Cement Mortar (Thin-Set): ANSI A118.4 consisting of the following:

1. Prepackaged dry-mortar mix combined with liquid-latex additive.
2. For wall applications, provide non-sagging mortar.

E. Medium-Bed, Latex-Portland Cement Mortar: ANSI A118.4:

1. Prepackaged dry-mortar mix combined with liquid-latex additive.

F. Polymer-Modified Tile Grout: ANSI A118.7.

1. Polymer Type: Dry, redispersible form, prepackaged with other dry ingredients.
2. Colors: As selected from manufacturers standards to match tile being grouted.

NOTE: Epoxy grout shall be used in all public rest rooms. Latex grout in public rest rooms is not allowed. All grout joints shall be made as small as possible.

TCA "method F111" for suspended slabs and TCA "method F113" for slabs on grade. Industry approved anti-fracture membrane is required for both methods.

2.4 MISCELLANEOUS MATERIALS

A. Sealants: 'Silicone sanitary sealant'.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.5 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions. Add materials and liquid latex additives in accurate proportions. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 PREINSTALLATION MEETING

A. Prior to the installation of tile, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include LAWA, the Architect of Record, the Contractor, tile installer, tile and setting material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present.

1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds. Grind concrete substrates to remove existing floor adhesive and mortar residues, films, sealing and curing compounds if they are determined to be present on the substrate.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with the Architect of Record.

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

3.3 PREPARATION

A. Remove paint, coatings, including curing compounds and other substances that are incompatible with tile-setting materials.

B. Blending: Color blend tiles at Project site before installing.

1. Furnish the same lots, batches, etc. within the same contiguous areas of the site (i.e. corridors on the same floors, common rooms which adjoin each other, etc.).

3.4 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation".

C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area beginning at thresholds. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Movement (Expansion) Joints: Locate sealant filled expansion joints where recommended by the manufacturers of mortar and tile materials but not less than the requirements of TCA EJ171, and as accepted by the Architect of Record. Form movement joints and other sealant-filled joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Locate joints in tile surfaces directly above joints in concrete substrates.
2. Prepare joints and apply sealants.

NOTE: All control joints to be carried to the surface.

3.5 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.

1. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.6 FLOOR TILE INSTALLATION

A. Thin-set Tile over Concrete Slabs (Typical): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.

2. Concrete Subfloors, Interior: TCA F113.

    a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
    b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
    c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
    d. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
    e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation, Latex-Portland Cement: ANSI A108.10.

B. Thin-set Tile over Waterproof Membrane (*Toilet Rooms, Kitchens and any other wet areas, in addition to all concrete slabs on grade*): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.

2. Concrete Subfloors, Interior: TCA F122.

    a. Apply the mortar to waterproofed slab with the flat side of the trowel.
    b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
    c. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
    d. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
    e. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
    f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation, Latex-Portland Cement: ANSI A108.10.

C. Medium-Set Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.

2. Concrete Subfloors, Interior: TCA F113 except apply medium set bed thickness.

   a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
   b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
   c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
   d. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
   e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation: Latex-Portland Cement: ANSI A108.10.

D. Thick-Set Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar and Bond Coat:

   a. Latex-Portland Cement Mortar: ANSI A108.1A (Wet Set Method).

   b. Latex-Portland Cement Bond Coat: ANSI A108.5.

2. Concrete Subfloors, Interior: TCA F121.

   a. Apply ½ of the mortar bed to slab and place reinforcing wire fabric. After placing mesh, apply balance of mortar bed. The mortar shall be rodded and compacted with a steel trowel.
   b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying bond coat to tiles

c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile sheets for 100% coverage to thickness of not less than 1/16-inch (1.5-mm)

d. Place tile onto the green mortar bed, maintaining 1/8-inch (3-mm) wide joints for typical tile units and 1/4-inch (6.35-mm) wide joints for quarry tile units if any, and true accurate pattern as shown. Tamp tile with wood block and rubber mallet to produce finish levels of tile matching adjacent tile surfaces. Beating shall take place prior to mortar taking and initial set. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.

e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation: Latex-Portland Cement: ANSI A108.10.

E. Stone Thresholds: Install stone thresholds in one piece, notched to fit neatly at door jambs; set in same type of setting bed as abutting field tile in accordance with TCA Method TR611.

3.7 WALL TILE INSTALLATION

A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Latex Portland Cement Mortar Installation (using specified Latex Portland Cement mortar material): ANSI A108.5.

2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCA W243, place tiles maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown.

3. Cementitious Backerboard (Latex Portland Cement Mortar) Method: TCA W244, place tiles maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown.

4. Grout Installation: Latex-Portland Cement: ANSI A108.10.

3.8 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

C. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

D. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

END OF SECTION 09 30 00

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes ceramic and porcelain tile.

1.2 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.3 SUBMITTALS

A. Product Data: Submit product data for each product used.

B. Samples: Submit samples showing full range of color and texture variations expected.

1. Full size units of each type, composition, color, and finish of tile.
2. Assembled samples with grouted joints for each color grout and for each type, composition, color, and finish of tile.
3. Thresholds in 6-inch (150-mm) lengths, each type.

C. Test Reports: Submit test reports from qualified independent, L.A. City Approved testing laboratory indicating and interpreting test results relative to compliance of tile products with requirements specified for slip resistance.

D. Maintenance instructions: Submit maintenance instructions for each type of product installed.

1.4 QUALITY ASSURANCE

A. Installer: Engage an installer, with a minimum of 5 years of successful commercial tile installations similar in material, design, and scope to that indicated.

B. Source Limitations for Tile: Obtain tile from one source or producer, and from same production run and of consistent quality in appearance and physical properties for each contiguous area.

C. Field-Constructed Sample Installations: Before installing tile, erect sample installations for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build sample installations to comply with the following requirements, using materials indicated for final unit of Work.

1. Locate sample installations on site, in locations and size indicated or, if not shown or indicated, as directed by LAWA but not less than 100 sq. ft. (9.29 sq. m) area for floors, and not less than 100 sq. ft. (9.29 sq. m) area for walls.
2. Retain and maintain sample installations during construction in undisturbed condition as a standard for judging completed unit of Work.
3. Approved sample installations may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.

B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

B. Maintain temperatures at 50°F or more in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

1.7 EXTRA MATERIALS

A. Provide attic stock equal to the following for each type, color, pattern, and size (or fraction thereof) of tile provided for the project. Supply in manufacturer=s unopened containers, identified with name, brand type, grade, class and all other qualifying information, to a location where directed by LAWA.

1. 2% of amount installed but not less than one box.

PART 2 - PRODUCTS

2.1 TILE PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

B. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.

C. Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing where applicable.

D. Floor Tiles

1. Manufacturers: “Crossville”; Daltile; or Approved Equal
2. Size: 12” x 12”

E. Wall Tiles

1. Manufacturers: “Crossville”; Daltile; or Approved Equal
2. Size: Square or rectangular shape with no dimension less than 4”.

F. Wall Base Tiles

1. Manufacturers: Same as Floor Tiles
2. Size: Will be one piece self-coved tile with inside corner and outside corner base tiles.

2.2 ACCESSORY MATERIALS

A. Thresholds: Fabricate to provide transition between adjacent floor finishes. Bevel edges at 1:2 slope, limit height of bevel to 1/2 inch (12.7 mm) or less, and finish bevel to match face of threshold.

1. Marble Thresholds: ASTM C 503 with a minimum abrasion resistance of 12 per ASTM C 1353 or ASTM C 241 and with honed finish.

a. Description: Uniform, fine- to medium-grained white stone with gray veining.

B. Waterproofing for all Wet Areas and <u>Existing Concrete Slabs on Grade.</u>

1. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.10; one of the following:

a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.

b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane.

c. MAPEI Corporation; Mapelastic 400.

NOTE: <u>All</u> wet areas such as but not limited to kitchens, rest rooms, custodial closets and all existing concrete slabs on grade, will incorporate a waterproofing membrane as part of the floor assembly. Indicate relevant waterproofing details on the drawings. The water-proofing membrane will extend up the wall, a minimum of 3 feet, behind all wall hung plumbing fixtures and 12 inches high at all walls without plumbing fixtures.

Provide penetration waterproofing details where partitions or other built-ins are attached to a wall system that has a waterproofing layer.

2.3 SETTING AND GROUTING MATERIALS

A. Manufacturers:

1. Custom Building Products.
2. LATICRETE International Inc.
3. MAPEI Corporation.

B. Source Limitations: For each tile installation, obtain compatible formulations of setting and grouting materials containing latex or latex additives from a single manufacturer.

C. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A and as specified below:

1. Reinforcing Wire Fabric: Galvanized, flat, welded wire fabric, 2” x 2” x 0.062 inch (50.8 x 50.8 mm x 1.57 mm) diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

2. Latex Additive: Manufacturer's standard styrene-butadiene-rubber water emulsion, serving as replacement for all gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

D. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4 consisting of the following:

1. Prepackaged dry-mortar mix combined with liquid-latex additive.
2. For wall applications, provide nonsagging mortar.

E. Medium-Bed, Latex-Portland Cement Mortar: ANSI A118.4:

1. Prepackaged dry-mortar mix combined with liquid-latex additive.

F. Polymer-Modified Tile Grout: ANSI A118.7.

1. Polymer Type: Dry, redispersible form, prepackaged with other dry ingredients.
2. Colors: As selected from manufacturers standards to match tile being grouted.

NOTE: Epoxy grout will be used in all restrooms. Latex grout in restrooms is not allowed. All grout joints will be made as small as possible.

TCA “method F111” for suspended slabs and TCA “method F113” for slabs on grade. Industry approved anti-fracture membrane is required for both methods.

2.4 MISCELLANEOUS MATERIALS

A. Sealants: ‘Silicone sanitary sealant’.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.5 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions. Add materials and liquid latex additives in accurate proportions. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 PREINSTALLATION MEETING

A. Prior to the installation of tile, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include LAWA, the Architect of Record, the Contractor, tile installer, tile and setting material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present.

1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds. Grind concrete substrates to remove existing floor adhesive and mortar residues, films, sealing and curing compounds if they are determined to be present on the substrate.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with the Architect of Record.

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

3.3 PREPARATION

A. Remove paint, coatings, including curing compounds and other substances that are incompatible with tile-setting materials.

B. Blending: Color blend tiles at Project site before installing.

1. Furnish the same lots, batches, etc. within the same contiguous areas of the site (i.e. corridors on the same floors, common rooms which adjoin each other, etc.).

3.4 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation".

C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area beginning at thresholds. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Movement (Expansion) Joints: Locate sealant filled expansion joints where recommended by the manufacturers of mortar and tile materials but not less than the requirements of TCA EJ171, and as accepted by the Architect of Record. Form movement joints and other sealant-filled joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Locate joints in tile surfaces directly above joints in concrete substrates.
2. Prepare joints and apply sealants.

NOTE: All control joints to be carried to the surface.

3.5 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.

1. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.6 FLOOR TILE INSTALLATION

A. Thinset Tile over Concrete Slabs (Typical): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.

2. Concrete Subfloors, Interior: TCA F113.

    a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
    b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
    c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
    d. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
    e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation, Latex-portland cement: ANSI A108.10.

B. Thinset Tile over Waterproof Membrane (*Toilet Rooms, Kitchens and any other wet areas, in addition to all concrete slabs on grade*): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.

2. Concrete Subfloors, Interior: TCA F122.

    a. Apply the mortar to waterproofed slab with the flat side of the trowel.
    b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
    c. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
    d. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
    e. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
    f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation, Latex-portland cement: ANSI A108.10.

C. Mediumset Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.

2. Concrete Subfloors, Interior: TCA F113 except apply medium set bed thickness.

   a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
   b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
   c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
   d. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
   e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation: Latex-portland cement: ANSI A108.10.

D. Thickset Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar and Bond Coat:

   a. Latex-Portland Cement Mortar: ANSI A108.1A (Wet Set Method).

   b. Latex-Portland Cement Bond Coat: ANSI A108.5.

2. Concrete Subfloors, Interior: TCA F121.

   a. Apply ½ of the mortar bed to slab and place reinforcing wire fabric. After placing mesh, apply balance of mortar bed. The mortar shall be rodded and compacted with a steel trowel.
   b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying bond coat to tiles

c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile sheets for 100% coverage to thickness of not less than 1/16-inch (1.5-mm)
d. Place tile onto the green mortar bed, maintaining 1/8-inch (3-mm) wide joints for typical tile units and 1/4-inch (6.35-mm) wide joints for quarry tile units if any, and true accurate pattern as shown. Tamp tile with wood block and rubber mallet to produce finish levels of tile matching adjacent tile surfaces. Beating shall take place prior to mortar taking and initial set. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation: Latex-portland cement: ANSI A108.10.

E. Stone Thresholds: Install stone thresholds in one piece, notched to fit neatly at door jambs; set in same type of setting bed as abutting field tile in accordance with TCA Method TR611.

3.7 WALL TILE INSTALLATION

A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Latex Portland Cement Mortar Installation (using specified latex portland cement mortar material): ANSI A108.5.

2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCA W243, place tiles maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown.

3. Cementitious Backerboard (Latex Portland Cement Mortar) Method: TCA W244, place tiles maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown.

4. Grout Installation: Latex-portland cement: ANSI A108.10.

3.8 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

C. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

D. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

END OF SECTION 09 30 00

SECTION 09 51 13 – ACOUSTICAL PANEL CEILINGS

1.1 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for ceilings.

1.2 ACTION SUBMITTALS

A. Product Data: For each product indicated.

B. Coordination Drawings: Drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:

1. Ceiling suspension assembly members.
2. Method of attaching hangers and lateral bracing to building structure.
3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

C. Samples: For each acoustical panel, for each exposed suspension system member, and for each color and texture required.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Research/evaluation reports:

NOTE: Indicate LARR numbers on the drawings as a condition of plan check approval.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Acoustical Testing Agency Qualifications: An independent testing laboratory or an NVLAP-accredited laboratory.

B. Fire-Test-Response Characteristics:

1. Fire-Resistance Ratings: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Ratings are indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.

2. Surface-Burning Characteristics: Acoustical panels complying with ASTM E 1264 for Class A materials, when tested per ASTM E 84.

C. Seismic Standard: Comply with the following:
1. Los Angeles Department of Building and Safety Document requirements.

NOTE: Refer to LADBS document number P/BC 2008-40: Recommended Standards for Suspended Ceiling Assemblies. This document provides guidelines for designing and installing a suspended ceiling assembly and provides standard support configurations for typical conditions. This document can be found online at www.ladbs.org.

D. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.

1. Approved mockups are not to become part of the completed Work.

NOTE: The ceiling installing shall not installed until the installation mock up has been approved by LAWA.

1.6 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

B. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Products: Subject to compliance with LAWA selection criteria and requirements,

2.2 GENERAL

C. Acoustical Panel Standard: Comply with ASTM E 1264.

1. Recycled Content: Provide acoustical panels with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 70Insert number percent by weight.

D. Low-Emitting Materials: Acoustical tile ceilings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the

Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Metal Suspension System Standard: Comply with ASTM C 635.

1. Recycled Content: Provide products made from steel sheet with average recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 25 percent.

F. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

NOTE: The use of powder actuated fasteners is by **SPECIAL APPROVAL ONLY**. Prior to the use of these fasteners, the Contractor shall develop and present to LAWA, their procedures and protocol for using such equipment at LAX.

G. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

1. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106 inch diameter wire.

H. Rod Hangers: ASTM A 510, mild carbon steel.

1. Diameter: 1/4 inch.
2. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.

I. Seismic struts and seismic clips.

J. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch , a minimum 1/2 inch wide flange, and in depth indicated.

K. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

2.3 ACOUSTICAL PANELS

L. Products: Subject to compliance with requirements, provide one of the following:

1. Armstrong World Industries, Inc.
2. USG Corporation

2.4 METAL SUSPENESION SYSTEM

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

1. Chicago Metallic Corporation

2.5 ACOUSTICAL SEALANT

A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant, that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

2.6 INSTALLATION

A. Per manufacturer's instructions and applicable codes.

END OF SECTION 09 51 13

SECTION 09 63 40 – STONE FLOORING, INTERIOR STONEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes interior stonework.

1.2 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For stone flooring installed on walkway surfaces, provide finished stone flooring installation with the following values as determined by testing the specified stone per ASTM C 1028, under a wet and a dry condition.

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of stone, stonework accessory, and other manufactured products required.

1. Include submittal of stone sealer manufacturer’s recommended methods for application of impregnator and surface protection coatings based on testing of project specific stone flooring materials.

2. Include submittal of stone sealer manufacturer’s recommended methods for application of impregnator and surface protection coatings based on testing of project specific stone countertop materials.

B. Shop Drawings: Submit cutting and setting drawings indicating sizes, dimensions, sections and profiles of stone units, arrangement and provisions for jointing, supporting, anchoring and bonding stonework; and other details showing relationships with, attachment to, and reception of, related work.

1. Indicate direction of book matching for stone units.

2. Show the extent of each type of movement joint. Show widths, details, and locations of expansion, contraction, control, and isolation joints in substrates receiving stone and finished stone surfaces.

C. Samples:

1. Submit sets of 12 inch (300-mm) square samples for each color, grade, finish, type and specie of stone consisting of units not less than full face size indicated for each stone thickness. Include 3 or more units in each set of samples showing the full range of appearance characteristics to be expected in completed Work. Stone delivered to the

jobsite, or installed, and which does not fall within the accepted sample range, may be subject to removal and replacement with stone that falls within the accepted sample range at no cost to the Owner.

a. Include sealer treatment on one half of exposed stone face for each sample submitted.

2. Submit one 12-inch (300-mm) long sample of each stone divider and transition strip.

3. Submit 12-inch (300-mm) long grout Samples for each color grout to be used to grout each type, composition, color, and finish of stone.

4. Adhesively Joined Shapes: Submit three (3) samples of stone countertop to apron sections bonded together with specified adhesive for each specie and finish of stone and consisting of units not less than 12-inch (300-mm) long x full size profile shown on the drawings. No fabrication of assembly shall be permitted until approval of sample is obtained.

D. Floor Stone Testing Results: Submit test reports from qualified independent, Los Angeles City Approved testing laboratory indicating and interpreting test results relative to compliance of stone flooring with requirements specified for slip resistance.

E. Maintenance Data: Submit maintenance instructions for each type of product specified.

F. Product Certificates: Submit manufacturers certifications for each type of grout and bonding material being provided are suitable for the intended use and meet or exceed the referenced standards and the requirements of this specification.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility for Stone: Obtain each stone from a single source with resources to provide materials of consistent quality in appearance and physical properties, including the capacity to cut and finish material without delaying the progress of the Work.

B. Installer Qualifications:

1. Subcontract the stonework to a single firm with a minimum of 10 years successful experience in conventional set stonework comparable to that shown and specified, in not less than 3 projects of similar scope to the satisfaction of LAWA. The stonework includes, but is not necessarily limited to, the following:

a. All preparation for stonework, including but not limited to, submittals, site erection, and sample installations as specified herein.

b. Interior direct cladding to architectural woodwork and partitions, interior stone flooring, stone thresholds, and countertops.

c. All anchors, supports, inserts and fasteners for the above, fabrication and installation of same.

d. All sealants and joint fillers in conjunction with the above.

2. The connection system as shown is suggested for the stone installation. Final connection design is the sole responsibility of the Contractor.

C. Floor Stone Testing: Test project specific stone flooring materials (each specie and finish) to verify the dilution rates, visual and physical performance of the impregnator and stone protection coats. Test for slip resistance in accordance with ASTM C1028 and report the static coefficient of friction for each stone specie and finish.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project in undamaged condition.

B. Store and handle stone and related materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breakage, chipping, or other causes.

1. Do not use pinch or wrecking bars.

2. Lift with wide-belt type slings where possible; do not use wire rope or ropes containing tar or other substances which might cause staining.

3. Store stones on wood skids or pallets, covered with non-staining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones.

4. Protect stone on wood skids or pallets, covered with non-staining, waterproof membrane, but allow air to circulate around stones.

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

1.6 PROJECT CONDITIONS

A. Maintain temperatures within range recommended by the mortar and grout manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C), in spaces during stone setting. After installation maintain temperatures within range recommended by the mortar and grout manufacturer.

B. Close spaces to traffic during stone flooring installation.

C. Close spaces to traffic for 72 hours after stone flooring installation.

D. Shade all stone, materials and the work area from direct sunlight during the installation as needed to prevent rapid evaporation caused by excessive heat or wind.

1.7 PRE-INSTALLATION COORDINATION

A. Pre-Installation Meeting: Prior to the start of interior stonework, a meeting shall be held at the

project site to review installation procedures and coordination with other Work. The meeting shall include the interior stone subcontractor, Contractor, Architect, LAWA, membrane installer (if any), and representatives of other trades affected by the Work.

B. Coordinate all aspects of the stonework with contiguous Work and provide components at the proper time and sequence to avoid delays in the Work.

1.8 EXTRA MATERIAL

A. Provide attic stock equal to the following for each type, color, pattern, and size (or fraction thereof) of stone provided for the project. Supply in manufacturer's unopened containers, identified with name, brand type, grade, class and all other qualifying information, to a location where directed by LAWA.

1. 2% of amount installed but not less than one box.

PART 2 - PRODUCTS

2.1 STONE, GENERAL

A. Comply with referenced standards and other requirements indicated applicable to each type of material required.

B. Provide matched blocks from a single quarry for each type, specie, color and quality of stone required. Extract blocks from a single bed of quarry stratum, especially reserved for Project, unless stones from randomly selected blocks are acceptable to Architect for aesthetic effect.

C. Visual Performance Criteria: All portions of stonework shall be furnished complying with the following criteria, all as reviewed and accepted by the Architect through sample submissions, sample installations, and thereafter on-site observations:

1. Color Range: Matching Architect's samples; uniform with no discernible variations between pieces in any contiguous area.

2. Finishing Technique:

a. Polished Finish: Uniform highly reflective mirror gloss finish with the full color and crystal structure of the stone visible through the finish. Evidence of swirl shall not be permitted.

b. Honed Finish: Uniform throughout. Evidence of swirl shall not be permitted.

c. Thermal (Flamed) Finish: Uniform textured finish produced by the application of a high temperature flame to the stone surface with all panels processed horizontally (parallel) to grade unless otherwise accepted by the Architect on the shop drawings. Evidence of channeling shall not be permitted.

2.2 STONE TYPES

A. General: Comply with ASTM C503 for marble, ASTM C615 for granite, ASTM C568 for limestone, ASTM C629 for slate, ASTM C1527 for travertine and as follows. Stone shall be sound, durable, and free of imperfections such as spalls, cracks, starts, seams, pits, stain producing minerals, and other defects that will impair its strength, durability and appearance. All material shall be subject to culling as required to match the preselected control samples prior to acquisition and thereafter through all stages of fabrication prior to delivery. Blend stone units at factory/warehouse.

B. Association Standard for Quality and Fabrication:

1. "Design Manual VII" of Marble Institute of America (MIA).

2. "Specifications for Architectural Granite" as published by the National Building Granite Quarriers Association (NBGQA)

3. "Indiana Limestone Handbook" as published by the Indiana Limestone Institute (ILI).

C. Species, Finishes, and Suppliers: Provide stone matching the Architect's samples which have been selected from the product lines, suppliers, and quarriers, indicated in the Finish Schedules on the Drawings.

2.3 SETTING AND GROUTING MATERIALS

A. Manufacturers and Plant Locations:

1. Custom Building Products.
2. LATICRETE International Inc.
3. MAPEI Corporation.

B. Source Limitations: For each type of stone installation, obtain compatible formulations of setting and grouting materials containing latex or latex additives from a single manufacturer.

C. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A and as specified below:

1. Reinforcing Wire Fabric: Galvanized, flat, welded wire fabric, 2" x 2" x 0.062 inch (50.8 x 50.8 mm x 1.57 mm) diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

2. Latex Additive: Manufacturer's standard styrene-butadiene-rubber water emulsion, serving as replacement for all gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

3. Bond Coats: For setting white and light colored stone use non-staining white, low alkali containing, Portland cement in the mortar that will not show through the stone body.

D. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4 consisting of the following:

1. Prepackaged dry-mortar mix combined with liquid-latex additive.
2. For wall applications, provide nonsagging mortar.
3. For setting white and light colored stone tile units use non-staining white, low alkali containing, Portland cement in the mortar that will not show through the stone tile body.

E. Medium-Bed, Latex-Portland Cement Mortar: ANSI A118.4:

1. Prepackaged dry-mortar mix combined with liquid-latex additive.
2. For setting white and light colored stone tile units use non-staining white, low alkali containing, Portland cement in the mortar that will not show through the stone tile body.

F. Polymer-Modified Tile Grout: ANSI A118.7.

1. Polymer Type: Dry, redispersible latex/polymer powder form, prepackaged with other dry ingredients and which contain dyes that have a proven track record of not leaching into natural stone. Use sanded grout at joints 1/8 inch (3 mm) wide or greater, use unsanded grout at joints 1/8 inch (3 mm) wide or less and wherever polished stone surfaces are to be grouted.
2. Colors: As selected by Architect from manufacturers standards to match stone being grouted.

G. Crack Isolation Membrane for Stone Installations:

1. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber, and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.12; one of the following:

   a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane. which is manufactured in the Miami FL plant.

   b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane. which is manufactured in the Bethany, CT plant.

   c. MAPEI Corporation; Mapelastic AquaDefense, which manufactured in the Laval, Quebec, Canada plant.

H. Water for Cleaning and Mixing Spotting Plaster: Clean, non-alkaline and potable.

I. Molding Plaster: Gypsum molding plaster complying with ASTM C59.

2.4 ACCESSORIES

A. General: Use only adhesives formulated for stone and recommended by their manufacturer for the application indicated.

B. Water-Cleanable Epoxy Adhesive for Setting Countertops, ANSI A118.3,

1. Manufacturers:

    a. Custom Building Products.
    b. Laticrete International, Inc.
    c. Mapei Corporation.

C. Stone Seam Adhesive For Countertops: A two-component epoxy or polyester, having high wetting properties, specifically recommended in writing by the epoxy or polyester manufacturer for interior use, stone to stone joints, and for bedding stone anchors. Flowable or pourable paste grade consistency as selected by fabricator for condition of use. Provide adhesive in custom color to match selected stone.

D. Joint Sealants:

1. For Countertops: ''Mildew-Resistant Silicone Sealant'

2. Floor Joints: 'Two-Part Polyurethane Sealant for Paving Applications',

E. Floor Cleaner: Provide stone cleaners of proper formulation for stone types, finishes, and applications indicated, as recommended by stone supplier. Use cleaning agents which do not contain caustic or harsh fillers that will damage stone or stone finishes.

F. Countertop Sealer: Provide stone sealing materials as manufactured by HMK Stone Care System, Hallandale, FL. (800) 424-2HMK, (415) 643-5603 or (954) 964-1658.

1. Impregnator: Low viscosity, UV resistant, water vapor permeable, silicone based impregnator specifically formulated to penetrate stone and grout pore structures without changing the color or sheen of the stone to which it is applied and which provides an invisible barrier of protection from water, dirt, oil, grease, lipstick, wine, and hand cream lotion infiltration.

    a. S34N Silicone Impregnator for factory sealing of stone countertop units, if field finishing stone countertops use S32 Silicone Impregnator.

2. Surface Protection Coating: No-rinse type, 100% natural vegetable soap cleanser, which is pH neutral (pH 7), vapor permeable and compatible with impregnator, and which emulsifies dirt and debris on the stone surface while repelling liquids. Will not change the color or sheen of the stone to which it is applied.

    a. P24 Liquid Stone Soap "No Rinse".

3. Prepare countertop surfaces to receive sealer in accordance with the countertop sealer manufacturer's recommendations. Apply sealers and surface protection coatings in accordance with the countertop sealer manufacturer's instructions.

G. Floor Sealer: Provide stone sealing materials as manufactured by HMK Stone Care System, (800) 424-2HMK or (954) 964-1658.

1. Impregnator: Slip resistant, low viscosity, UV resistant, water vapor permeable, silicone based impregnator specifically formulated to penetrate stone and grout pore structures without changing the color or sheen of the stone to which it is applied and which provides an invisible barrier of protection from water, dirt, oil, grease, and alkali infiltration.

    a. S32 Silicone Impregnator.

2. Surface Protection Coating: Slip and scuff resistant, no-rinse type, 100% natural vegetable soap cleanser, which is pH neutral (pH 7), vapor permeable and compatible with impregnator, and which emulsifies dirt and debris on the stone surface while repelling liquids. Will not change the color or sheen of the stone to which it is applied.

    a. P24 Liquid Stone Soap “No Rinse”.

H. Setting Buttons: Resilient plastic buttons, non-staining to stone, sized to suit joint thicknesses and bed depths of stonework involved.

I. Divider and Transition Strips: Stainless steel shapes and flat bar trims fabricated from ASTM A666 (for flat bar) and ASTM A276 (for shapes) Type 304 stainless steel, 1/4 inch (6.35 mm) wide at top edge unless otherwise indicated, depth as required to suit conditions shown and having an integral provision for anchorage to mortar bed or substrate, unless otherwise indicated. Provide NAAMM #4 satin finish at exposed top edge in the long direction, furnish in longest lengths available.

J. Countertop Framing Supports: Refer to Section 05 50 00, METAL FABRICATIONS.

2.5 STONE ANCHORS AND ATTACHMENTS

A. General: Provide anchors and attachments of type and size required to support stonework and fabricated from the following metals for conditions and anchors indicated below.

1. Expansion Anchors: Stainless steel, Type 304. Type, size and load capacity as required to support loading of 4 times the loads imposed by stone cladding system. Do not use lead shield expansion bolts or cinch anchors.

2. Anchor Tiebacks: Type 304 stainless steel dowels, cramps, straps, discs and rods in standard commercial tempers and hardness as required to sustain imposed loads and in no case less than 3/16 inch (4.5 mm) thick, complying with ASTM A666.

3. Shims: Plastic of the required joint thickness and of the size required to support the stonework.

2.6 FABRICATION

A. General: Fabricate interior stonework in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawings.

1. Unless otherwise shown, provide square edges typically, with quirk mitered outside corners at stone to stone joints, to the extent indicated.

B. Accurately cut, dress, drill, fit and finish stonework to shapes, profiles and dimensions shown on Drawings and/or final shop and setting drawings. Make exposed surfaces straight, sharp, true and continuous at joints within the tolerances specified.

1. Stone Sizes: As indicated.

2. Stone Thicknesses:

a. Woodwork Tops: 1-1/2-inch (38-mm), unless otherwise shown.

b. Wall Cladding: 3/4-inch (19.05-mm), unless otherwise shown. c.

Flooring Units: 3/4-inch (19.05-mm), unless otherwise shown.

3. Fabrication Tolerances:

a. Size and Squareness:

Delete the following tolerance for 3/8" units if not using 3/8" units

1) [Unit Thickness of 3/8-inch (9.5-mm): +/- 1/64 inch (0.4 mm) in 12" (300 mm) for tiles with polished or honed faces; or plus or minus 1/32 inch (0.8 mm) for tiles with sand-rubbed, natural-cleft, or thermal-finished faces.

2) **]**Unit Thickness of 3/4-inch (19.05-mm) to 1-1/2-inch (38-mm): +/- 1/8-inch in 8 feet (3 mm in 2438 mm).

3) Unit Thickness of Greater than 1-1/2-inch (38-mm): +/- 1/4-inch in 8 feet (6 mm in 2438 mm).

b. Thickness:

Delete the following tolerance for 3/8" units if not using 3/8" units.

1) [3/8-inch (9.5-mm) Stone Tiles with Smooth Finish: Vary from specified thickness by not more than plus or minus 1/32 inch (0.8 mm).]

Delete the following tolerance for 3/8" units if not using 3/8" units.

2) [3/8-inch (9.5-mm) Stone Tiles with Natural-Cleft or Thermal Finish: Vary average thickness of each tile from specified thickness by not more than plus 1/16 inch (1.5 mm), minus 0.]

3) Stone Tiles 3/4-inch (19.05-mm) thick or greater, All Finishes: Vary average thickness of each tile from specified thickness by not more than plus 1/16 inch (1.5 mm), minus 0 inches.

4. Cut all joints and edges square and at right angles to face, and with backs parallel to face.

Cut kerfs, reveals, and rustications as shown. Make arrises straight, sharp, true, and continuous at joints.

C. Fabricate stone thresholds in sizes and profiles as indicated or required to provide transition between adjacent floor finishes.

D. Stone Countertops:

1. Undercounter Lavatories: Make cutouts for undercounter lavatories in shop using template or pattern furnished by lavatory manufacturer. Form cutouts to smooth, even curves with edges at right angles to top. Ease juncture of cutout edges with tops, and finish edges to match tops.

2. Counter-Mounted Sinks: Prepare countertops in shop for field cutting openings for counter-mounted sinks. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

3. Fittings: Factory core countertops for plumbing fittings, undercounter soap dispensers, and similar items provided under Section 10 28 00, TOILET AND BATH ACCESSORIES and Division 22 00 00, PLUMBING.

4. All stone countertop aprons shall be adhesively joined to the countertops using epoxy adhesive. Maximum adhesive joint width shall be limited to 1/16-inch (1.5-mm)

   a. Prior to cleaning, lightly abrade stone surfaces to be bonded.

   b. Cleaning: Stone shall be dry and clean from grease, oil, dirt, water, and loose particles.

   c. Precondition stone to be joined with adhesive to a temperature which is within the temperature range recommended by the adhesive manufacturer for assembling and curing the adhesive.

   d. Mix adhesive in parts by weight, or parts by volume, in strict accordance with the adhesive manufacturer’s instructions.

   e. Stone countertops shall be assembled and cured, within the temperature range, and under the humidity conditions, recommended by the adhesive manufacturer. Apply adhesive, and brace, or use jigging, to maintain proper alignment of joined stone pieces until adhesive hardens. Remove adhesive from the stone faces which are to remain exposed in the finished Work.

   f. Assembled countertops shall not be moved until the adhesive has cured to ensure the absence of joint slippage.

   g. Apply bracing to the assembled countertops to ensure that the assembled countertops are free of torsional stress during transportation, handling and storage.

E. Carefully inspect finished stones at fabrication plant for compliance with requirements relative to

qualities of appearance, material and fabrication; replace defective stones with stones that do comply.

2.7 SPOTTING, MORTAR AND GROUT MIXES

A. Spotting Plaster: Stiff mix of molding plaster and water.

B. Mortars and Grouts: Mix mortars and grouts to comply with the requirements of referenced standards and with manufacturers' written instructions including those for accurate proportioning of materials and liquid latex additive content; mix materials with type of equipment, selection of speeds, in proper containers, for time periods, and other procedure needed to produce mortars and grouts of uniform quality and with optimum performance characteristics for application specified or indicated.

PART 3 - EXECUTION

3.1 PREINSTALLATION MEETING

A. Prior to the installation of stone, and at the Contractor's direction, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the Owner, Architect, the Contractor, stone installer, stone and setting material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 EXAMINATION

A. Examine substrates and areas where the stonework will be installed, with Installer present.

1. Verify that substrates for setting stone flooring are sound and free of voids, bugholes, rock pockets, honeycombs, and protrusions; and which are dry; clean; free of oil, waxy films, and curing compounds.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind stone units has been completed before installing stone.
3. Verify that joints and cracks in the existing floor substrates are coordinated with stone floor joint locations; if not coordinated, adjust joint locations in consultation with Architect.
4. Do not commence installation of flooring materials until floor substrate is within the following tolerances in all directions. If substrate is not within tolerance, level the substrate using a method and a product(s) that is compatible with and acceptable to the setting materials manufacturer.

    a. Subfloor Surfaces to Receive Thinset and Medium Set Setting Beds: +/- 1/8 inch in 10 feet (3 mm in 3.05 m) non-cumulative.

    b. Subfloor Surfaces to Receive Thickset Setting Beds: +/- 1/4 inch in 10 feet (6.35

mm in 3.05 m) non-cumulative.

c. No valleys or ridges greater than 1/8 inch (3 mm).

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Grind or scarify concrete substrates to remove existing floor adhesive and mortar residues (if any), laitance, films, sealing and curing compounds if they are determined to be present on the substrate.

B. Blending: Color blend stone flooring units at Project site before installing.

1. Furnish the same lots, batches, etc. within the same contiguous areas of the site (i.e. corridors on the same floors, common rooms which adjoin each other, etc.).

3.4 INSTALLATION, GENERAL

A. Installation Methods and Standards: Stone setting and pointing shall be in accordance with the applicable requirements and recommendations of the Marble Institute of America (MIA), unless otherwise specified or shown.

B. Stonework shall be installed by skilled mechanics. Employ skilled stone fitters at the site to do necessary field cutting as stones are set.

1. Use power saws with diamond tipped blades to cut stone. Cut lines straight and true, with edges eased slightly to prevent snipping.

C. Set stone to comply with requirements indicated on Drawings and Shop Drawings. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure stonework in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations indicated, with uniform joints of 1/8-inch (3-mm), unless greater widths are indicated, and with edges and faces aligned. Do not install stone units which are warped, curled, cracked, chipped, or broken, discolored or not properly finished.

D. Extend stonework into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

E. Accurately form intersections and returns. Perform cutting and drilling of stone without marring visible surfaces. Fit stone closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap stone. Where cut edges will be visible after installation, finish to match factory-fabricated edges.

F. Lay stone in grid pattern, unless otherwise indicated. Align joints when adjoining stone units on floor, base, walls, and trim are the same size. Lay out stonework and center stone fields in both directions in each space beginning at thresholds. Lay out stonework and center stone fields in

both directions on each wall area. Adjust to minimize cutting.

G. Divider and Transition Strips: Install divider and transition strips at locations indicated and where exposed edge of stone flooring meets carpet or other flooring which finishes flush with top of stone flooring units.

H. Movement (Contraction, Control, Expansion, and Isolation Joints) Joints: Locate sealant filled movement joints where recommended by the manufacturer of mortar and grout materials but not less than the requirements of TCNA EJ171 which follows, and as accepted by the Architect. Form movement joints and other sealant-filled joints during installation of setting materials, mortar beds, and stone. Do not saw-cut joints after installing stone.

1. Spacing Guidelines:

a. Where stone plane abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in backing materials, but not at drain strainers.

b. In the joint between stone units making up the inside corner of planes.

c. All contraction, control, expansion, isolation, seismic and cold joints in the horizontal structure and vertical surfaces shall continue through the stone surfaces, but not through membranes.

d. Vertical and Horizontal Joints Widths: Widths for the stone shall be the same as the grout joint but not less than 1/8 inch (3-mm) or the width of the control, expansion, seismic, joint whichever is greater.

e. Keep movement joints free from dirt, debris, grout, mortar, and setting bed materials. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

1. Do not install stone or setting materials over crack isolation membrane until membrane has cured.

3.6 INSTALLATION TOLERANCES

A. Tolerances: Set stone to comply with the following tolerances:

1. Variation from Plumb: +/- 1/8 inch in 10 feet (3 mm in 3.05 m) non-cumulative.
2. Variation from Level: +/- 1/8 inch in 10 feet (3 mm in 3.05 m) non-cumulative.
3. Variation in Plane between Adjacent Stone Units (Lipping): +/- 1/32-inch (0.8-mm) difference between planes of adjacent units.

4. Face Widths of Joints: +/- 1/32 inch (0.8 mm).

3.7 FLOOR INSTALLATION METHODS

A. Thinset Stone Tile over Concrete Slabs (Typical): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.

2. Concrete Subfloors, Interior: TCNA F113 Stone.

   a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
   b. Wipe the back of each stone tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to stone tiles.
   c. Immediately after wiping stone tile backs, but prior to placing stone tile, the mortar shall be troweled to back of stone tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
   d. Place stone tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of stone tile units using water damp sponges. Rake out joints to depth required to receive grout as stone tile units are set.
   e. Prohibit foot and wheel traffic on stone tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-Portland Cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

B. Thinset Stone over Crack Isolation Membrane: Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.

2. Concrete Subfloors, Interior: TCNA F125-Full Stone.

   a. Apply the mortar to crack isolation membrane covered slab with the flat side of the

trowel.

b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
c. Wipe the back of each stone tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to stone tiles.
d. Immediately after wiping tile backs, but prior to placing stone tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
e. Place stone tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as stone tile units are set.
f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-Portland Cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

C. Medium-set Stone Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.

2. Concrete Subfloors, Interior: TCNA F113 Stone except apply medium set bed thickness.

a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
b. Wipe the back of each stone tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to stone tiles.
c. Immediately after wiping stone tile backs, but prior to placing stone tile, the mortar shall be troweled to back of stone tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
d. Place stone tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of stone tile using water damp sponges. Rake out joints to depth required to receive grout as stone tile units are set.
e. Prohibit foot and wheel traffic on stone tiled floors for period of time as

recommended by the mortar manufacturer.

3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-Portland Cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

D. Thick-set Stone Flooring (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar and Bond Coat:

   a. Latex-Portland Cement Mortar: ANSI A108.1A (Wet Set Method).

   b. Latex-Portland Cement Bond Coat: ANSI A108.5.

2. Concrete Subfloors, Interior: TCNA F121 Stone.

   a. Apply ½ of the mortar bed to slab and place reinforcing wire fabric. After placing mesh, apply balance of mortar bed. The mortar shall be rodded and compacted with a steel trowel.
   b. Wipe the back of each stone flooring unit, with a damp sponge, to remove all dust or dirt immediately before applying bond coat to stone flooring units c. Immediately after wiping stone flooring backs, but prior to placing them, the mortar shall be troweled to back of each stone flooring unit for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
   d. Place stone flooring unit onto the green mortar bed, maintaining 1/8-inch (3-mm) wide joints and true accurate pattern as shown. Tamp stone flooring unit with wood block and rubber mallet to produce finish levels of stone flooring matching adjacent stone flooring surfaces. Beating shall take place prior to mortar taking and initial set. Exercise care to quickly remove spillage from faces of stone flooring using water damp sponges. Rake out joints to depth required to receive grout as stone flooring units are set.
   e. Prohibit foot and wheel traffic on stone floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-Portland Cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

E. Stone Thresholds: Install stone thresholds in one piece, notched to fit neatly at door jambs; set in same type of setting bed as abutting field tile in accordance with TCNA Method TR611.

3.8 STONE TILE WALL INSTALLATION

A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply. Exercise care to quickly remove spillage from faces of stone using damp sponges. Rake out joints to depth required to receive grout as stone units are set.

1. Latex Portland Cement Mortar Installation (using specified Latex Portland Cement mortar material): ANSI A108.5.

2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCNA W243 Stone, place tiles maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown.

3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-Portland Cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.9 INSTALLATION OF COUNTERTOPS

A. Uncrate countertops and adhere, or fasten, to substrates where indicated.

1. Install countertops over plywood underlayment with full spread of water-cleanable epoxy adhesive unless otherwise indicated to be mechanically fastened.

B. Erect countertops level and true with joints, if any, uniform in width and accurately aligned. Do not install units which are cracked, chipped, discolored.

1. Make-up plumbing connections located in countertops in accordance with Division 22 work.

C. Grout joints, except joints shown to receive sealants, full and flush with grouts as specified herein. Tool joints uniformly, without voids, pinholes, or low spots, and slightly concave. Remove all grout spillage immediately. Cure grout as recommended by the manufacturer.

3.10 CLEANING, SEALING AND PROTECTION

A. Cleaning:

1. General: Upon completion of placement and grouting remove Latex-Portland

Cement grout residue and haze from stone as soon as possible.

2. Flooring:

   a. Curing: Before applying stone impregnator and stone soap allow the setting bed and grout materials to cure a minimum of 21 days.

   b. Floor Preparation: Clean substrates of substances that could impair penetration and bond of the stone impregnator to stone using cleaning solutions, dilution rates, dwell times as recommended by the stone impregnator manufacturer. Apply cleaning solutions using low speed (175 rpm) floor cleaning machine suitable for deep cleaning, and non-damaging to, smooth textured, stone surfaces coupled with a wet vac; by using a mop and bucket; or using auto-scrub brushing techniques each in accordance with the stone impregnator manufacturer's recommendations. If auto-scrub brushing, thoroughly scrub stone flooring using soft medium bristle brush heads, instead of nylon pads, to deep clean textured surfaces and grout joints of polished and honed finished surfaces. Test floor cleaning machine, or auto-scrub brushes, to ensure that they will not harm each of the finishes, and types, of stone flooring prior to cleaning operations. During machine cleaning, or auto-scrubbing, operations monitor the quality and cleanliness of the equipment, or brushes, to assure that they do not become worn or contaminated and scratch the finish of the stone flooring.

B. Sealing:

1. Impregnator Application: Allow floor to thoroughly dry for 24 to 72 hours after floor preparation. Using brush, or roller, applicators apply two thin, even, wet on wet coats of impregnator allowing 5 to 10 minutes between each coat for proper penetration unless otherwise recommended by the impregnator manufacturer. 10 to 15 minutes after final coat is placed, but prior to its surface drying, remove all excess "puddled" impregnator using a white cloth to avoid splotchy/dull areas. Allow 72 hours for impregnator to cure.

2. Surface Protection Coating: Not more than 4 days before occupancy by Owner apply no-rinse stone surface protection coating to stone using dilution rates as recommended by the surface protection coating manufacturer. Apply surface protection coating by using either mop and bucket or auto-scrub brushing techniques in accordance with the surface protection coating manufacturer's recommendations. If scrub brushing, thoroughly scrub stone flooring using soft medium bristle brush heads, instead of nylon pads, to deep clean textured surfaces and grout joints of polished and honed finished surfaces. Test brushes, to ensure that they will not harm each of the finishes, and types, of stone flooring prior to cleaning operations. During auto-scrubbing operations monitor the quality and cleanliness of the brushes, to assure that they do not become worn or contaminated and scratch the finish of the stone flooring. Do not rinse with water as rinsing will remove the stone surface protection coating.

C. Leave finished installation clean and free of warped, curled, cracked, chipped, broken, un-bonded, discolored and otherwise defective stone units.

1. Replace warped, curled, cracked, chipped, broken, unbonded, discolored and otherwise defective stone in manner which results in stonework matching approved samples and field-constructed sample installations, showing no evidence of replacement.

D. Protect installed stone work with minimum 40 lb kraft paper or other heavy, breathable, covering and maintain conditions in a manner acceptable to the stone material manufacturers and installer that ensures that stone work is without damage or deterioration at time of Substantial Completion.

NOTE: This guide specification covers the basic requirements for Interior Stonework.

Incorporate this information into the specifications for your project. For any deviations, please discuss with your designated LAWA representative.

End of Section 09 60 00

SECTION 09 66 13 - PORTLAND CEMENT TERRAZZO FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Poured-in-place Portland Cement Terrazzo Flooring and Base.

> **NOTE:** Some of the existing terrazzo installations at the airport are cementitious. In the event that one of these existing installations is required to be repaired or replaced, this guide specification section is to be utilized.

1.2 DEFINITIONS

A. Aggregate: Marble chips or other types of aggregate.

1.3 PREINSTALLATION MEETINGS

A. Pre-Installation Conference: Conduct conference at LAX.

1. Review methods and procedures related to terrazzo including, but not limited to, the following:

   a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
   b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   c. Review special terrazzo designs and patterns.
   d. Review procedures for coping with unfavorable forecasted weather conditions.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:

1. Divider strips.
2. Control-joint strips.

3. Expansion-joint strips.
4. Accessory strips.
5. Abrasive strips.
6. Stair treads, risers, and landings.
7. Terrazzo patterns.

C. Samples: For each exposed product and for each color and texture specified, 6 inches (150 mm) in size.

D. Samples for Initial Selection: NTMA color plates showing the full range of colors and patterns available for each terrazzo type.

E. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare Samples of same thickness and from same material to be used for the Work, in size indicated below:

1. Terrazzo: 6-inch- (150-mm-) square Samples.
2. Accessories: 6-inch- (150-mm-) long Samples of each exposed strip item required.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: .Engage an experienced Installer who is a current NTMA member in good standing and who has completed a minimum of 3 terrazzo installations similar in material and extent to that indicated for Project – as determined by LAWA – over the last 5 years and that have resulted in construction with a record of successful in-service performance.

> **NOTE:** A letter from the NTMA dated within 30 days of the bid, stating same, must be submitted with the bid. Any active investigations of contractor's work must be noted in this letter.

B. Material Certificates: For each type of terrazzo material or product, from manufacturer.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For terrazzo to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is a contractor member of NTMA.

B. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups for terrazzo including accessories.

a. Size: Minimum 100 sq. ft. (9 sq. m) of typical poured-in-place flooring condition for each color and pattern in locations directed by LAWA.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless LAWA specifically approves such deviations in writing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with terrazzo installation only when forecasted weather conditions permit work to be performed according to NTMA's written recommendations.

B. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.

C. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

B. FloorScore Compliance: Terrazzo floors shall comply with requirements of FloorScore Standard.

C. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 PORTLAND CEMENT TERRAZZO

A. Portland Cement Terrazzo System: Sand cushion.

1. Underbed: Comply with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo system indicated for component proportions and mixing.
2. Topping: Comply with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo system indicated for matrix and aggregate proportions and mixing.

    a. Terrazzo Topping Thickness: As required.
    b. Formulated Mix Color and Pattern: Insert NTMA color plate designation.
    c. Custom Mix Color and Pattern: Match existing.

B. Materials:

1. Portland Cement: ASTM C 150, Type 1.

    a. Color for Exposed Matrix: As required by mix indicated.

2. Water: Potable.
3. Sand: ASTM C 33/C 33M.
4. Aggregates: Comply with NTMA gradation standards for mix indicated and contain no deleterious or foreign matter.

    a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
    b. 24-Hour Absorption Rate: Less than 0.75 percent.
    c. Dust Content: Less than 1.0 percent by weight.

5. Matrix Pigments: Pure mineral or synthetic pigments, alkali resistant, durable under exposure to sunlight, and compatible with terrazzo matrix.
6. Bonding Agent: Neat Portland Cement, or epoxy or acrylic bonding agents formulated for use with topping indicated.
7. Underbed Reinforcement: Galvanized welded-wire reinforcement, wire 2 by 2 inches (51 by 51 mm) by 0.062 inch (1.57 mm) in diameter, complying with ASTM A 185/A 185M and ASTM A 82/A 82M, except for minimum wire size.
8. Isolation Membrane: Polyethylene sheeting, ASTM D 2103, Type 13300, 4 mils (0.1 mm) thick; or unperforated asphalt felt, ASTM D 226, Type I (No. 15).

2.3 STRIP MATERIALS

A. Standard Divider Strips: One-piece, flat-type strips for grouting into sawed joints prepared in substrate.

B. Heavy-Top Divider Strips: One-piece, flat-type strips for grouting into sawed joints prepared in substrate.

C. Heavy-Top Angle Divider Strips: One-piece, L-type angle strips with anchoring device and in depth required for topping thickness indicated.

D. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material and color of divider strips and in depth required for topping thickness indicated.

E. Expansion-Joint Strips: Brass, with removable zip-strip top for installing sealant; minimum 1/2 inch (12.7 mm) wide.

F. Accessory Strips: Match divider-strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:

1. Base-bead strips for exposed top edge of terrazzo base.
2. Edge-bead strips for exposed edges of terrazzo.
3. Nosings for terrazzo stair treads and landings.

2.4 MISCELLANEOUS ACCESSORIES

A. Strip Adhesive: Recommended by manufacturer for this use.

1. Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Anchoring Devices:

1. Strips: Provide mechanical anchoring devices or adhesives for strip materials as recommended by manufacturer and as required for secure attachment to substrate.

C. Isolation and Expansion-Joint Material: Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, and non-outgassing in unruptured state; butyl rubber; rubber; minimum 1/2 inch (12.7 mm) wide.

D. Portland Cement Terrazzo Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by cleaner manufacturer for use on terrazzo type indicated.

E. Sealer: Slip- and stain-resistant, penetrating-type sealer that is chemically neutral; does not affect terrazzo color or physical properties; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.

1. Surface Friction: Not less than 0.6 according to ASTM D 2047.
2. Acid-Base Properties: With pH factor between 7 and 10.
3. Sealers shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. Product: “Scotchgard Stone Floor Protector” or LAWA approved equal.
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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions, including levelness tolerances, have been corrected.

3.2 PREPARATION

A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.

1. Roughen concrete substrates before installing terrazzo system according to NTMA's written recommendations.

B. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

1. Moisture Testing: Perform tests indicated below.

a. Calcium Chloride Test: Perform anhydrous calcium chloride test per ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

1) Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform not less than two tests in each installation area and with test areas evenly spaced in installation areas.

b. In-Situ Probe Test: Perform relative-humidity test using in-situ probes per ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative-humidity-level measurement.
c. Test Method: Test for moisture content by method recommended in writing by terrazzo manufacturer. Proceed with installation only after substrates pass testing.

C. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.

1. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.3 INSTALLATION, GENERAL

A. Comply with NTMA's written recommendations for terrazzo and accessory installation.

B. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet (6.4 mm in 3 m); noncumulative.

C. Underbed:

1. Comply with NTMA's "Terrazzo Specifications and Design Guide" for underbed installation.
2. Cover entire surface to receive terrazzo with dusting of sand.
3. Install isolation membrane over sand, overlapping ends and edges a minimum of 3 inches (75 mm).
4. Install welded-wire reinforcement, overlapping at edges and ends at least two squares. Stop mesh a minimum of 1 inch (25 mm) short of expansion joints.
5. Place underbed and screed to elevation indicated below finished floor elevation.

D. Strip Materials:

1. Divider and Control-Joint Strips:

a. Locate divider strips directly over control joints, breaks, and saw cuts in concrete slabs.
b. Install control-joint strips back to back and directly above concrete-slab control joints.
c. Install control-joint strips with 1/4-inch (6.4-mm) gap between strips, and install sealant in gap.
d. Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.

2. Expansion-Joint Strips: Form expansion joints using divider strips and install directly above concrete-slab expansion joints.

> **NOTE:** All expansion and control joints within the existing concrete slab are to be carried through the terrazzo, to the finish surface.

3. Accessory Strips: Install as required to provide a complete installation.
4. Abrasive Strips: Install with surface of abrasive strip positioned 1/16 inch (1.6 mm) higher than terrazzo surface.

3.4 POURED-IN-PLACE TERRAZZO INSTALLATION

A. Pour in place and seed additional aggregates in matrix to uniformly distribute granular material and produce a surface with a minimum of 70 percent aggregate exposure. Cure and finish Portland Cement Terrazzo according to NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.

1. Grinding: Delay grinding until heavy trade work is complete and construction traffic through area is restricted. Exercise extreme care to ensure fluids from grinding operation do not react with dividers and strips to produce a stain on aggregate.

   a. Rough Grinding: Grind with 24 or finer grit stones or with comparable diamond plates.

   b. Intermediate Grinding: Follow initial grind with 80 or finer grit stones.

   c. Grouting: Cleanse floor with clean water and rinse thoroughly. Remove excess rinse water by wet vacuum and machine until completely dry. Apply epoxy grout to fill voids.

   d. Fine Grinding: Grind with **120** or finer grit stones until all grout is removed from surface. Upon completion terrazzo shall show a minimum of 70% to 75% of marble chips.

3.5 REPAIR

A. Cut out and replace terrazzo areas that evidence lack of bond with substrate or underbed, including areas that emit a "hollow" sound if tapped. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by LAWA.

3.6 CLEANING AND PROTECTION

A. Terrazzo Cleaning:

1. Remove grinding dust from installation and adjacent areas.
2. Wash surfaces with cleaner immediately after final cleaning of terrazzo flooring according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow them to dry thoroughly.

B. Sealing:

1. Seal surfaces according to NTMA's written recommendations.
2. Apply sealer according to sealer manufacturer's written instructions.

C. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 66 13

SECTION 09 66 23 – RESINOUS MATRIX TERRAZZO FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes resinous matrix (epoxy) terrazzo.

1.2 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For terrazzo installed on walkway surfaces, provide finished installation with the following values as determined by testing per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.3 SUBMITTALS

A. Product Data: Submit product data for each material indicated.

B. Shop Drawings: Submit shop drawings showing the extent of each terrazzo matrix, type, size and layout of divider strips, control joint strips, and edge strips

1. Indicate layout of abrasive strips at stair nosings.

2. Indicate layout of stair treads, risers, and landings.

3. Large scale details of precast terrazzo jointing and edge conditions, including anchorage details.

C. Samples: Submit samples of each of the following items for each type, color, and pattern of terrazzo and accessory required and in size indicated below. Sample submittals shall be for color, pattern and texture only. Compliance with other requirements is the responsibility of the Contractor.

1. Epoxy Terrazzo: 6-inch- (150-mm-) square Samples.
2. Precast Epoxy Terrazzo Base: 12-inch- (300-mm-) long Samples.
3. Precast Epoxy Terrazzo Tread: 12-inch- (300-mm-) long Samples.
4. Precast Epoxy Terrazzo Riser: 12-inch- (300-mm-) long Samples.
5. Accessories: 6-inch- (150-mm-) long Samples of each exposed strip item required.

NOTE: With previous terrazzo installations at the airport, a minimum of three sample runs have been required in order to achieve the approved design.

D. Field Testing: Submit pre-installation relative humidity probe readings and pH testing for information only. Readings shall be prepared in accordance with ASTM F2170.

E. Maintenance Data: Submit copies of instructions for maintenance of each type of terrazzo.

F. Warranty: Submit sample copies of the Moisture Vapor Transmission (MVT) warranty to verify compliance with specification. Submit executed copies of epoxy terrazzo warranty as specified herein.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who is a current NTMA member in good standing and who has completed a minimum of 3 terrazzo installations similar in material and extent to that indicated for Project – as determined by LAWA – over the last 5 years and that have resulted in construction with a record of successful in-service performance.

> **NOTE:** A letter from the NTMA dated within 30 days of the bid, stating same, must be submitted with the bid. Any active investigations of contractor's work must be noted in this letter.

B. Standard: Except as modified by governing codes and by the Contract Documents, comply with applicable provisions and recommendations of the NTMA Terrazzo Information Guide Specification.

C. Sample Installations:

1. Following acceptance of samples, provide sample installations of the following where directed by the LAWA.

    a. Floors: Cast a typical module (minimum 10' x 10') of interior flooring including divider strips.

2. Sample installations shall be complete with all bedding, jointing, and sealants as shown in accordance with the final shop drawings. Sample installations shall be reviewed by the Architect for acceptance of terrazzo assemblies including jointing and workmanship. Replace unsatisfactory work as directed. Maintain sample installations during construction as a standard for judging acceptability of terrazzo work. Properly finished and maintained sample installations shall be retained as a portion of the completed work.

1.5 PROJECT CONDITIONS

A. Deliver materials, other than bulk materials, in manufacturer's unopened containers, fully identified with trade name, grade and color.

B. Store materials above grade, protected from the weather, soiling or damage from any source. Store in accordance with manufacturer's instructions.

C. Wrap precast units individually in polyethylene film or other non-staining protective cover and mark each unit for proper identification of installed location.

1.6 PROTECTION

A. Protect terrazzo work throughout the construction period so that it will be without any indication of use or damage at the time of acceptance by LAWA.

1.7 WARRANTY

A. Manufacturer and installer shall supply to LAWA a three year Joint and Several Warranty from the date of substantial completion stating that the Moisture Vapor Barrier shall protect the epoxy terrazzo installation from moisture related blistering or disbondment and that in the event of defects related to moisture vapor transmission within the stipulated period, the manufacturer and installer shall jointly or severally effect all repairs or replacement necessary to remedy defects at the convenience of, and no cost to LAWA.

PART 2 - PRODUCTS

2.1 EPOXY TERRAZZO

A. Epoxy Terrazzo Material Products and Manufacturers: The epoxy resin terrazzo specifications are based on Terroxy Resin System by Terrazzo and Marble (T & M) Supply Companies.

1. The following terrazzo systems and manufacturers are capable of providing epoxy resin terrazzo flooring complying with the requirements of the Contract Documents.

   a. General Polymers; Thin-Set Epoxy Terrazzo #1100 Flooring System.

   b. Crossfield Products Corp., Dex-O-Tex Division; Dex-O-Tex Cheminert Terrazzo.

   c. Master Terrazzo Technologies, LLC; Morricite.

2. System Performance: The epoxy resin flooring system shall possess the following properties:

Compressive Strength, ASTM D695	10,000 psi
Water Absorption, ASTM D570	0.10 %
Tensile Strength, ASTM D638	3,000 psi
Flexural Strength, ASTM D790	4,500 psi
Adhesion, ACI 503R	350 psi, 100% concrete failure
Hardness, ASTM D2240	65-85 Shore D
Impact Resistance – MIL-D-3134, Sec. 4.7.3	Withstands 16 ft/lbs. no chipping, cracking, spalling or loss of adhesion.
Abrasion Resistance, ASTM D4060, CS 17 Wheel	70-90 milligrams lost
Slip Resistance	Meets ADA Standards

Critical Radiant Flux, ASTM D648	.90
Thermal coefficient of linear expansion, ASTM D696	25 x 10^{-6} in/in/ degree F.

B. Moisture Vapor Barrier: One of the following:

1. Barrier Primer; Terrazzo and Marble (T & M) Supply Companies.

2. FasTop MVT or AquArmorS; General Polymers.

C. Flexible Epoxy Membrane (Crack Bridging Membrane): 100% solids for crack preparation followed by full coverage application.

1. Products: One of the following:

   a. Isocrack Membrane; Terrazzo and Marble (T & M) Supply Companies.

   b. 3556 EPO-FLEX Flexible Epoxy Membrane; General Polymers.

2. System Performance: The flexible epoxy membrane shall possess the following properties:

Tensile Strength, ASTM D412	1,000-1,300 psi
Elongation at Break, ASTM D412	130-145%
Adhesion, ACI 503R	350 psi, 100% concrete failure
Hardness, ASTM D2240	23 Shore D
Thermal Cycling, ASTM C884 (24 hours, -21C to +25C	No Cracking
Flammability	Self-extinguishing over concrete
VOC	Zero
The epoxy elastomer must be free of solvent, external plasticizers, coal tar, known carcino-gens, rubber compounds or nitrile butadienes	

D. Fabric Reinforcing: Fiberglass of type and manufacture recommended and acceptable to the matrix manufacturer.

1. FS38-4.4 Fiberglass Scrim; General Polymers.

E. Aggregates: Natural, sound, crushed stone chips, mother of pearl, glass, plastic, and metal filings with colors selected and graded to match Architect's samples, but with maximum size within limits of workability for terrazzo thickness indicated.

1. Sizes shall be **#1's** and **#0's only,** conforming with N.T.M.A. standards.

2. Abrasion and impact resistance shall not exceed 40% loss per ASTM C131.

3. 24 hour absorption rate not to exceed 0.75 percent.

4. Chips shall contain no deleterious or foreign matter.

5. Dust content less than 1% by weight.

6. Obtain and stockpile each aggregate material from a single source of consistent quality in appearance and physical properties for the entire project.

F. Epoxy Fill Mortar: 100% Solids fill mortar system including blended aggregate of a type recommended by the epoxy resin terrazzo manufacturer. One of the following:

1. Terroxy Fill; Terrazzo and Marble (T & M) Supply Companies.

2. 3520 Epoxy Terrazzo Matrix as the binder resin mixed with dry silica sand; General Polymers.

G. Finishing Grout: 100% solids resin-based grout with filler and pigments as recommended by matrix manufacturer. One of the following:

1. Terroxy Grout; Terrazzo and Marble (T & M) Supply Companies.

2. 3520 Epoxy Terrazzo Matrix with 5271 Terrazzo Grout Additive; General Polymers.

H. Substrate Primer: 100% solids, moisture insensitive, two-component resin recommended by matrix manufacturer. No solvent containing primers are allowed.

2.2 MIXES

A. Toppings: Adjust topping mixes as required to obtain LAWA's acceptance for each type, color, pattern and finish. Refer to the drawings and finish schedules for the extent of each topping and finish; the following topping mixes were used to develop the Architect's samples. The samples were prepared by and reflect sample controls numbers of using Terrazzo and Marble (T & M) Supply Companies terrazzo materials. Each precast terrazzo unit shall be composed of a single mix design prepared using the matrices specified, precast units consisting of a face mix and a backup mix shall not be permitted. Adjust Portland cement precast mixes, for bases, treads and riser units, as required to obtain LAWA's acceptance for matching the type, color, pattern and finish of the epoxy matrix type, color pattern and finish indicated on the drawings for the base, tread and riser units.

1. TR-01: Refer to Sample #1 in the Terrazzo Chart below.

2. TR-02: Refer to Sample #2 in the Terrazzo Chart below.

NOTE: A white field with dark aggregate will maintain a clear appearance longer. In a multi color design, a matrix with a repetition of aggregate is helpful in order to create a more unified appearance.

TERRAZZO CHART

Sample #1		**Chip Blend**		
Matrix Color	**Resin Color # & Fanfold**	**Aggregate**	**Size**	**%**
	Resin Color selected to match		0's	90
			0's	10
Sample #2		**Chip Blend**		
Matrix Color	**Color # & Fanfold**	**Aggregate**	**Size**	**%**
	Resin Color selected to match		1's & 0's	90
			1's, & 0's	10

B. Precast Terrazzo Base and Stair Tread/Riser Setting Beds:

1. Cement Setting Bed Mix: 226 Thick Bed Mortar Mix; Laticrete International Inc.

2. Liquid Latex Additives: Laticrete 3701 Liquid Latex Mortar Admix.

3. Mixing: Comply with the manufacturers printed recommendations for either machine or hand mixing of setting bed mixes.

   a. Mix 6 bags of cement setting bed mix to 1 pail (5 gal.) of liquid latex additive. Adjust quantity of liquid latex additive to bring the cement setting bed to the proper consistency for placing.

4. Welded Wire Fabric for Setting Bed Reinforcement at Metal Stair Risers and Treads: ASTM A185, 2 in. x 2 in. x 16 gage, galvanized.

C. Grout for Precast Items: Polymer-modified tile grout composed of ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients to which only water must be added at Project site, and complying with ANSI A118.6, custom colored to match adjacent precast terrazzo tile units.

NOTE: the mix design shall consist no more than 40% glass / mirror. Recycled glass is not permitted. All glass/mirror or aggregate shall be no larger than #1, (#0s and #1s only).

The Contractor shall also premix all terrazzo ingredients which are able to be combined prior to installation (Epoxy Part A and B and aggregate mixes). This premix process shall occur in a clean and neat factory or laboratory environment. Quantities should be carefully measured on certified/calibrated scales and mixing shall follow laboratory best practices. The resulting premixed ingredients shall then be packaged in clean, clearly labeled, hard sided containers in ratios whereby labor staff can combine in the field with no need to calculate or measure. LAWA or its authorized third party inspectors shall have continuous and unabated access to witness/inspect the factory/laboratory premix and packaging processes.

2.3 ACCESSORIES

A. Divider and Stop Strips: White alloy zinc, 1/8" in. thick x depth as indicated for terrazzo topping. Angle or "T" - types. Verify compatibility of divider and stop strips with resin supplier prior to ordering.

1. Control Joint Strips: Laminations of 16 gage zinc, back to back strips infilled with Flexible Epoxy Membrane pigmented to match resin color of epoxy terrazzo.

B. Cleaner: A neutral chemical cleaner, specially compounded for cleaning terrazzo of the types indicated, as recommended by the manufacturer of the cleaner with the following minimum characteristics.

1. pH factor between 7 and 10.

2. Biodegradable and phosphate free.

3. Free form crystallizing salts or water soluble alkaline salts.

C. Floor Sealer: Waterbased, colorless, stain-resistant penetrating sealer with Ph factor between 7 and 10, that does not affect color or physical properties of terrazzo surface, and which will provide an anti-slip coefficient of friction of greater than 0.6.
1. Product: “Scotchgard Stone Floor Protector”
2. LAWA approved Equal

D. Joint Sealants: Two-Part Polyurethane Sealant (Self Leveling), refer to Section 079200, JOINT SEALANTS.

E. Channels to receive abrasive inserts at Precast Stair Nosings: 16 gauge aluminum channel.

F. Abrasive Inserts: One line composition strips filled with 100 or finer carborundum, aluminum oxide or silicon carbide, black, mixed 4 parts to 1 with a binding material.

G. Reinforcing, Anchors and Fasteners for Precast Units:

1. Reinforcing for Treads and Risers: ASTM A615, grade as selected by fabricator. Reinforcing adjacent to the exposed surface of panels is to be positioned and firmly held in place by hangers, or other means without the use of form-contact bar supports.

2. Welded Wire Fabric for Treads and Risers: ASTM A185, 2 in. x 2 in. x 16 gage, galvanized.

3. Anchors and Fasteners: All anchors, clips, shapes, fasteners, dowels, cramps, and accessories for erecting precast terrazzo units shall be galvanized steel devices of grade, type, size and number required to attach precast terrazzo to supporting stair substrates.

H. Precast Portland Cement Terrazzo Base, Tread and Riser Materials (To be used when proposing Alternate):

1. Portland Cement: ASTM C150, Type I, non-air entraining, non-staining white and gray as required to match Architect's epoxy terrazzo samples. Obtain cement from a single source for all work of one color.

2. Sand: ASTM C33 for fine aggregates as required to match Architect's epoxy terrazzo samples.

3. Water: Fresh, clean and potable.

4. Aggregates, Glass, Plastic and Shell Materials: As required to match Architect's epoxy terrazzo samples.

5. Pigments: Pure mineral pigments, resistant to alkalis, nonfading and weatherproof, colors as required to match Architect's epoxy terrazzo samples.

2.4 PRECAST UNIT FABRICATION

A. Precast Terrazzo Bases: Fabricate precast terrazzo bases from epoxy terrazzo materials to the sizes, shapes and profiles shown and from the terrazzo mix(es) indicated.

1. The minimum thickness of the precast terrazzo base shall be ½".

2. Forms: Construct forms of non-staining metal, fiberglass reinforced polyester, plywood, or other acceptable material. Fabricate and reinforce forms for close control of dimensions and details. Construct forms tightly to prevent leakage of mixes. Form joints will not be permitted on faces exposed to view in the finished work.

3. Mixing and Placing: Mix terrazzo mixes to distribute fine and coarse aggregate evenly throughout. Place terrazzo so as to prevent segregation in the forms.

4. Curing: Allow units to cure.

5. Casting Tolerances: As required to achieve installation tolerances. Units which have bowed, warped, or curled shall not be acceptable.

B. Precast Terrazzo Treads and Risers: Fabricate precast terrazzo treads and risers from epoxy terrazzo materials to the sizes, shapes and profiles shown to match the epoxy terrazzo mix indicated for treads and risers.

1. The minimum thickness of the precast terrazzo stairs and treads shall be 1-1/2". Provide 2 lines of abrasive insert at stair tread nosing.

2. Forms: Construct forms of non-staining metal, fiberglass reinforced polyester, plywood, or other acceptable material. Fabricate and reinforce forms for close control of dimensions and details. Construct forms tightly to prevent leakage of mixes. Form joints will not be permitted on faces exposed to view in the finished work.

3. Reinforcement: Place welded wire and reinforcing bars of size and spacings as required to resist shrinkage, temperature and handling stresses. Support and space reinforcement using devices to ensure that it will remain positioned in the precast terrazzo units as required. Keep reinforcement from the edges and surfaces of the units.

4. Mixing and Placing: Mix terrazzo mixes to distribute fine and coarse aggregate evenly throughout. Place terrazzo so as to prevent segregation in the forms.

5. Curing: Allow units to cure.

6. Casting Tolerances: As required to achieve installation tolerances. Units which have bowed, warped, or curled shall not be acceptable.

C. Surface Treatment:

1. Finish surfaces exposed to view to match accepted samples in all respects. Provide smooth joints and square edges.

2. Finish: Allow terrazzo to obtain sufficient strength prior to grinding and as required to withstand handling stresses and to produce a terrazzo finish consistent with the accepted samples. Protect corners and edges to preserve uniform, straight arrisses and corners. Grind in a continuous operation, using grinding equipment to achieve a uniform appearance. Do not change equipment, materials, procedure or operating personnel during the course of the grinding work for the entire Project. Discard and replace terrazzo units which develop any irregular penetration or appearance, or swirl marks as a result of grinding. Select type of grit gradation(s) and speed of operation to achieve the following:

a. Match finish of cast in place epoxy terrazzo as specified under Part 3 – Execution below.

3. Abrasive Inserts for Stair Treads:

a. Carefully mask terrazzo on either side of abrasive channel to protect finished terrazzo.

b. Clean all foreign matter from channel.

c. Trowel abrasive mix into channel with finished elevation approximately 1/16" above terrazzo tread.

d. After abrasive mix has set, remove masking material and allow to cure.

PART 3 - EXECUTION

3.1 CONDITION OF SURFACES

A. Examine the substrates and adjoining construction and the conditions under which the Work is to be installed. Do not proceed with the Work until unsatisfactory conditions have been corrected. Examine areas to receive terrazzo for:

1. Defects in existing work that affect proper execution of terrazzo work.

2. Deviations beyond allowable tolerances for the concrete slab work. The substrate shall not exceed ¼" in a 10'-0" span. When placing a 10 foot straightedge anywhere on the substrate, at no point shall the gap between the straightedge and the substrate exceed ¼".

3. Ensure that the building expansion joints in the floor area are raised or lowered to actual finish elevation of terrazzo.

4. Ensure that drains in installation area are functional and raised or lowered to actual finish elevation of terrazzo.

3.2 PREPARATION

A. General: Comply with NTMA specifications and recommendations, unless otherwise shown or specified for preparation of substrate.

B. Substrates to Receive Epoxy Terrazzo: After the removal of existing floor coverings in areas to receive the terrazzo work, and before the terrazzo flooring installation, visit the jobsite to evaluate substrate condition. The evaluation shall include a determination of the suitableness of the substrate to receive the epoxy terrazzo materials and to test for moisture and alkalinity of the substrate. Test for moisture by relative humidity probe and digital meter method according to ASTM F 2170 "Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-situ Probes" and the probe manufactures instructions. Use a minimum of 1 probe for every 5,000 sf of surface to receive terrazzo flooring. Proceed with the epoxy floor system installation only after substrates have a maximum relative-humidity-measurement reading of 75 percent in 24 hours. If the pH of the slab is 10 or lower, notify the manufacturer for preparations required to ensure a good bond.

1. Probe Manufacturer: A relative humidity probe kit and manufacturer known to comply with the requirements includes "The Rapid RH Probe" manufactured by Wagner Electronic Products, Inc., Rogue River, OR. (800) 207-2164 (v).

C. Surface Treatment:

1. Prepare slab substrates, (*including any existing cementitious terrazzo*) to "open" surface pores by means of light scarification, medium shot blast or medium scarification with a vacuum unit. Surface preparation results shall achieve a minimum Concrete Surface Profile (CSP) of 5 according to International Concrete Repair Institute Guideline No. 03732. Remove all contaminating or bond breaking substances including but not limited to dust, laitance, curing compounds, coatings, sealers, oil, grease, existing floor covering adhesives and mastics. All oil or grease not removed by scarification or blasting shall be removed by either detergent scrubbing with heavy duty cleaner/degreaser, low pressure water cleaning, steam cleaning, or chemical cleaning methods in accordance with the manufacturers written instructions. All spalled or deteriorated slab surfaces shall be mechanically removed by scabbling or chipping hammers. Acid etching is not acceptable.

> **NOTE:** Many of the existing sub-floor areas of the existing Terminals are not level and require extensive floor prep. All existing finishes such as but not limited to Fritztile are to be removed from the concrete slab.

2. Apply moisture vapor barrier across the entire area to receive the epoxy terrazzo in accordance with the manufacturer's recommendations.

3. Repair or level damaged slab surfaces with epoxy fill mortar. Latex fills or self-leveling underlayments are not acceptable.

4. Flexible Epoxy Membrane (Crack Bridging Membrane) Placement:

    a. Install flexible epoxy membrane at 40 mils thickness over the moisture vapor barrier and embed fabric reinforcement. Follow the specific recommendations of the flooring manufacturer for detailing at terminations, construction control joints, construction joints, building columns, and base conditions. Thoroughly mix flexible epoxy membrane and apply to prepared moisture vapor coated slab substrates according to manufacturer's instructions. Allow membrane to level until no ridges are showing.

5. Cracks and non-expansion joints greater than 1/16" wide after surface preparation shall be prepared until sound and treated with membrane materials in accordance with the instructions of the epoxy terrazzo manufacturer and as follows. Allow in base bid for above crack detailing as follows - 5% of lineal footage of total project square footage for combined Type 1 & 2, and 3% of lineal footage of Type 3. (i.e., a 10,000 sq ft project would allow for a combined 500 lineal feet of Type 1 & 2 repairs and 300 lineal feet of Type 3 repairs.

    a. Type 1 Crack Detailing: Hairline cracks shall receive detail coat of epoxy primer with 6" fabric reinforcement.

    b. Type 2 Crack Detailing Fill cracks greater than hairline but less than 1/16" wide after surface preparation with neat, epoxy membrane. Place detail coat of epoxy

membrane over crack and embed 12" fiberglass cloth. Lightly abrade or solvent wipe treated cracks prior to applying primer.

c. Type 3 Crack Detailing Fill cracks greater than 1/16" with flexible epoxy membrane. Place 25-30 mil detail coat so that flexible epoxy membrane extends at least 9” to 12” on each side of crack or joint. After flexible epoxy membrane has leveled, lay precut reinforcing fabric into wet membrane. Smooth cloth with a flat steel trowel, allowing cloth to be encapsulated but remain exposed on the surface of flexible epoxy membrane. Lightly abrade or solvent wipe treated cracks prior to applying primer.

NOTE: For the floor leveling purposes, the Bid cost for Epoxy Terrazzo shall include the price for installing a 5/8” minimum epoxy sand level.

3.3 INSTALLATION

A. General: Comply with NTMA specifications and recommendations, unless otherwise shown or specified for installation of strips, placing, curing, grinding, and finishing of terrazzo. Make provisions for protecting adjacent work from terrazzo placement and finishing.

1. Extend terrazzo work into recesses and under equipment in the spaces shown or scheduled to receive terrazzo. Form a complete covering without interruptions or seams, except provide divider strips where shown. Place and finish terrazzo uniformly and neatly around obstructions so as to achieve continuous color, pattern and finish throughout the Work.

2. Complete terrazzo work prior to contiguous work which might be damaged by water or other materials used.

B. Epoxy Terrazzo:

1. Control Joints, Stop Strips and Divider Strips:

a. Control Joints: Place back to back angle divider strips **directly over concrete control joints** leaving a space appropriate for anticipated movement – typically 1/4” – 3/8”. Fill gap between control joints with divider strip joint sealant. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo.

NOTE: All control joints to be carried to the surface.

b. Stop Strips: Install stop strips at perimeter of epoxy terrazzo flooring fields. Adhere stop strips with substrate primer – do not fasten to concrete. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo.

c. Divider Strips: Place divider strips directly over concrete where indicated on the drawings. Adhere divider strips with substrate primer – do not fasten to concrete. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo.

NOTE: All pours to be to the divider strips. Phased pours in areas within the divider strips shall not be allowed unless directed otherwise by LAWA. The leg of the divider strip shall be fully bonded to the slab. When two divider strips are joined, the ends shall touch and align.

2. Placing Epoxy Terrazzo:

a. Clean and prepare substrate to comply with NTMA specifications for type of terrazzo application indicated. Clean substrate of loose chips and foreign matter.

b. Priming: Apply epoxy primer evenly over prepared flexible membrane at the rate of 200-300 square feet per gallon, to thoroughly wet surface, but avoiding "ponding" the material.

c. For thin-set terrazzo topping, comply with resin manufacturer's recommendations for proportioning mixes.

d. Comply with NTMA guide specifications previously referenced under "Thin-Set Terrazzo Materials" and with matrix manufacturer's directions for installing thin-set terrazzo. Match Architect's samples and provide total material thickness of not less than 3/8”. Allow cure per manufacturer's recommendations prior to grinding operations.

3. Grinding: Exercise extreme care to ensure fluids from grinding operation do not react with dividers and strips to produce a stain on aggregate. Delay grinding until heavy trade work is completed and construction traffic through the area is restricted.

a. Rough Grinding: Grind with 24 or finer grit stones or with comparable diamond plates.

b. Intermediate Grinding: Follow initial grind with 80 or finer grit stones.

c. Grouting: Cleanse floor with clean water and rinse thoroughly. Remove excess rinse water by wet vacuum and machine until completely dry. Apply epoxy grout to fill voids.

d. Fine Grinding: Grind with **120** or finer grit stones until all grout is removed from surface. Upon completion terrazzo shall show a minimum of 70% to 75% of marble chips.

C. Precast Terrazzo:

1. Preparation: Clean precast terrazzo surfaces which have become dirty or stained prior to setting to remove soil, stains and foreign materials. Clean precast terrazzo by thoroughly

scrubbing with fiber brushes followed by a thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh filler or abrasives.

2. Installation, General:

   a. Employ only skilled and experienced workmen to install the precast terrazzo work. Use carborundum or diamond tipped power saws to cut precast terrazzo units which need to be fitted to existing field conditions.

   b. Set precast terrazzo units to comply with requirements indicated on drawings and final shop drawings. Install anchors, supports, fasteners and other attachments indicated or necessary to secure precast terrazzo work in place. Shim and adjust anchors, supports and accessories to set precast terrazzo work accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned.

   c. Installation Tolerances:

      1) Joint Widths: +/- 1/16".

      2) Variation from Plumb: +/- 1/16".

      3) Variation from Level: +/- 1/8" in 20', non-cumulative.

      4) Piece Alignments (Edge to Edge): +/- 1/32".

3. Installation of Wall Base: Install base where indicated, after placing floors, and in accordance with NTMA, and the applicable provisions of TCA W243 and ANSI A108.5. Tamp units into setting bed to achieve a full bond without voids. Level units at joints. Grind at joints to remove any minor discrepancies in level of units. Replace warped, stained, damaged and non-matching units as directed. Grout joints, except those shown to receive sealant or divider strips, with a mixture of Portland cement, pigment and water, matching the matrix of the unit being grouted.

4. Installation of Stair Tread/Risers: Place setting bed on steel pan and poured in place concrete type stairs where shown and in accordance with NTMA, and the applicable provisions of TCA S151 Method F111 (for steel pan stairs) and Methods F112 and W211 (for concrete stairs) and ANSI A108.1A. Tamp units into setting bed to achieve a full bond without voids. Level units at joints. Grind at joints to remove any minor discrepancies in level of units. Replace warped, stained, damaged and non-matching units as directed. Grout joints, except those shown to receive sealant or divider strips, with a mixture of Portland cement, pigment and water, matching the matrix of the units being grouted.

3.4 CLEANING, SEALING AND PROTECTION

A. Clean terrazzo after installing and grinding operations are completed by thoroughly washing all terrazzo surfaces with a neutral cleaner. Rinse with clean water and allow surface to dry thoroughly. Apply sealer per manufacturer's recommendations.

B. Apply 3M Stone Floor Protector Sealer in two coats at the coverage rate of 2500 sq./gallon per coat in compliance with sealer manufacture instructions.

END OF SECTION 09 66 23

SECTION 09 66 23 – RESINOUS MATRIX TERRAZZO FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes resinous matrix (epoxy) terrazzo.

1.2 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For terrazzo installed on walkway surfaces, provide finished installation with the following values as determined by testing per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.3 SUBMITTALS

A. Product Data: Submit product data for each material indicated.

B. Shop Drawings: Submit shop drawings showing the extent of each terrazzo matrix, type, size and layout of divider strips, control joint strips, and edge strips

1. Indicate layout of abrasive strips at stair nosings.

2. Indicate layout of stair treads, risers, and landings.

3. Large scale details of precast terrazzo jointing and edge conditions, including anchorage details.

C. Samples: Submit samples of each of the following items for each type, color, and pattern of terrazzo and accessory required and in size indicated below. Sample submittals shall be for color, pattern and texture only. Compliance with other requirements is the responsibility of the Contractor.

1. Epoxy Terrazzo: 6-inch- (150-mm-) square Samples.
2. Precast Epoxy Terrazzo Base: 12-inch- (300-mm-) long Samples.
3. Precast Epoxy Terrazzo Tread: 12-inch- (300-mm-) long Samples.
4. Precast Epoxy Terrazzo Riser: 12-inch- (300-mm-) long Samples.
5. Accessories: 6-inch- (150-mm-) long Samples of each exposed strip item required.

NOTE: With previous terrazzo installations at the airport, a minimum of three sample runs have been required in order to achieve the approved design.

D. Field Testing: Submit pre-installation relative humidity probe readings and pH testing for information only. Readings shall be prepared in accordance with ASTM F2170.

E. Maintenance Data: Submit copies of instructions for maintenance of each type of terrazzo.

F. Warranty: Submit sample copies of the Moisture Vapor Transmission (MVT) warranty to verify compliance with specification. Submit executed copies of epoxy terrazzo warranty as specified herein.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who is a current NTMA member in good standing and who has completed a minimum of 3 terrazzo installations similar in material and extent to that indicated for Project – as determined by LAWA – over the last 5 years and that have resulted in construction with a record of successful in-service performance.

NOTE: A letter from the NTMA dated within 30 days of the bid, stating same, must be submitted with the bid. Any active investigations of contractor's work must be noted in this letter.

B. Standard: Except as modified by governing codes and by the Contract Documents, comply with applicable provisions and recommendations of the NTMA Terrazzo Information Guide Specification.

C. Sample Installations:

1. Following acceptance of samples, provide sample installations of the following where directed by the LAWA.

   a. Floors: Cast a typical module (minimum 10' x 10') of interior flooring including divider strips.

2. Sample installations shall be complete with all bedding, jointing, and sealants as shown in accordance with the final shop drawings. Sample installations shall be reviewed by the Architect for acceptance of terrazzo assemblies including jointing and workmanship. Replace unsatisfactory work as directed. Maintain sample installations during construction as a standard for judging acceptability of terrazzo work. Properly finished and maintained sample installations shall be retained as a portion of the completed work.

1.5 PROJECT CONDITIONS

A. Deliver materials, other than bulk materials, in manufacturer's unopened containers, fully identified with trade name, grade and color.

B. Store materials above grade, protected from the weather, soiling or damage from any source. Store in accordance with manufacturer's instructions.

C. Wrap precast units individually in polyethylene film or other non-staining protective cover and mark each unit for proper identification of installed location.

1.6 PROTECTION

A. Protect terrazzo work throughout the construction period so that it will be without any indication of use or damage at the time of acceptance by LAWA.

1.7 WARRANTY

A. Manufacturer and installer shall supply to LAWA a three year Joint and Several Warranty from the date of substantial completion stating that the Moisture Vapor Barrier shall protect the epoxy terrazzo installation from moisture related blistering or disbondment and that in the event of defects related to moisture vapor transmission within the stipulated period, the manufacturer and installer shall jointly or severally effect all repairs or replacement necessary to remedy defects at the convenience of, and no cost to LAWA.

PART 2 - PRODUCTS

2.1 EPOXY TERRAZZO

A. Epoxy Terrazzo Material Products and Manufacturers: The epoxy resin terrazzo specifications are based on Terroxy Resin System by Terrazzo and Marble (T & M) Supply Companies.

1. The following terrazzo systems and manufacturers are capable of providing epoxy resin terrazzo flooring complying with the requirements of the Contract Documents.

   a. General Polymers; Thin-Set Epoxy Terrazzo #1100 Flooring System.

   b. Crossfield Products Corp., Dex-O-Tex Division; Dex-O-Tex Cheminert Terrazzo.

   c. Master Terrazzo Technologies, LLC; Morricite.

   d. Terrazzo and Marble (T & M) Supply Companies; Terroxy Resin Systems – Thin-set Epoxy Terrazzo

2. System Performance: The epoxy resin flooring system shall possess the following properties:

Compressive Strength, ASTM D695	10,000 psi
Water Absorption, ASTM D570	0.10 %
Tensile Strength, ASTM D638	3,000 psi
Flexural Strength, ASTM D790	4,500 psi
Adhesion, ACI 503R	350 psi, 100% concrete failure
Hardness, ASTM D2240	65-85 Shore D
Impact Resistance – MIL-D-3134, Sec. 4.7.3	Withstands 16 ft/lbs. no chipping, cracking, spalling or loss of adhesion.

Abrasion Resistance, ASTM D4060, CS 17 Wheel	70-90 milligrams lost
Slip Resistance	Meets ADA Standards
Critical Radiant Flux, ASTM D648	.90
Thermal coefficient of linear expansion, ASTM D696	25 x 10^{-6} in/in/ degree F.

B. Moisture Vapor Barrier: One of the following:

1. Moisture Vapor Treatment; Terrazzo and Marble (T & M) Supply Companies.

2. FasTop MVT or AquArmorS; General Polymers.

C. Flexible Epoxy Membrane (Crack Bridging Membrane): 100% solids for crack preparation followed by full coverage application.

1. Products: One of the following:

   a. Isocrack Membrane; Terrazzo and Marble (T & M) Supply Companies.

   b. 3556 EPO-FLEX Flexible Epoxy Membrane; General Polymers.

2. System Performance: The flexible epoxy membrane shall possess the following properties:

Tensile Strength, ASTM D412	1,000-1,300 psi
Elongation at Break, ASTM D412	130-145%
Adhesion, ACI 503R	350 psi, 100% concrete failure
Hardness, ASTM D2240	23 Shore D
Thermal Cycling, ASTM C884 (24 hours, -21C to +25C	No Cracking
Flammability	Self-extinguishing over concrete
VOC The epoxy elastomer must be free of solvent, external plasticizers, coal tar, known carcino-gens, rubber compounds or nitrile butadienes	Zero

D. Fabric Reinforcing: Fiberglass of type and manufacture recommended and acceptable to the matrix manufacturer.

1. FS38-4.4 Fiberglass Scrim; General Polymers.

E. Aggregates: Natural, sound, crushed stone chips, mother of pearl, glass, plastic, and metal filings with colors selected and graded to match Architect's samples, but with maximum size within limits of workability for terrazzo thickness indicated.

1. Sizes shall be **#1's** and **#0's only,** conforming with N.T.M.A. standards.

2. Abrasion and impact resistance shall not exceed 40% loss per ASTM C131.

3. 24 hour absorption rate not to exceed 0.75 percent.

4. Chips shall contain no deleterious or foreign matter.

5. Dust content less than 1% by weight.

6. Obtain and stockpile each aggregate material from a single source of consistent quality in appearance and physical properties for the entire project.

F. Epoxy Fill Mortar: 100% Solids fill mortar system including blended aggregate of a type recommended by the epoxy resin terrazzo manufacturer. One of the following:

1. Terroxy Fill; Terrazzo and Marble (T & M) Supply Companies.

2. 3520 Epoxy Terrazzo Matrix as the binder resin mixed with dry silica sand; General Polymers.

G. Finishing Grout: 100% solids resin-based grout with filler and pigments as recommended by matrix manufacturer. One of the following:

1. Terroxy Grout; Terrazzo and Marble (T & M) Supply Companies.

2. 3520 Epoxy Terrazzo Matrix with 5271 Terrazzo Grout Additive; General Polymers.

H. Substrate Primer: 100% solids, moisture insensitive, two-component resin recommended by matrix manufacturer. No solvent containing primers are allowed.

2.2 MIXES

A. Toppings: Adjust topping mixes as required to obtain LAWA's acceptance for each type, color, pattern and finish. Refer to the drawings and finish schedules for the extent of each topping and finish; the following topping mixes were used to develop the Architect's samples. The samples were prepared by and reflect sample controls numbers of using Terrazzo and Marble (T & M) Supply Companies terrazzo materials. Each precast terrazzo unit shall be composed of a single mix design prepared using the matrices specified, precast units consisting of a face mix and a backup mix shall not be permitted. Adjust Portland cement precast mixes, for bases, treads and riser units, as required to obtain LAWA's acceptance for matching the type, color, pattern and finish of the epoxy matrix type, color pattern and finish indicated on the drawings for the base, tread and riser units.

1. TR-01: Refer to Sample #1 in the Terrazzo Chart below.

2. TR-02: Refer to Sample #2 in the Terrazzo Chart below.

NOTE: A white field with dark aggregate will maintain a clear appearance longer. In a multi-color design, a matrix with a repetition of aggregate is helpful in order to create a more unified appearance.

TERRAZZO CHART

Sample #1		**Chip Blend**		
Matrix Color	**Resin Color # & Fanfold**	**Aggregate**	**Size**	**%**
	Resin Color selected to match		0's	90
			0's	10
Sample #2		**Chip Blend**		
Matrix Color	**Color # & Fanfold**	**Aggregate**	**Size**	**%**
	Resin Color selected to match		1's & 0's	90
			1's, & 0's	10

B. Precast Terrazzo Base and Stair Tread/Riser Setting Beds:

1. Cement Setting Bed Mix: 226 Thick Bed Mortar Mix; Laticrete International Inc.

2. Liquid Latex Additives: Laticrete 3701 Liquid Latex Mortar Admix.

3. Mixing: Comply with the manufacturers printed recommendations for either machine or hand mixing of setting bed mixes.

   a. Mix 6 bags of cement setting bed mix to 1 pail (5 gal.) of liquid latex additive. Adjust quantity of liquid latex additive to bring the cement setting bed to the proper consistency for placing.

4. Welded Wire Fabric for Setting Bed Reinforcement at Metal Stair Risers and Treads: ASTM A185, 2 in. x 2 in. x 16 gage, galvanized.

C. Grout for Precast Items: Polymer-modified tile grout composed of ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients to which only water must be added at Project site, and complying with ANSI A118.6, custom colored to match adjacent precast terrazzo tile units.

NOTE: the mix design shall consist no more than 40% glass / mirror. Recycled glass is not permitted. All glass/mirror or aggregate shall be no larger than #1, (#0s and #1s only).

The Contractor shall also premix all terrazzo ingredients which are able to be combined prior to installation (Epoxy Part A and B and aggregate mixes). This premix process shall occur in a clean and neat factory or laboratory environment. Quantities should be carefully measured on certified/calibrated scales and mixing shall follow laboratory best practices. The resulting premixed ingredients shall then be packaged in clean, clearly labeled, hard sided containers in ratios whereby labor staff can combine in the field with no need to calculate or measure. LAWA or its authorized third party inspectors shall have continuous and unabated access to witness/inspect the factory/laboratory premix and packaging processes.

2.3 ACCESSORIES

A. Divider and Stop Strips: White alloy zinc, 1/8" in. thick x depth as indicated for terrazzo topping. Angle or "T" - types. Verify compatibility of divider and stop strips with resin supplier prior to ordering.

1. Control Joint Strips: Laminations of 16 gage zinc, back to back strips infilled with Flexible Epoxy Membrane pigmented to match resin color of epoxy terrazzo.

B. Cleaner: A neutral chemical cleaner, specially compounded for cleaning terrazzo of the types indicated, as recommended by the manufacturer of the cleaner with the following minimum characteristics.

1. pH factor between 7 and 10.

2. Biodegradable and phosphate free.

3. Free form crystallizing salts or water soluble alkaline salts.

C. Floor Sealer: Waterbased, colorless, stain-resistant penetrating sealer with Ph factor between 7 and 10, that does not affect color or physical properties of terrazzo surface, and which will provide an anti-slip coefficient of friction of greater than 0.6.
1. Product: “Scotchgard Stone Floor Protector”
2. LAWA approved Equal

D. Joint Sealants: Two-Part Polyurethane Sealant (Self Leveling), refer to Section 079200, JOINT SEALANTS.

E. Channels to receive abrasive inserts at Precast Stair Nosings: 16 gauge aluminum channel.

F. Abrasive Inserts: One line composition strips filled with 100 or finer carborundum, aluminum oxide or silicon carbide, black, mixed 4 parts to 1 with a binding material.

G. Reinforcing, Anchors and Fasteners for Precast Units:

1. Reinforcing for Treads and Risers: ASTM A615, grade as selected by fabricator. Reinforcing adjacent to the exposed surface of panels is to be positioned and firmly held in place by hangers, or other means without the use of form-contact bar supports.

2. Welded Wire Fabric for Treads and Risers: ASTM A185, 2 in. x 2 in. x 16 gage, galvanized.

3. Anchors and Fasteners: All anchors, clips, shapes, fasteners, dowels, cramps, and accessories for erecting precast terrazzo units shall be galvanized steel devices of grade, type, size and number required to attach precast terrazzo to supporting stair substrates.

H. Precast Portland Cement Terrazzo Base, Tread and Riser Materials (To be used when proposing Alternate):

1. Portland Cement: ASTM C150, Type I, non-air entraining, non-staining white and gray as required to match Architect's epoxy terrazzo samples. Obtain cement from a single source for all work of one color.

2. Sand: ASTM C33 for fine aggregates as required to match Architect's epoxy terrazzo samples.

3. Water: Fresh, clean and potable.

4. Aggregates, Glass, Plastic and Shell Materials: As required to match Architect's epoxy terrazzo samples.

5. Pigments: Pure mineral pigments, resistant to alkalis, nonfading and weatherproof, colors as required to match Architect's epoxy terrazzo samples.

2.4 PRECAST UNIT FABRICATION

A. Precast Terrazzo Bases: Fabricate precast terrazzo bases from epoxy terrazzo materials to the sizes, shapes and profiles shown and from the terrazzo mix(es) indicated.

1. The minimum thickness of the precast terrazzo base shall be ½”.

2. Forms: Construct forms of non-staining metal, fiberglass reinforced polyester, plywood, or other acceptable material. Fabricate and reinforce forms for close control of dimensions and details. Construct forms tightly to prevent leakage of mixes. Form joints will not be permitted on faces exposed to view in the finished work.

3. Mixing and Placing: Mix terrazzo mixes to distribute fine and coarse aggregate evenly throughout. Place terrazzo so as to prevent segregation in the forms.

4. Curing: Allow units to cure.

5. Casting Tolerances: As required to achieve installation tolerances. Units which have bowed, warped, or curled shall not be acceptable.

B. Precast Terrazzo Treads and Risers: Fabricate precast terrazzo treads and risers from epoxy terrazzo materials to the sizes, shapes and profiles shown to match the epoxy terrazzo mix indicated for treads and risers.

1. The minimum thickness of the precast terrazzo stairs and treads shall be 1-1/2". Provide 2 lines of abrasive insert at stair tread nosing.

2. Forms: Construct forms of non-staining metal, fiberglass reinforced polyester, plywood, or other acceptable material. Fabricate and reinforce forms for close control of dimensions and details. Construct forms tightly to prevent leakage of mixes. Form joints will not be permitted on faces exposed to view in the finished work.

3. Reinforcement: Place welded wire and reinforcing bars of size and spacings as required to resist shrinkage, temperature and handling stresses. Support and space reinforcement using devices to ensure that it will remain positioned in the precast terrazzo units as required. Keep reinforcement from the edges and surfaces of the units.

4. Mixing and Placing: Mix terrazzo mixes to distribute fine and coarse aggregate evenly throughout. Place terrazzo so as to prevent segregation in the forms.

5. Curing: Allow units to cure.

6. Casting Tolerances: As required to achieve installation tolerances. Units which have bowed, warped, or curled shall not be acceptable.

C. Surface Treatment:

1. Finish surfaces exposed to view to match accepted samples in all respects. Provide smooth joints and square edges.

2. Finish: Allow terrazzo to obtain sufficient strength prior to grinding and as required to withstand handling stresses and to produce a terrazzo finish consistent with the accepted samples. Protect corners and edges to preserve uniform, straight arrisses and corners. Grind in a continuous operation, using grinding equipment to achieve a uniform appearance. Do not change equipment, materials, procedure or operating personnel during the course of the grinding work for the entire Project. Discard and replace terrazzo units which develop any irregular penetration or appearance, or swirl marks as a result of grinding. Select type of grit gradation(s) and speed of operation to achieve the following:

   a. Match finish of cast in place epoxy terrazzo as specified under Part 3 – Execution below.

3. Abrasive Inserts for Stair Treads:

   a. Carefully mask terrazzo on either side of abrasive channel to protect finished terrazzo.

   b. Clean all foreign matter from channel.

c. Trowel abrasive mix into channel with finished elevation approximately 1/16" above terrazzo tread.

d. After abrasive mix has set, remove masking material and allow to cure.

PART 3 - EXECUTION

3.1 CONDITION OF SURFACES

A. Examine the substrates and adjoining construction and the conditions under which the Work is to be installed. Do not proceed with the Work until unsatisfactory conditions have been corrected. Examine areas to receive terrazzo for:

1. Defects in existing work that affect proper execution of terrazzo work.

2. Deviations beyond allowable tolerances for the concrete slab work. The substrate shall not exceed ¼” in a 10’-0” span. When placing a 10 foot straightedge anywhere on the substrate, at no point shall the gap between the straightedge and the substrate exceed ¼”.

3. Ensure that the building expansion joints in the floor area are raised or lowered to actual finish elevation of terrazzo.

4. Ensure that drains in installation area are functional and raised or lowered to actual finish elevation of terrazzo.

3.2 PREPARATION

A. General: Comply with NTMA specifications and recommendations, unless otherwise shown or specified for preparation of substrate.

B. Substrates to Receive Epoxy Terrazzo: After the removal of existing floor coverings in areas to receive the terrazzo work, and before the terrazzo flooring installation, visit the jobsite to evaluate substrate condition. The evaluation shall include a determination of the suitableness of the substrate to receive the epoxy terrazzo materials and to test for moisture and alkalinity of the substrate. Test for moisture by relative humidity probe and digital meter method according to ASTM F 2170 "Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-situ Probes" and the probe manufactures instructions. Use a minimum of 1 probe for every 5,000 sf of surface to receive terrazzo flooring. Proceed with the epoxy floor system installation only after substrates have a maximum relative-humidity-measurement reading of 75 percent in 24 hours. If the pH of the slab is 10 or lower, notify the manufacturer for preparations required to ensure a good bond.

1. Probe Manufacturer: A relative humidity probe kit and manufacturer known to comply with the requirements includes "The Rapid RH Probe" manufactured by Wagner Electronic Products, Inc., Rogue River, OR. (800) 207-2164 (v).

C. Surface Treatment:

1. Prepare slab substrates, (*including any existing cementitious terrazzo*) to "open" surface pores by means of light scarification, medium shot blast or medium scarification with a vacuum unit. Surface preparation results shall achieve a minimum Concrete Surface Profile (CSP) of 5 according to International Concrete Repair Institute Guideline No. 03732. Remove all contaminating or bond breaking substances including but not limited to dust, laitance, curing compounds, coatings, sealers, oil, grease, existing floor covering adhesives and mastics. All oil or grease not removed by scarification or blasting shall be removed by either detergent scrubbing with heavy duty cleaner/degreaser, low pressure water cleaning, steam cleaning, or chemical cleaning methods in accordance with the manufacturers written instructions. All spalled or deteriorated slab surfaces shall be mechanically removed by scabbling or chipping hammers. Acid etching is not acceptable.

NOTE: Many of the existing sub-floor areas of the existing Terminals are not level and require extensive floor prep. All existing finishes such as but not limited to Fritztile are to be removed from the concrete slab.

2. Apply moisture vapor barrier across the entire area to receive the epoxy terrazzo in accordance with the manufacturer's recommendations.

3. Repair or level damaged slab surfaces with epoxy fill mortar. Latex fills or self-leveling underlayments are not acceptable.

4. Flexible Epoxy Membrane (Crack Bridging Membrane) Placement:

   a. Install flexible epoxy membrane at 40 mils thickness over the moisture vapor barrier and embed fabric reinforcement. Follow the specific recommendations of the flooring manufacturer for detailing at terminations, construction control joints, construction joints, building columns, and base conditions. Thoroughly mix flexible epoxy membrane and apply to prepared moisture vapor coated slab substrates according to manufacturer's instructions. Allow membrane to level until no ridges are showing.

5. Cracks and non-expansion joints greater than 1/16" wide after surface preparation shall be prepared until sound and treated with membrane materials in accordance with the instructions of the epoxy terrazzo manufacturer and as follows. Allow in base bid for above crack detailing as follows - 5% of lineal footage of total project square footage for combined Type 1 & 2, and 3% of lineal footage of Type 3. (i.e., a 10,000 sq ft project would allow for a combined 500 lineal feet of Type 1 & 2 repairs and 300 lineal feet of Type 3 repairs.

   a. Type 1 Crack Detailing: Hairline cracks shall receive detail coat of epoxy primer with 6" fabric reinforcement.

   b. Type 2 Crack Detailing Fill cracks greater than hairline but less than 1/16" wide after surface preparation with neat, epoxy membrane. Place detail coat of epoxy

membrane over crack and embed 12" fiberglass cloth. Lightly abrade or solvent wipe treated cracks prior to applying primer.

c. Type 3 Crack Detailing Fill cracks greater than 1/16" with flexible epoxy membrane. Place 25-30 mil detail coat so that flexible epoxy membrane extends at least 9" to 12" on each side of crack or joint. After flexible epoxy membrane has leveled, lay precut reinforcing fabric into wet membrane. Smooth cloth with a flat steel trowel, allowing cloth to be encapsulated but remain exposed on the surface of flexible epoxy membrane. Lightly abrade or solvent wipe treated cracks prior to applying primer.

NOTE: For the floor leveling purposes, the Bid cost for Epoxy Terrazzo shall include the price for installing a 5/8" minimum epoxy sand level.

3.3 INSTALLATION

A. General: Comply with NTMA specifications and recommendations, unless otherwise shown or specified for installation of strips, placing, curing, grinding, and finishing of terrazzo. Make provisions for protecting adjacent work from terrazzo placement and finishing.

1. Extend terrazzo work into recesses and under equipment in the spaces shown or scheduled to receive terrazzo. Form a complete covering without interruptions or seams, except provide divider strips where shown. Place and finish terrazzo uniformly and neatly around obstructions so as to achieve continuous color, pattern and finish throughout the Work.

2. Complete terrazzo work prior to contiguous work which might be damaged by water or other materials used.

B. Epoxy Terrazzo:

1. Control Joints, Stop Strips and Divider Strips:

a. Control Joints: Place back to back angle divider strips **directly over concrete control joints** leaving a space appropriate for anticipated movement – typically 1/4" – 3/8". Fill gap between control joints with divider strip joint sealant. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo.

NOTE: All control joints to be carried to the surface.

b. Stop Strips: Install stop strips at perimeter of epoxy terrazzo flooring fields. Adhere stop strips with substrate primer – do not fasten to concrete. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo.

c. Divider Strips: Place divider strips directly over concrete where indicated on the drawings. Adhere divider strips with substrate primer – do not fasten to concrete. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo.

NOTE: All pours to be to the divider strips. Phased pours in areas within the divider strips shall not be allowed unless directed otherwise by LAWA. The leg of the divider strip shall be fully bonded to the slab. When two divider strips are joined, the ends shall touch and align.

2. Placing Epoxy Terrazzo:

a. Clean and prepare substrate to comply with NTMA specifications for type of terrazzo application indicated. Clean substrate of loose chips and foreign matter.

b. Priming: Apply epoxy primer evenly over prepared flexible membrane at the rate of 200-300 square feet per gallon, to thoroughly wet surface, but avoiding "ponding" the material.

c. For thin-set terrazzo topping, comply with resin manufacturer's recommendations for proportioning mixes.

d. Comply with NTMA guide specifications previously referenced under "Thin-Set Terrazzo Materials" and with matrix manufacturer's directions for installing thin-set terrazzo. Match Architect's samples and provide total material thickness of not less than 3/8”. Allow cure per manufacturer's recommendations prior to grinding operations.

3. Grinding: Exercise extreme care to ensure fluids from grinding operation do not react with dividers and strips to produce a stain on aggregate. Delay grinding until heavy trade work is completed and construction traffic through the area is restricted.

a. Rough Grinding: Grind with 24 or finer grit stones or with comparable diamond plates.

b. Intermediate Grinding: Follow initial grind with 80 or finer grit stones.

c. Grouting: Cleanse floor with clean water and rinse thoroughly. Remove excess rinse water by wet vacuum and machine until completely dry. Apply epoxy grout to fill voids.

d. Fine Grinding: Grind with **120** or finer grit stones until all grout is removed from surface. Upon completion terrazzo shall show a minimum of 70% to 75% of marble chips.

C. Precast Terrazzo:

1. Preparation: Clean precast terrazzo surfaces which have become dirty or stained prior to setting to remove soil, stains and foreign materials. Clean precast terrazzo by thoroughly

scrubbing with fiber brushes followed by a thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh filler or abrasives.

2. Installation, General:

   a. Employ only skilled and experienced workmen to install the precast terrazzo work. Use carborundum or diamond tipped power saws to cut precast terrazzo units which need to be fitted to existing field conditions.

   b. Set precast terrazzo units to comply with requirements indicated on drawings and final shop drawings. Install anchors, supports, fasteners and other attachments indicated or necessary to secure precast terrazzo work in place. Shim and adjust anchors, supports and accessories to set precast terrazzo work accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned.

   c. Installation Tolerances:

      1) Joint Widths: +/- 1/16".

      2) Variation from Plumb: +/- 1/16".

      3) Variation from Level: +/- 1/8" in 20', non-cumulative.

      4) Piece Alignments (Edge to Edge): +/- 1/32".

3. Installation of Wall Base: Install base where indicated, after placing floors, and in accordance with NTMA, and the applicable provisions of TCA W243 and ANSI A108.5. Tamp units into setting bed to achieve a full bond without voids. Level units at joints. Grind at joints to remove any minor discrepancies in level of units. Replace warped, stained, damaged and non-matching units as directed. Grout joints, except those shown to receive sealant or divider strips, with a mixture of Portland cement, pigment and water, matching the matrix of the unit being grouted.

4. Installation of Stair Tread/Risers: Place setting bed on steel pan and poured in place concrete type stairs where shown and in accordance with NTMA, and the applicable provisions of TCA S151 Method F111 (for steel pan stairs) and Methods F112 and W211 (for concrete stairs) and ANSI A108.1A. Tamp units into setting bed to achieve a full bond without voids. Level units at joints. Grind at joints to remove any minor discrepancies in level of units. Replace warped, stained, damaged and non-matching units as directed. Grout joints, except those shown to receive sealant or divider strips, with a mixture of Portland cement, pigment and water, matching the matrix of the units being grouted.

3.4 CLEANING, SEALING AND PROTECTION

A. Clean terrazzo after installing and grinding operations are completed by thoroughly washing all terrazzo surfaces with a neutral cleaner. Rinse with clean water and allow surface to dry thoroughly. Apply sealer per manufacturer's recommendations.

B. Apply 3M Stone Floor Protector Sealer in two coats at the coverage rate of 2500 sq./gallon per coat in compliance with sealer manufacture instructions.

END OF SECTION 09 66 23

SECTION 09 68 13 – TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes carpet tile.

1.2 STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:

1. The Carpet and Rug Institute "The Carpet Specifiers' Handbook."

2. The Carpet and Rug Institute "CRI 104 Commercial Carpet Installation Standard."

1.3 SUBMITTALS

A. Product Data: Submit product data, specifications, installation instructions for materials specified herein and other data as may be required to show compliance with the Contract Documents. Include installation recommendations for each type of substrate required.

B. Shop Drawings: Submit shop drawings showing the following:

1. Existing floor materials to be removed.
2. Existing floor materials to remain.
3. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
4. Carpet tile type, color, and dye lot.
5. Type of subfloor.
6. Type of installation.
7. Pattern of installation, carpet locations, direction, and starting points per floor.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Pile direction.
11. Transition and other accessory strips.
12. Transition details to other flooring materials.

C. Samples: Submit samples showing full range of color, texture, and pattern variations expected. Prepare samples from same material to be used for the Work. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules. Submit the following:

1. Carpet Tile: Full-size Samples.
2. Exposed Edge Stripping and Accessory: 12-inch- (300-mm-) long Samples.

D. Maintenance Data: Submit copies of instructions for care, cleaning, maintenance and repair of carpeting.

1. Each carpet manufacturer shall meet with the authorized LAWA personnel, to review the characteristics of his product and to recommend appropriate maintenance procedures, prior to occupancy of the finished spaces.

E. Warranty: Submit special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage a carpet installer, who has completed a minimum of three (3) projects over the last 10 years which were similar in material, design and extent to that indicated for the project - as determined by the LAWA – and which have resulted in construction with a record of successful in service performance.

1. In the case where the Installer is actually a Dealer, it is understood that the terms Installer, Dealer, Carpeting Contractor and Contractor shall be one and the same for purposes of this Contract. He shall assume responsibility for all of the work, including acquisition of the materials from the manufacturers herein specified.

B. Mill Inspection: The carpeting may be inspected to determine compliance with the Contract Documents with respect to manufacture, materials, pattern and colors. Inspection may be made at the mill by a representative of LAWA at any time during the process of manufacture.

C. Sample Installations: Before installing carpet, install sample installation, for each type of carpet installation required to demonstrate aesthetic effects and qualities of materials and execution. Install sample installations to comply with the following requirements, using materials indicated for the completed Work:

1. Size and Location: Provide 250 square foot (23.23 sq.m) sample installation in location as directed by LAWA.

2. Demonstrate the proposed range of aesthetic effects and workmanship.

3. Obtain LAWA's approval of sample installations before starting work.

4. Maintain sample installations during construction in an undisturbed condition as a standard for judging the completed Work.

5. Approved sample installations may become part of the completed Work if undamaged at time of Substantial Completion.

NOTE: The contractor shall not proceed with installation until the required mock up has been approved by LAWA.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver carpeting in original mill protective wrapping with mill register numbers and tags attached.

B. Deliver other materials in manufacturers unopened containers identified with name, brand, type, grade, class, and other qualifying information.

C. Store materials in a dry location, in such a manner as to prevent damage.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install carpet tile until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Do not install carpet tile over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

1.7 WARRANTY

A. Carpet Manufacturer's Warranty: Written warranty, signed by carpet tile manufacturer agreeing to replace carpet tile that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, wear, static buildup in excess of 3.0 kV when tested under the Standard Shuffle Test at 70 deg. F (21 deg. C) and 20% RH, edge raveling without seam sealers, tuft bind loss, zippering (wet or dry), shrinkage, curling, doming, snags, runs, and delamination. Warrantees shall be full term, not pro-rated for the specified warranty period.

1. Warranty Period: 10 years.

1.8 EXTRA MATERIALS AND ATTIC STOCK

A. Attic Stock: Package and deliver usable remnants of carpet to LAWA at the conclusion of the job. Include any uncut carpet tiles.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Carpet Tile Types: Provide manufacturers commercial grade carpet tile for a 100% glue down installation.

B. Provide carpet tile by one of the following:
1. Interface
2. Lees / Mohawk Industries
3. Milliken
4. Mannington
5. Shaw

C. Fiber Content: **Nylon 6,6.**

D. Pile Characteristics: **No Over-Tufting.**

E. Dye Process: **Solution-dye** or **injection-dye is required.**

F. Density: Greater than 7000.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Portland cement-based formulation provided by or recommended by carpet tile manufacturer. Do not use gypsum based compounds.

B. Carpet Adhesives: Water-resistant, mildew resistant, and nonstaining, high solids, low VOC emitting formulations that are specifically recommended by the carpet manufacturer, as verified through compatibility and adhesion testing for the intended substrate and application, and that comply with flammability requirements for installed carpet.

C. Carpet Edging: Provide rubber composition carpet edging in single lengths wherever possible, keeping the number of joints or splices to a minimum. Provide in quantities and locations as job required based upon the recommended good practice of the industry; include in every location where carpet terminates and other flooring continues. Color to match adjacent carpet types.

D. Floor Sealer: Type as recommended and manufactured by the carpet tile manufacturer for the applications indicated.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION MEETING

A. Prior to the installation, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include LAWA, the Architect of Record, the Contractor, the installer, material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 PREPARATION

A. Coordinate the installation of carpet so as not to delay the occupancy of the site or interfere with the completion of construction.

B. Examine the substrates, adjoining construction and the conditions under which the Work is to be installed. Verify recommended limits for moisture content and alkalinity of concrete substrates with carpet manufacturer.

1. Moisture Content: Verify moisture content using a standard calcium chloride crystal test or a 1 square yard (0.84 sq.m) clear plastic test. Perform testing at a frequency as recommended by the carpet manufacturer. Perform testing at a frequency of not less than once every 1,000 square feet (93 sq.m).

2. Alkalinity Test: Verify alkalinity of concrete substrates by drilling a 3/8 inch (9.5 mm) diameter hole approximately 1/4 inch (6.35 mm) deep, remove all residue; fill with distilled water, allow water to stand 3 minutes and test with a calibrated electronic meter

or Ph paper. Perform testing at a frequency of not less than once every 1,000 square feet (93 sq.m).

3. Alternative test procedures for moisture content and alkalinity may be acceptable subject to the carpet manufacturer's review and written acceptance.

C. Concrete Subfloors: Verify that concrete slabs comply with the following:

1. Remove coatings, including curing compounds, existing floor covering adhesive residues, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by the carpet manufacturer.

2. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by the carpet manufacturer.

3. Use leveling and patching compounds recommended by flooring manufacturer for filling cracks, holes and depressions in the substrate. Surface shall be smooth, level and at proper elevation. Remove ridges, roughness and protrusions from concrete surfaces by grinding.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

E. Carpet installation shall not commence until painting and finishing work are complete and ceiling and overhead work is tested, approved, and completed.

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

3.3 INSTALLATION

A. General: Comply with the manufacturer's instructions, specified industry standards and recommendations, and as required to match the accepted sample installations. Apply adhesive in accordance with adhesive manufacturer's directions.

B. Adhere all full size, perimeter tiles, and cut tiles, with a full spread of adhesive. Dry fit cut tiles and apply adhesive to tile back after tile has been cut. Use full uncut tiles down the center of corridors and, where necessary, cut perimeter tiles to butt walls.

1. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

2. Cut openings in carpet for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges of carpet will be covered by plates and escutcheons.

3. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

C. Butt carpet tile tightly together to form seams without gaps or entrapped pile yarns and aligned with adjoining tiles.

D. Edge Strip Installation: Install edge strip at every location where edge of carpet is exposed to traffic, unless otherwise indicated. Unless otherwise directed by the Architect of Record, install in single lengths and secure in accordance with manufacturer's directions.

E. Traffic over adhesive installations shall be restricted until adhesive has properly cured in accordance with the adhesive manufacturers recommendations.

3.4 CLEANING AND PROTECTION

A. Cleaning: As the carpeting is installed, remove and dispose of all trimmings, excess pieces of carpeting and laying materials from each area as it is completed. Vacuum carpeting with a commercial vacuum, having a cylindrical brush or beater bar and high suction. Remove adhesives, stains, and soil spots in accordance with the carpet manufacturer's recommendations.

B. Protection: Protect carpeting against damage of every kind as damaged carpeting shall be rejected. Use non-staining cover material for protection. Tape joints of protective covering.

1. Plastic and polyethylene sheet protective coverings shall not be permitted.

2. Remove and replace rejected carpeting with new carpeting. At the completion of the work, remove covering, vacuum clean carpeting and remove soiling and stains (if any) to the satisfaction of LAWA.

END OF SECTION 09 68 13

SECTION 09 68 16 – SHEET CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes broadloom carpet.

1.2 STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:

1. The Carpet and Rug Institute "The Carpet Specifiers' Handbook."

2. The Carpet and Rug Institute "CRI 104 Commercial Carpet Installation Standard."

1.3 SUBMITTALS

A. Product Data: Submit product data, specifications, installation instructions for materials specified herein and other data as may be required to show compliance with the Contract Documents. Include installation recommendations for each type of substrate required.

B. Shop Drawings: Submit shop drawings showing the following:

1. Existing floor materials to be removed.
2. Existing floor materials to remain.
3. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
4. Dye lots, pattern types, repeats, locations, pile direction, and starting points per floor.
5. Seam locations, types, and methods.
6. Type of installation.
7. Type, color, and location of insets and borders.
8. Type, color, and location of edge, transition, and other accessory strips.
9. Show details of cutouts.
10. Type of cushion.
11. Include on shop drawings dimensions which verify field conditions.
12. Transition, and other accessory strips.
13. Transition details to other flooring materials.

C. Samples: Submit samples showing full range of color, texture, and pattern variations expected. Prepare samples from same material to be used for the Work. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules. Submit the following:

1. Carpet: 24-inch- (600-mm-) square Samples of each carpet required.
2. Exposed Edge Stripping and Accessory: 12-inch- (300-mm-) long Samples.
3. Carpet Cushion: 6-inch- (150-mm-) square Sample.

4. Mitered Carpet Border Seam: 12-inch- (300-mm-) square Sample. Show carpet pattern alignment.

D. Maintenance Data: Submit copies of instructions for care, cleaning, maintenance and repair of carpeting.

1. Each carpet manufacturer shall meet with the authorized LAWA personnel, to review the characteristics of their product and to recommend appropriate maintenance procedures, prior to occupancy of the finished spaces.

E. Warranties: Submit special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage a carpet installer, who has completed a minimum of three (3) projects over the last 10 years which were similar in material, design and extent to that indicated for the project - as determined by LAWA – and which have resulted in construction with a record of successful in service performance.

1. In the case where the Installer is actually a Dealer, it is understood that the terms Installer, Dealer, Carpeting Contractor and Contractor shall be one and the same for purposes of this Contract. He shall assume responsibility for all of the work, including acquisition of the materials from the manufacturers herein specified.

B. Mill Inspection: The carpeting may be inspected to determine compliance with the Contract Documents with respect to manufacture, materials, pattern and colors. Inspection may be made at the mill by a representative of LAWA at any time during the process of manufacture.

C. Sample Installations: Before installing carpet, install sample installations for each type of carpet installation required to demonstrate aesthetic effects and qualities of materials and execution. Install sample installations to comply with the following requirements, using materials indicated for the completed Work:

1. Size and Location: Provide 250 square foot (23.23 sq.m) sample installations in locations as directed by LAWA. Subdivide the sample installation with one continuous seam of the type specified.

2. Demonstrate the proposed range of aesthetic effects and workmanship.

3. Obtain LAWA's approval of sample installations before starting work.

4. Maintain sample installations during construction in an undisturbed condition as a standard for judging the completed Work.

5. Approved sample installations may become part of the completed Work if undamaged at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver carpeting in original mill protective wrapping with mill register numbers and tags attached.

B. Deliver other materials in manufacturers unopened containers identified with name, brand, type, grade, class, and other qualifying information.

C. Store materials in a dry location, in such a manner as to prevent damage.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use. Stack rolls horizontally no higher than two high on a flat surface.

B. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.

1.7 WARRANTY

A. Carpet Manufacturer's Warranty: Written warranty, signed by carpet manufacturer agreeing to replace carpet that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, wear, static buildup in excess of 3.0 kV when tested under the Standard Shuffle Test at 70 deg. F (21 deg. C) and 20% RH, edge raveling, tuft bind loss, shrinkage, zippering (wet or dry), and delamination. Warrantees shall be full term, not pro-rated for the specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

1.8 EXTRA MATERIALS AND ATTIC STOCK

A. Attic Stock: Package and deliver usable remnants of carpet to a storage room as directed by LAWA at the conclusion of the job. Include pieces of broadloom 20 square feet (1.86 sq.m) in area or greater.

PART 2 - PRODUCTS

2.1 CARPET

A. Carpet Types: Provide manufacturers commercial grade broadloom carpet for **100% glue down** installation.

B. Provide carpet tile by one of the following:
1. Interface
2. Lees / Mohawk Industries
3. Milliken

4. Mannington
5. Shaw

C. Fiber Content: **Nylon 6,6.**

D. Pile Characteristics: **No Over-Tufting.**

E. Dye Process: **Solution-dye** or **injection-dye is required.**

F. Density: Greater than 7000.

2.2 CARPET CUSHION

A. Product as recommended in writing by the carpet manufacturer for the application indicated and which will not void the specified warranties, (*if required*).

2.3 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Portland cement based formulation provided by or recommended by the following. Do not use gypsum based compounds.

1. Carpet manufacturer.
2. Carpet cushion manufacturer.

B. Carpet Adhesives: Water-resistant, mildew resistant, and nonstaining, high solids, low VOC emitting formulations that are specifically recommended by the carpet manufacturer, as verified through compatibility and adhesion testing for the intended substrate and application, and that comply with flammability requirements for installed carpet:

C. Tackless Carpet Stripping (Stretch-In Installations): Water-resistant plywood in minimum 1 inch (25 mm) wide strips, thickness to match cushion thickness, with minimum 3 rows of prenailed angular pins protruding from the top designed to grip and hold stretched carpet at backing.

D. Plastic Coated Fabric Tape (Stretch-In and Double Stick Broadloom Cushion Installations): Woven fabric impregnated with plastic and coated with adhesive having high-tack adhesion forming a secure bond for application to cushion top seams to resist peaking. Provide water-resistant plastic-coated tape which will unwind without adhesive transfer.

E. Seaming Tape: Hot melt adhesive tape, 6" wide, recommended by the carpet mill as suitable for backing specified.

F. Seaming Cement: Water-resistant and flame-resistant carpet adhesive for sealing raw edges, seaming, reinforcing seams and patching. Provide fast drying, easy spreading carpet seaming adhesive having excellent aging characteristics recommended by the carpet manufacturer.

G. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

H. Carpet Edging: Provide rubber composition carpet edging in single lengths wherever possible, keeping the number of joints or splices to a minimum. Provide in quantities and locations as job

required based upon the recommended good practice of the industry; include in every location where carpet terminates and other flooring continues. Color to match adjacent carpet types.

I. Floor Sealer: Type as recommended and manufactured by the carpet manufacturer for the applications indicated.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION MEETING

A. Prior to the installation, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the LAWA, the Architect of Record, the Contractor, the installer, material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 PREPARATION

A. Coordinate the installation of carpet so as not to delay the occupancy of the site or interfere with the completion of construction.

B. Examine the substrates, adjoining construction and the conditions under which the Work is to be installed. Verify recommended limits for moisture content and alkalinity of concrete substrates with carpet manufacturer.

1. Moisture Content: Verify moisture content using a standard calcium chloride crystal test or a 1 square yard (0.84 sq.m) clear plastic test. Perform testing at a frequency of not less than once every 1,000 square feet (93 sq.m).

2. Alkalinity Test: Verify alkalinity of concrete substrates by drilling a 3/8 inch (9.5 mm) diameter hole approximately 1/4 inch (6.35 mm) deep, remove all residue; fill with distilled water, allow water to stand 3 minutes and test with a calibrated electronic meter or Ph paper. Perform testing at a frequency of not less than once every 1,000 square feet (93 sq.m).

3. Alternative test procedures for moisture content and alkalinity may be acceptable subject to the carpet manufacturer’s review and written acceptance.

C. Concrete Subfloors: Verify that concrete slabs comply with the following:

1. Remove coatings, including curing compounds, existing floor covering adhesive residues, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by the carpet manufacturer.

2. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness

characteristics by performing bond and moisture tests recommended by the carpet manufacturer.

3. Use leveling and patching compounds recommended by flooring manufacturer for filling cracks, holes and depressions in the substrate. Surface shall be smooth, level and at proper elevation. Remove ridges, roughness and protrusions from concrete surfaces by grinding.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

E. Carpet installation shall not commence until painting and finishing work are complete and ceiling and overhead work is tested, approved, and completed.

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

3.3 INSTALLATION

A. 100% Direct Glue Down of Broadloom Carpet: Comply with the manufacturer's instructions, specified industry standards and recommendations, and as required to match the accepted sample installations.

1. Carpet Layout, Cutting and Edge Trim Seaming: Prior to applying adhesives, place seams at locations indicated on accepted shop drawings. All carpet rolls shall be installed in the exact roll number sequence as listed on the carpet rolls. Maintain direction of pattern, texture and lay of pile. Side to end seaming shall not be allowed. All edges of all rolls of carpet shall be finish trimmed prior to laying to assure a perfect seam condition and carpet match. All trimmed edges shall then be treated with latex seaming adhesive to assure that loose and cut yarns are not left to ravel or pull out.

a. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

b. Extend carpet into closets and offsets, and under movable equipment of the rooms and spaces shown or scheduled to receive carpet, including recessed covers within those spaces.

c. Provide cutouts as required for removable access covers in substrates except do not cutout for floor closer cover plates. Bind edges neatly and secure to substrate. Cut only 3 sides wherever it is feasible to provide carpet flap in lieu of fully removable cutout.

d. At doorways, center seams under door in closed position; do not place seams perpendicular to door frame in direction of traffic through doorway.

e. Cut openings in carpet for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges of carpet will be covered by plates and escutcheons.

f. Seams shall be located away from areas subject to pivoting traffic.

2. Apply adhesive in accordance with adhesive manufacturer's directions.

3. Adhere carpet with a full spread of adhesive. Ensure uniform bond over the entire area.

   a. Butt carpet tightly together to form seams without gaps or entrapped pile yarns and aligned with adjoining rolls of carpet. Seams shall be pressed by hand and/or suitable tool to produce the best possible even top pile width-to-width. Adjacent widths of carpet must be installed to finish at exactly the same elevation.

   b. Roll carpet uniformly, removing air pockets and bubbles.

   c. If the pile of the carpet has been compressed while laying in storage, so that there appears to be a difference in color in adjacent widths of material, the Contractor shall neutralize the pile with a steam machine and obtain a uniform pile direction throughout by brushing the carpet while it is still damp, at no additional cost to LAWA.

4. Edge Strip Installation: Install edge strip at every location where edge of carpet is exposed to traffic, unless otherwise indicated. Unless otherwise directed by the Architect of Record, install in single lengths and secure in accordance with manufacturer's directions.

5. Traffic over adhesive installations shall be restricted until adhesive has properly cured in accordance with the adhesive manufacturers recommendations.

B. Stair Carpeting: Comply with the manufacturer's instructions, specified industry standards and recommendations, and as follows:

1. Glue Down Installation: Tightly secure carpet to treads and risers using carpet adhesive. Stairs with a return nosing shall be cut and installed with the tread and risers being separate pieces.

3.4 CLEANING AND PROTECTION

A. Cleaning: As the carpeting is installed, remove and dispose of all trimmings, excess pieces of carpeting and laying materials from each area as it is completed. Vacuum carpeting with a commercial vacuum, having a cylindrical brush or beater bar and high suction. Remove adhesives, stains, and soil spots in accordance with the carpet manufacturer's recommendations.

B. Protection: Protect carpeting against damage of every kind as damaged carpeting shall be rejected. Use non-staining cover material for protection. Tape joints of protective covering.

1. Plastic and polyethylene sheet protective coverings shall not be permitted over glue down installations.

2. Remove and replace rejected carpeting with new carpeting. At the completion of the work and when directed by LAWA, remove covering, vacuum clean carpeting and remove soiling and stains (if any) to the satisfaction of LAWA.

END OF SECTION 09 68 16

SECTION **09 91 23 - INTERIOR PAINTING**

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems.

1.2 SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Product List: For each product indicated.

1.3 EXTRA MATERIALS

A. Furnish extra materials from the same production run as the material applied.

1.4 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. LAWA will select one surface to represent surfaces and conditions for application of each paint system.
      a. Vertical and Horizontal Surfaces: Provide to LAWA, samples of at least 100 sq. ft..
      b. Other Items: LAWA may designate items or areas required.
   2. Final LAWA approval of paint selections will be based on mockups.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with LAWA requirements:
   1. Benjamin Moore & Co.
   2. Dunn-Edwards Corporation.
   3. Frazee Paint.

4. ICI Paints
5. Kelly-Moore Paints
6. PPG Architectural Finishes, Inc.
7. Sherwin-Williams Company.
8. Vista Paint.

2.2 PAINT, GENERAL

A. Material Compatibility:
   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content: Products shall comply with VOC limits of Los Angeles Department of Building and Safety and LAWA requirements.

C. FLOOR COATINGS:
   1. Frazee; Monochem Dex-coat 2600
   2. ICI; Groundworks, 3214 Water-based Clear Acrylic Concrete Sealer
   3. PPG; Perma-Crete Plex-Seal WB Interior/Exterior Clear Sealer 4-6200
   4. Sherwin Williams; H&C Concrete & Masonry Waterproofing Sealer

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: LAWA reserves the right to invoke the following procedure:
   1. LAWA may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Concrete: 12 percent.
   2. Masonry (Clay and CMU): 12 percent.
   3. Gypsum Board: 12 percent.
   4. Plaster: 12 percent.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

NOTE: When planning, either partial or full removal of existing coatings, regulatory restrictions and procedures shall be followed.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations.

B.

1. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
2. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in LAWA equipment rooms:
    a. Equipment, including panelboards and switch gear.
    b. Uninsulated metal piping.
    c. Uninsulated plastic piping
    d. Pipe hangers and support.
    e. Metal conduit.
    f. Plastic conduit.
    g. Tanks that do not have factory-applied final finishes.
    h. Duct, equipment and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    i. Mechanical and electrical equipment that is indicated to have a factory primed finish for field painting.

2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: LAWA may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site as per LAWA direction.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by LAWA, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

Provide interior painting schedule indicating the type of prime coat, intermediate coat and top coat for all substrates applicable to your project.

END OF SECTION 09 91 23

SECTION 10 21 13 – TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes toilet compartments and screens as follows:
   1. Type: Stainless steel.
   2. Compartment Style: Ceiling hung with intermittent floor support.
   3. Screen Style: Wall hung.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Shop Drawings: Include plans, elevations, sections, details of installation, and attachments to other work and hardware.

C.

NOTE: These shop drawings shall accurately indicate existing field conditions. Perform a dimensional field survey of as-built conditions prior to submitting shop drawings.

D.

E.

F. Samples: For each exposed finish and for each color and pattern required.

G. Maintenance manuals

1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's Americans with Disabilities Act (ADA) and Architectural Barriers Act and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities and the City of Los Angeles Building Code.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to approval Equal by LAWA

B.

   1. Hadrian Manufacturing- Stainless Steel Embossed
      a. Approved Equal

1) Bobrick Washroom Equipment, Inc.

2.2 MATERIALS

A. Panel, Pilaster, Screen and Door Material:
   1. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled flatness, patterned.
   2. Submit sample to LAWA for pattern approval

2.3 FABRICATION

A. Toilet Compartments: Ceiling hung with intermittent floor support. Floor support pilaster to have stainless steel shoes that completely surrounds the pilaster without any voids.

B. Urinal Screens: Wall hung, with continuous stainless steel support angles with stainless steel vandal resistant screws.

C. Metal Units: Internally reinforce metal panels for hardware, accessories, and grab bars.

D. Doors: Unless otherwise approved by LAWA, 24 inch wide out-swinging doors for standard toilet compartments and 36 inch wide out-swinging doors with a minimum 32 inch wide clear opening for compartments indicated to be accessible to people with disabilities.
   1. In new construction, one set of 48 inch in swinging doors shall be provided in compartments indicated to be accessible to people with disabilities.

E. Door Hardware: Stainless steel. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.

F. Accessible Toilet Stalls shall display a rectangular decal, 9”W x 3”H, white letters on blue background specifying “ PRIORITY FOR PERSONS WITH DISABILITIES”

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units rigid, straight, level, and plumb, with not more than 1/4 inch between pilasters and panels and not more than 3/4 inch between panels and walls. Provide brackets, pilaster shoes, bracing, and other components required for a complete installation. Use theft-resistant exposed fasteners finished to match hardware. Use sex-type bolts for through-bolt applications.

NOTE: Partition Pilasters supporting adjacent partitions with accessible grab bars shall extend to the floor with a stainless steel shoe. Floor to ceiling pilasters shall be located at all corners of toilet stall partition that are not supported by adjacent wall.

Locked partition doors shall be removable by lifting the door up and off the hinges with special tools. Doors at unoccupied stalls shall be held partially open (30 degrees) in a consistent and uniform position and shall open into the stall, except at accessible stalls, where the doors shall swing out.

Coat hooks shall be installed inside of each compartment wall at centerline and 6 inches below top of door except at accessible stalls where the maximum is 48" above finish floor. Coat hooks shall bear at least 15 lbs.

Coordinate with the structural specification for the steel member that support ceiling hung toilet compartments. Structural beams shall be installed for anchoring ceiling hung partitions. Indicate this steel support on the drawings.

END OF SECTION 10 21 13

SECTION 10 21 13 – TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes toilet compartments and screens as follows:
   1. Type: Stainless steel.
   2. Compartment Style: Ceiling hung with intermittent floor support every 2-3 compartments.
   3. Screen Style: Wall hung.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Shop Drawings: Include plans, elevations, sections, details of installation, and attachments to other work and hardware.

> **NOTE:** The shop drawings shall accurately indicate existing field conditions. Perform a dimensional field survey of as-built conditions prior to submitting shop drawings.

C. Samples: For each exposed finish and for each color and pattern required.

D. Maintenance manuals

1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's Americans with Disabilities Act (ADA), Architectural Barriers Act (ABA), and Accessibility Guidelines for Buildings and Facilities and the City of Los Angeles Building Code.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to approval by LAWA.
   1. Hadrian Manufacturing- Stainless Steel Embossed
      a. Approved Equal subject to review and approval by LAWA
         1) Bradley Corporation - Stainless Steel 5WL texture
         2) Metpar Corporation – Stainless Steel 5SM pattern

2.2 MATERIALS

A. Panel, Pilaster, Screen and Door Material:
   1. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled flatness, patterned.
   2. Submit sample to LAWA for pattern approval.

2.3 FABRICATION

A. Toilet Compartments: Ceiling hung with intermittent floor support every 2-3 compartments. Floor support pilaster to have stainless steel shoes that completely surrounds the pilaster without any voids.

B. Urinal Screens: Wall hung, with continuous stainless steel support angles with stainless steel vandal resistant screws.

C. Metal Units: Internally reinforce metal panels for hardware, accessories, and grab bars.

D. Doors: Unless otherwise approved by LAWA, 24 inch wide **out-swinging doors** for standard toilet compartments and 36 inch wide **out-swinging doors** with a minimum 32 inch wide clear opening for compartments indicated to be accessible to people with disabilities.
   1. In new construction, one set of 48 inch **out-swinging doors** shall be provided in compartments indicated to be accessible to people with disabilities.

E. Door Hardware: Stainless steel. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.

F. Accessible Toilet Stalls shall display a rectangular decal, 9”W x 3”H, white letters on blue background specifying “ PRIORITY FOR PERSONS WITH DISABILITIES”

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units rigid, straight, level, and plumb, with not more than 1/4 inch between pilasters and panels and not more than 3/4 inch between panels and walls. Provide brackets, pilaster shoes, bracing, and other components required for a complete installation. Use theft-resistant exposed fasteners finished to match hardware. Use sex-type bolts for through-bolt applications.

NOTE:
Partition Pilasters supporting adjacent partitions with accessible grab bars will extend to the floor with a stainless steel shoe. Floor to ceiling pilasters shall be located at all corners of toilet stall partition that are not supported by adjacent wall.

Locked partition doors shall be removable by lifting the door up and off the hinges with special tools. Doors at unoccupied stalls will be held partially open (30 degrees) in a consistent and uniform position and shall open out of the stall.

Coat hooks will be installed inside of each compartment wall at centerline and 6 inches below top of door except at accessible stalls where the maximum is 48" above finish floor. Coat hooks shall bear a minimum of 150 lbs.

Coordinate with the structural specifications for the steel member concealed in the ceiling that supports the ceiling hung toilet compartments. Structural beams shall be installed for anchoring ceiling hung partitions. Indicate this steel support on the drawings.

END OF SECTION 10 21 13

SECTION 10 26 00 – WALL AND DOOR PROTECTION

NOTE: This guide specification covers the basic requirements for Decorative Metals.

Incorporate this information into the specifications for your project. For any deviations, please discuss with your designated LAWA representative.

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Decorative wall protection.
2. Metal base.

NOTE: All walls within the public areas are to receive stainless steel wall and corner protection including a 12 inch high stainless steel base. This protection is deemed necessary for the walls of the public areas in order to protect the wall finish from luggage carts and other sources of high impact.

1.2 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details for decorative metal.

1. Include plans, elevations, component details, and attachments to other work.
2. Indicate materials, gauges and profiles of each decorative metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.

B. Samples for Verification: For each type of exposed finish required.

1. Sections of linear shapes.
2. Samples of welded joints showing quality of workmanship.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.4 QUALITY ASSURANCE

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

1.5 COORDINATION

A. Coordinate installation of anchorages for decorative metal items. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

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

2.2 STAINLESS STEEL

A. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.

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

2.3 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:

1. Stainless-Steel Items: Type 304 stainless-steel fasteners.

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

C. Provide concealed fasteners for interconnecting components and for attaching decorative metal items to other work unless exposed fasteners are unavoidable.

1. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

2.4 MISCELLANEOUS MATERIALS

A. Laminating Adhesive: Adhesive recommended by metal fabricator that will fully bond metal to metal and that will prevent telegraphing and oil canning and is compatible with substrate and noncombustible after curing.

1. Contact Adhesive: VOC content of not more than 80 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 FABRICATION, GENERAL

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

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

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

D. Form simple and compound curves in bars by bending members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces.

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

F. Mill joints to a tight, hairline fit.

G. Grind smooth and polish exposed metal edges and corners.

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

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

1. Where welding cannot be concealed behind finished surfaces, finish joints to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 Welds: no evidence of a welded joint.

J. Provide castings that are sound and free of warp, cracks, blowholes, or other defects that impair strength or appearance. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks.

2.6 DECORATIVE WALL PROTECTION

A. Bumper Rail: Assembly consisting of continuous metal bars and wall brackets; designed to withstand impacts.

1. Rail: Stainless steel flat bar, in dimensions and profiles indicated on Drawings.
2. Wall Bracket: Cast stainless-steel shape, in dimensions and profiles indicated on Drawings
3. Finish: Directional satin, No. 4.
4. Accessories: Anchors to connect bumper rail to other work.
5. Mounting: Surface mounted directly to wall.

B. Surface-Mounted, Metal Corner Guards: Fabricated from metal bars welded to two mounting brackets. Interconnect corner guard components with full-length, full penetration welds. Use welding method that is appropriate for metal and finish indicated and that develops full strength of members joined. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces.

1. Material: Stainless steel, Type 304.
2. Bar: 1/2-inch-diameter stainless-steel bar.
3. Mounting Brackets: Fabricated from one-piece, formed or extruded stainless steel with formed edges; with 90- or 135-degree turn to match wall condition

    a. Wing Size: 1-1/2 inches high by 1 inch wide.
    b. Corner Radius: 1/8 inch.
    c. Mounting: Flat-head, countersunk screws through factory-drilled mounting holes.

2.7 METAL BASE

A. Form metal base from stainless-steel sheet, No. 4 finish, thickness as indicated on Drawings.

2.8 FINISHES, GENERAL

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

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

2.9 STAINLESS-STEEL FINISHES

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

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.

C. Directional Satin Finish: No. 4.

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

3.2 INSTALLATION, GENERAL

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

B. Perform cutting, drilling, and fitting required to install decorative metal. Set products accurately in location, alignment, and elevation, measured from established lines and levels.

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

D. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.

E. Restore protective coverings that have been damaged during shipment or installation. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at same location.

1. Retain protective coverings intact; remove coverings simultaneously from similarly finished items to preclude non-uniform oxidation and discoloration.

3.3 DECORATIVE WALL PROTECTION INSTALLATION

A. General: Install decorative wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

1. Install decorative wall protection units in locations and at mounting heights indicated on Drawings.
2. Provide mounting hardware, anchors, and other accessories required for a complete installation.

3.4 METAL BASE INSTALLATION

A. Install metal base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

B. Tightly adhere metal base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

C. On masonry surfaces or other similar irregular substrates, fill voids along top edge of metal base with manufacturer's recommended adhesive filler material.

3.5 CLEANING AND PROTECTION

A. Unless otherwise indicated, clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and drying with soft cloths.

B. Protect finishes of decorative metal from damage during construction period with temporary protective coverings approved by decorative metal fabricator. Remove protective covering at time of Substantial Completion.

C. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 10 26 00

SECTION 10 26 13 - WALL AND DOOR PROTECTION, CORNER GUARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Corner guards.

1.2 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain corner guards from single source from single manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless-Steel Sheet: ASTM A 240/A 240M.

B. Adhesive: As recommended by impact-resistant plastic wall protection manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.2 CORNER GUARDS

A. Surface-Mounted, Metal Corner Guards: Fabricated from one-piece, formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Arden Architectural Specialties, Inc.
      b. Balco, Inc.
      c. Construction Specialties, Inc.
      d. Korogard Wall Protection Systems; a division of RJF International Corporation.

   2. Material: Stainless steel, Type 304.
      a. Thickness: Minimum 0.0625 inch.
      b. Finish: Directional satin, No. 4.

   3. Wing Size: Nominal 3-1/2 by 3-1/2 inches.
   4. Corner Radius: 1/8 inch.
   5. Mounting: Adhesive.

2.3 END-WALL GUARDS

A. Surface-Mounted, Metal, End-Wall Guards: Fabricated from one-piece, formed or extruded metal that covers entire end of wall; with formed edges.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Arden Architectural Specialties, Inc.
      b. Balco, Inc.
      c. Construction Specialties, Inc.
      d. Korogard Wall Protection Systems; a division of RJF International Corporation.
   2. Material: Stainless steel, Type 304.
      a. Thickness: Minimum 0.0625 inch.
      b. Finish: Directional satin, No. 4.
   3. Wing Size: Nominal 3-1/2 by 3-1/2 inches.
   4. Corner Radius: 1/8 inch.
   5. Mounting: Adhesive.

2.4 FABRICATION

A. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.

B. Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

C. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.5 METAL FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
   1. Remove tool and die marks and stretch lines, or blend into finish.
   2. Grind and polish surfaces to produce uniform finish, free of cross scratches.
   3. Run grain of directional finishes with long dimension of each piece.
   4. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
   1. For impact-resistant wall protection units attached with adhesive or foam tape, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

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

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing impact-resistant wall protection system components.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
   1. Install impact-resistant wall protection units in locations indicated
   2. Provide full height units. Do not splice.

3.4 CLEANING

A. Immediately after completion of installation, clean corner guards.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 10 26 00

SECTION 10 26 13 - WALL AND DOOR PROTECTION, CORNER GUARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Corner guards.

1.2 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain corner guards from single source from single manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless-Steel Sheet: ASTM A 240/A 240M.

B. Adhesive: As recommended by impact-resistant plastic wall protection manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.2 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:

1. Stainless-Steel Items: Type 304 stainless-steel fasteners.

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

C. Provide concealed fasteners for interconnecting components and for attaching decorative metal items to other work unless exposed fasteners are unavoidable.

1. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

2.3 CORNER GUARDS

A. Surface-Mounted, Metal Corner Guards: Fabricated from one-piece, formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Arden Architectural Specialties, Inc.
      b. Balco, Inc.
      c. Construction Specialties, Inc.
      d. Korogard Wall Protection Systems; a division of RJF International Corporation.
   2. Material: Stainless steel, Type 304.
      a. Thickness: Minimum 0.0625 inch.
      b. Finish: Directional satin, No. 4.
   3. Wing Size: Nominal 3-1/2 by 3-1/2 inches.
   4. Corner Radius: 1/8 inch.
   5. Mounting: Adhesive with flat-head, countersunk screws through factory-drilled mounting holes.

2.4 END-WALL GUARDS

A. Surface-Mounted, Metal, End-Wall Guards: Fabricated from one-piece, formed or extruded metal that covers entire end of wall; with formed edges.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Arden Architectural Specialties, Inc.

b. Balco, Inc.
c. Construction Specialties, Inc.
d. Korogard Wall Protection Systems; a division of RJF International Corporation.

2. Material: Stainless steel, Type 304.
   a. Thickness: Minimum 0.0625 inch.
   b. Finish: Directional satin, No. 4.
3. Wing Size: Nominal 3-1/2 by 3-1/2 inches.
4. Corner Radius: 1/8 inch.
5. Mounting: Adhesive.

2.5 FABRICATION

A. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.

B. Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

C. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.6 METAL FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
   1. Remove tool and die marks and stretch lines, or blend into finish.
   2. Grind and polish surfaces to produce uniform finish, free of cross scratches.
   3. Run grain of directional finishes with long dimension of each piece.
   4. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

1. For impact-resistant wall protection units attached with adhesive or foam tape, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

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

3.2 PREPARATION

A. Complete finishing operations, including painting, and grouting tiles before installing impact-resistant wall protection system components.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
1. Install impact-resistant wall protection units in locations indicated
2. Provide full height units. Do not splice.

3.4 CLEANING

A. Immediately after completion of installation, clean corner guards.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 10 26 00

SECTION 10 28 00 – TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Warm-air dryers.
3. Childcare accessories.
4. Under lavatory guards.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Samples: Full size, for each accessory item to verify design, operation, and finish requirements.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

D. Warranty: Sample of special warranty.

E. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.4 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

NOTE: Indicate all accessories on drawings with an accessory schedule. All accessories shall be recessed or semi-recessed. Verify wall thickness for all recessed accessories.

1.5 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Basis-of-Design Product: Subject to LAWA approval, provide and indicate on the drawings the following products:

1. Bobrick Washroom Equipment, Inc.
2. Georgia Pacific
3. Bradley

B. Toilet Tissue (Jumbo-Roll) Dispenser:

1. Basis-of-Design Product: Bobrick 2892.
2. Description: Stainless Steel Twin – Jumbo Roll Toilet tissue dispenser.
3. Material and Finish: Stainless steel, No. 4 finish (satin).

C. Paper Towel Dispenser:

1. Basis-of-Design Product: Georgia Pacific 29744
2. Material and Finish: Stainless steel, No. 4 finish (satin).

D. Recessed Waste Receptacle:

1. Basis-of-Design Product: Bobrick B-3644.
2. Mounting: Recessed.
3. Material and Finish: Stainless steel.

E. Semi Recessed Waste Receptacle:

1. Basis-of-Design Product: Bradley 334-10
2. Mounting: Semi Recessed.
3. Material and Finish: Stainless steel.

F. Waste Receptacle Large Capacity, Stand Alone:

1. Basis-of-Design Product: Bobrick B-2280
2. Mounting: Stand Alone.
3. Material and Finish: Stainless steel.

G. Liquid-Soap Dispenser:

1. Basis-of-Design Product: Bobrick B-830.
2. Description: Sureflo Soap Dispensing System.

H. Grab Bar (corner):

1. Basis-of-Design Product: Bobrick B-68137.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch thick.
4. Outside Diameter: 1-1/4 inches.
5. Configuration and Length: Corner, 36" x 54".

I. Grab Bar (straight):

1. Basis-of-Design Product: Bobrick B-6806 x 36.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch thick.
4. Outside Diameter: 1-1/4 inches.
5. Configuration and Length: Straight Bar – 36" long.

J. Vendor:

1. Basis-of-Design Product: Bobrick B-352 25.
2. Type: Sanitary napkin and tampon.
3. Mounting: Fully recessed.
4. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).

K. Vendor (alternate):

1. Basis-of-Design Product: Bobrick B-3500 25.
2. Type: Sanitary napkin and tampon.
3. Mounting: Fully recessed.
4. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).

L. Seat-Cover Dispenser:

1. Basis-of-Design Product: Bobrick B – 4221, Contura Series
2. Mounting: Surface mounted.
3. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).

M. Seat-Cover Dispenser (alternate):

1. Basis-of-Design Product: Bobrick B – 221
2. Mounting:
3. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).

N. Mirror Unit:

1. Basis-of-Design Product: Bobrick B-290.
2. Frame: Stainless-steel angle.

O. Air Freshener:

1. Basis-of-Design Product: Technical Concepts – Model no. 401375.
2. Description: Automatic Air Freshener.

2.3 WARM-AIR DRYERS

A. Hand Dryer:

1. Basis-of-Design Product: Dyson, Airblade A02 (LAWA Standard)

2.4 CHILDCARE ACCESSORIES

A. Manufacturers: Subject to LAWA approval, provide products by one of the following:

B. Diaper-Changing Station:

1. Basis-of-Design Product: Koala Bear Kare – KB110SSRE.
2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
3. Mounting: Recessed.
4. Operation: concealed pneumatic cylinder with hinge structure.
5. Material and Finish: Stainless steel, No. 4 finish (satin), exterior shell with high density grey polyethylene interior.

2.5 UNDERLAVATORY GUARDS

A. Manufacturers: Subject to LAWA approval, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Plumberex Specialty Products, Inc.
2. Truebro by IPS Corporation.

C. Underlavatory Guard:

1. Basis-of-Design Product: Truebro Lav Guard 2 E-Z.
2. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

2.6 CUSTODIAL ACCESSORIES

2.7 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. The total number of keys for each accessory shall be determined by LAWA.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 10 28 00

SECTION **10 28 00** – **TOILET ACCESSORIES**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Public-use washroom accessories
   2. Warm-air dryers
   3. Childcare accessories
   4. Under lavatory guards

1.2 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:
   1. Construction details and dimensions.
   2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
   3. Material and finish descriptions.
   4. Features that will be included for Project.
   5. Manufacturer's warranty.

B. Samples: Full size, for each accessory item to verify design, operation, and finish requirements.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

D. Warranty: Sample of special warranty.

E. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.4 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

NOTE: Indicate all accessories on drawings with an accessory schedule. All accessories shall be recessed or semi-recessed. Verify wall thickness for all recessed accessories.

1.5 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Basis-of-Design Product: Subject to LAWA approval, provide and indicate on the drawings the following products:
   1. Bobrick Washroom Equipment, Inc.
   2. Georgia Pacific
   3. Bradley Corporation
   4. Koala Bear Kare
   5. Toto USA, Inc.

B. Toilet Tissue (Jumbo-Roll) Dispenser:
   1. Basis-of-Design Product: Bobrick 2892.
   2. Description: Stainless Steel Twin – Jumbo Roll Toilet tissue dispenser.
   3. Material and Finish: Stainless steel, No. 4 finish (satin).

C. Paper Towel Dispenser:
   1. Basis-of-Design Product: Bobrick 29744
   2. Mounting: Semi Recessed.
   3. Material and Finish: Stainless steel, No. 4 finish (satin).

D. Recessed Waste Receptacle:
   1. Basis-of-Design Product: Bobrick B-3644.
   2. Mounting: Recessed.
   3. Material and Finish: Stainless steel.

E. Semi Recessed Waste Receptacle:
   1. Basis-of-Design Product: Bradley 334-10
   2. Mounting: Semi Recessed.
   3. Material and Finish: Stainless steel.

F. Waste Receptacle Large Capacity, Stand Alone:
   1. Basis-of-Design Product: Bobrick B-2280
   2. Mounting: Stand Alone.
   3. Material and Finish: Stainless steel.

G. Liquid-Soap Dispenser:
   1. Basis-of-Design Product: Bobrick B-830.
   2. Description: Sureflo Soap Dispensing System.

H. Grab Bar (corner):
   1. Basis-of-Design Product: Bobrick B-68137.
   2. Mounting: Flanges with concealed fasteners.
   3. Material: Stainless steel, 0.05 inch thick.
   4. Outside Diameter: 1-1/4 inches.
   5. Configuration and Length: Corner, 36" x 54".

I. Grab Bar (straight):
   1. Basis-of-Design Product: Bobrick B-6806 x 36.
   2. Mounting: Flanges with concealed fasteners.
   3. Material: Stainless steel, 0.05 inch thick.
   4. Outside Diameter: 1-1/4 inches.
   5. Configuration and Length: Straight Bar – 36" long.

J. Vendor:
   1. Basis-of-Design Product: Bobrick B-2706-25.
   2. Type: Sanitary napkin and tampon.
   3. Mounting: Fully recessed.
   4. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).
   5.

K. Vendor (alternate):
   1. Basis-of-Design Product: Bobrick B-3706-25.
   2. Type: Sanitary napkin and tampon.
   3. Mounting: Fully recessed.
   4. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).

L. Seat-Cover Dispenser:
   1. Basis-of-Design Product: Bobrick B – 4221, Contura Series
   2. Mounting: Surface mounted.
   3. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).

M. Seat-Cover Dispenser (alternate):
   1. Basis-of-Design Product: Bobrick B – 221, Classic Series
   2. Mounting: Surface Mounted
   3. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).

N. Mirror Unit:
   1. Basis-of-Design Product: Bobrick B-290.
   2. Mounting: Surface Mounted
   3. Frame: Stainless-steel angle.

O. Air Freshener:
   1. Basis-of-Design Product: Technical Concepts – Model no. 401375.
   2. Description: Automatic Air Freshener.

2.3 WARM-AIR DRYERS

A. Hand Dryer:
   1. Basis-of-Design Product: Toto USA 'Clean Dry' HDR110#SS (LAWA Standard)
   2. Mounting: Recessed.
   3. Exposed Material and Finish: Stainless steel

2.4 CHILDCARE ACCESSORIES

A. Manufacturers: Subject to LAWA approval, provide products by one of the following:

B. Diaper-Changing Station:
   1. Basis-of-Design Product: Koala Bear Kare – KB110SSRE.
   2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
   3. Mounting: Recessed.
   4. Operation: concealed pneumatic cylinder with hinge structure.
   5. Material and Finish: Stainless steel, No. 4 finish (satin), exterior shell with high density grey polyethylene interior.

2.5 UNDERLAVATORY GUARDS

A. Manufacturers: Subject to LAWA approval, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   1. Plumberex Specialty Products, Inc.
   2. Truebro by IPS Corporation.

C. Underlavatory Guard:
   1. Basis-of-Design Product: Truebro Lav Guard 2 E-Z.
   2. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
   3. Material and Finish: Antimicrobial, molded plastic, white.

2.6 CUSTODIAL ACCESSORIES

2.7 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. The total number of keys for each accessory shall be determined by LAWA.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf , when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 10 28 00

SECTION 10 43 13 - DEFIBRILLATOR CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Custom fabricated automated external defibrillator (AED) cabinets.

2. Automated external defibrillators (AED's).

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for AED cabinets.

1. Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

2. Automated External Defibrillator

B. Shop Drawings: For AED cabinets. Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Initial Selection: For each type of fire protection cabinet indicated.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Size: 6 by 6 inches square.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For AED cabinets and AED's.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to AED cabinets including, but not limited to, the following:

    a. Schedules and coordination requirements.

1.5 COORDINATION

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of AED cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

B. Stainless-Steel Sheet: ASTM A 666, Type 304.

C. Tempered Float Glass: ASTM C 1048, Kind KT, Condition A, Type I, Quality q3, 1/8 inch, Class I (clear).

2.2 AED CABINET

A. Cabinet Type: Suitable for mounting AED with emergency telephone and alarm; match existing AED cabinets;

1. Basis of Design Product: Potter Roemer LLC; Model HSSS7063-D-LAWA-modified as described herein or a comparable product by one of the following:

    a. J. L. Industries, Inc., a division of Activar Construction Products Group;.
    b. Larsen's Manufacturing Company;.

B. Cabinet Construction: Nonrated.

C. Cabinet Interior Size: 14 inches wide by 22 inches high by 6 inches deep, as required to incorporate AED and specified features. All cabinet components and equipment shall be accessible, removable and replaceable with the cabinet door in a 90 degree position.

D. Cabinet Material: Stainless-steel sheet.

E. Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim.

F. Cabinet Trim Material: Stainless-steel sheet.

G. Door Material: Stainless-steel sheet.

H. Door Style: Provide limited visibility window to match existing.

I. Door Glazing: Tempered float glass.

J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide manufacturer's standard.
2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

K. Accessories:
1. Identification: Manufacturer's standard.

L. Finishes:

1. Manufacturer's standard baked-enamel paint for the interior of cabinet.
2. Stainless Steel: No. 4.

M. Cabinet Interior Features:
1. Emergency Phone Box.
2. Cable Access Box
3. Raceway

N. Alarm:
1. Circuitry Board.
2. Alarm Circuitry
3. Alarm Key Switch and Key:
4. Control for Visual Alarm, Audio Alarm and Relay Cloasures:

O. Power Requirements for Alarm Board, Siren and LED:

2.3 AUTOMATED EXTERNAL DEFIBRILLATOR (AEDS)

A. Provide the following:
1. Philips Heartstart OnSite (HS1) Defibrillator

2.4 FABRICATION

A. AED Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

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

B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 STAINLESS-STEEL FINISHES

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

B. Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
1. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed cabinets will be installed.

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

3.2 PREPARATION

A. Prepare recesses for recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install AED cabinets in locations and at mounting heights, at heights acceptable to the Los Angeles Fire Department.

B. AED Cabinets: Fasten cabinets to structure, square and plumb.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust cabinet doors to operate easily without binding.

C. On completion of cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by AED cabinet and mounting bracket manufacturers.

E. Replace AED cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10 44 13

SECTION 10 44 13 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire protection cabinets for the following:

a. Portable fire extinguishers.

NOTE: Indicate on the drawings a fire extinguisher in a cabinet within a 75 foot travel distance to all portions of the building on each floor. Keep in mind that additional fire extinguishers and cabinets may be required as dictated by the Fire Department Field Inspector.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.

1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Initial Selection: For each type of fire protection cabinet indicated.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Size: 6 by 6 inches square.

E. Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to fire protection cabinets including, but not limited to, the following:

a. Schedules and coordination requirements.

1.5 COORDINATION

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

B. Stainless-Steel Sheet: ASTM A 666, Type 304.

C. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), 1/4 inch-thick, mm thick, with Finish 1 (smooth or polished).

2.2 FIRE PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

1. Products: Subject to compliance with requirements, provide one of the following:

a. J. L. Industries, Inc., a division of Activar Construction Products Group;.
b. Larsen's Manufacturing Company;.
c. Potter Roemer LLC;

B. Cabinet Construction: Nonrated.

C. Cabinet Material: Stainless-steel sheet.

1. Shelf: Same metal and finish as cabinet.

D. Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim.

E. Cabinet Trim Material: Stainless-steel sheet.

F. Door Material: Stainless-steel sheet.

G. Door Style: Vertical duo panel with frame.

H. Door Glazing: Acrylic sheet.

1. Acrylic Sheet Color: Clear transparent acrylic sheet.

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide manufacturer's standard.
2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Identification: Comply with the Los Angeles Fire Department Requirements.

a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet door.
2) Application Process: Engraved.
3) Lettering Color: Black.
4) Orientation: Vertical.

K. Finishes:

1. Manufacturer's standard baked-enamel paint for the interior of cabinet.
2. Stainless Steel: No. 4.

2.3 FABRICATION

A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.

4. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

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

B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 STAINLESS-STEEL FINISHES

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

B. Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
1. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed cabinets will be installed.

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

3.2 PREPARATION

A. Prepare recesses for recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire protection cabinets in locations and at mounting heights, at heights acceptable to the Los Angeles Fire Department.

B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10 44 13

SECTION 10 44 16 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to the Los Angeles Fire Department.

1.6 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.

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

a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
b. Larsen's Manufacturing Company.
c. Potter Roemer LLC.

2. Valves: Manufacturer's standard.
3. Handles and Levers: Manufacturer's standard.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 2-A:10-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.2 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.

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

a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
b. Larsen's Manufacturing Company.

c. Potter Roemer LLC.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

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

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 10 44 16

SECTION 12 30 00 – CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes interior woodwork for the following applications:

1. Wood cabinets.
2. Plastic-laminate cabinets.
3. Solid-surfacing-material countertops.

NOTE: The Architect of Record shall prepare and sign a letter addressed to LAWA certifying that the installed millwork, either stand alone or combined with any equipment that is integrated into the millwork or sitting on top of the millwork, is in compliance with ADA Standards.

1.2 SUBMITTALS

A. Product Data: For the following:

1. Cabinet hardware and accessories.
2. Handrail brackets.
3. Finishing materials and processes.

B. Shop Drawings: Include location of each item, plans and elevations, large-scale details, attachment devices, and other components.

C. Samples:

1. Lumber and panel products for transparent finish, for each species and cut, finished on one side and one edge.
2. Lumber and panel products with shop-applied opaque finish, for each finish system and color, with exposed surface finished.
3. Plastic-laminate-clad panel products, for each type, color, pattern, and surface finish.
4. Thermoset decorative-overlay surfaced panel products, for each type, color, pattern, and surface finish.
5. Solid-surfacing materials.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products or licensee of AWI's Certified Compliance Program.

B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.

1. This project has been registered as AWI/QCP Number.
2. Provide AWI certification labels or compliance certificate indicating that woodwork complies with requirements of grades specified.

C. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to the Los Angeles Department of Building and Safety.

D. Forest Certification: Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

E. Mockups: Construct mockups at the jobsite to verify compliance with the construction documents and the written comments issued during the LAWA submittal reviews. Include the following mockups:

a. Functional Mock Up: Fabricate from plywood or particle board in configuration indicated to confirm podium configuration, coordination and integration of all equipment including, but not limited to, computers, ticket spitters, monitors, and dynamic signage displays.

NOTE: Whenever practical, the millwork is to be designed with integral cable raceways with future expansion in mind. Within this millwork, discretely locate any access panels that are to be provided for ease of cable and wiring maintenance. Such millwork installations will require coordination with electrical and communication disciplines. Underlying floor mounted electrical outlets are to be fully recessed with cover plates and smoothly aligned with the adjacent floor finishes.

b. Aesthetic Mock Up: Fabricated from specified and indicated materials; incorporate all requested modifications from the Functional Mock Up.

2. Construct all mock ups at jobsite.
3. Approved mock ups may **not** become part of the completed work.

F. Conduct pre-installation conference at the jobsite.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative

humidity at levels planned for building occupants during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 WOODWORK FABRICATORS

A. Fabricators: Subject to LAWA review.

2.2 MATERIALS

A. Thermoset Decorative Overlay: Particleboard or medium-density fiberboard with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

B. High-Pressure Decorative Laminate: NEMA LD 3.

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

    a. Formica Corporation.
    b. Laminart.
    c. Wilsonart International; Div. of Premark International, Inc.
    d. Nevamar Company

C. Solid-Surfacing Material (SSM): Provide material that meets or exceeds ISSFA-2-01 performance standards, consisting of reacted monomers and resins, mineral fillers and pigments and manufactured in sheets of specific thicknesses. SSM shall be solid, non-porous, homogeneous, hygienic, renewable, and, when applicable, may feature inconspicuous hygienic seams. SSM shall be free from conspicuous internal strengthening fibers.

1. Products: Subject to compliance with LAWA requirements, provide one of the following:

    a. Avonite, Inc.; Avonite.
    b. DuPont Polymers; Corian.
    c. Wilsonart International, Div. of Premark International, Inc.; Gibraltar.
    d. Nevamar Company
    e. Hanstone
    f. Formica Corporation

D. Stainless Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness..

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials for a complete installation of architectural woodwork.

NOTE: Coordinate all cabinet hardware with the Door Hardware schedule.

B. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.

C. Frameless Concealed Hinges (European Type):

1. Provide 170 degree minimum opening capabilities. For end doors perpendicular to walls, provide 90 degree type.

D. Drawer Slides: Unless noted otherwise, provide positive stop, side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings.

E. Door and Drawer Locks:

1. Pin and tumbler slide bolt lock, two keys each.
2. Key all locks inside one room alike and provide masterkey for all locks in project to LAWA.
3. Finish to match adjacent pull, or as selected by LAWA.

F. Exposed Hardware Finishes: Complying with BHMA A156.18 for BHMA finish number indicated.

2.4 MISCELLANEOUS MATERIALS

A. Adhesives, General: Do not use adhesives that contain added urea formaldehyde.

B. Low-Emitting Materials: Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. VOC Content for Installation Adhesives and Glues: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

NOTE: All adhesives shall be compliant with South Coast Air Quality Management District (SCAQMD) requirements.

2.5 SOLID-SURFACING-MATERIAL COUNTERTOPS

A. Grade: Premium.

B. Solid-Surfacing-Material Thickness: 3/4 inch.

C. Colors, Patterns, and Finishes: As preselected and indicated in Division 09 Section "Colors and Finishes."

D. Fabricate tops in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

1. Fabricate tops with shop-applied edges of materials and configuration indicated.
2. Fabricate tops with indicated backsplash.

E. Install integral sink bowls in countertops in shop.

F. Drill holes in countertops for plumbing fittings and soap dispensers in shop.

2.6 FABRICATION

A. General: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.

B. Provide Premium grade interior woodwork unless otherwise noted. Subject to LAWA approval.

NOTE: Any grade below premium has been determined not be suitable for the public areas and therefore will not be allowed. All counter heights shall be 34" AFFL to comply with ADA requirements.

2.7 SHOP FINISHING

A. Finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.

B. Finishing Materials: Products shall comply with the testing and product requirements of the California Department of Health Services "Standard Practice for the Testing Of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Condition woodwork to average prevailing humidity conditions in installation areas and examine and complete work as required, including removal of packing and backpriming before installation.

B. Quality Standard: Install woodwork to comply with AWI Standards.

C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches. Shim as required with concealed shims.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

E. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.

1. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c..

G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop. Calk space between backsplash and wall with sealant.

1. Countertops without base cabinets for support shall be designed to conceal structural supports from view and not violate ADA minimum knee clearances.

END OF SECTION 06 40 23

SECTION 12 24 13 - ROLLER SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes roller shades with manual and electrical shade operators.

> **NOTE:** Any window treatment is optional. Window treatment is used primarily to reduce heat gain into the building and to improve the readability of electronic signage during certain times of the day.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, operating instructions, and typical wiring diagrams including integration of motor controllers with building management system, audiovisual and lighting control systems as applicable.

B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.

C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Ceiling suspension system members and attachment to building structure.
2. Ceiling-mounted or penetrating items including light fixtures, air outlets and inlets, speakers, sprinklers, recessed shades, and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
3. Shade mounting assembly and attachment.
4. Size and location of access to shade operator, chain locations, motor, and adjustable components.
5. Minimum Drawing Scale: 1/4 inch = 1 foot (1:48).

D. Samples for Initial Selection: For each colored component of each type of shade indicated.

1. Include similar Samples of accessories involving color selection.

E. Samples for Verification:

1. Complete, full-size operating unit not less than 16 inches (400 mm) wide for each type of roller shade indicated.

2. For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.

3. For the following products:

   a. Shade Material: Not less than 3 inches (76 mm) square, with specified treatments applied. Mark face of material.

   b. Window Treatment Schedule: For roller shades. Use same designations indicated on Drawings.

F. Product Certificates: For each type of roller shade, signed by product manufacturer.

G. Qualification Data: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

H. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:

1. Methods for maintaining roller shades and finishes.
2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
3. Operating hardware.
4. Motorized shade operator.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.

B. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

C. Flame-Resistance Ratings: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. Product Standard: Provide roller shades complying with WCMA A 100.1.

E. Electrical Components: NFPA Article 100 listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing.

F. Shade cloth to “pass” indoor air quality / VOC testing as per ASTM D 5116-97 ASTM D 6670-01, USEPA-ETV (U.S. Environmental Protection Agency’s Environmental Technology Verification Protocol).

G. Shade Cloth: Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC9644, ATCC9645.

H. Shade Cloth to be constructed of a woven screen material consisting of yarns comprised of extruded vinyl coated Polyester core yarn as a composite Thermoplastic shade cloth that shall be sealed at the edges, assuring binding the core yarn to the coating at the cut edge to assure a sealed edge to substantially minimize raveling. Screen cloths to have inert core yarns: i.e. Fiberglass yarns shall not be acceptable.

I. Use only injection-molded Delrin engineered plastics by Dupont for all plastic components of shade hardware. Styrene based, PVC, or glass reinforced polyester thermo polymer plastics are not acceptable.

J. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

2. Locate mock-up in window designated by LAWA.

3. Do not proceed with remaining work until mock-up is accepted by LAWA.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in a window treatment schedule.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 WARRANTY

A. Roller Shade Hardware, Chain and Shadecloth; Manufacturer's standard fit-for-use, including normal wear & tear,, non-depreciating, Limited Lifetime twenty-five year warranty. Warranty to transfer to owner upon completion of installation.

B. Roller Shade Motors and Motor Control Systems: Manufacturer's standard non-depreciating eight-year warranty.

PART 2 - PRODUCTS

2.1 ROLLER SHADES

A. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated in Drawings or a comparable product by one of the following:

1. MechoShade Systems, Inc (MechoShade), as basis of design, performance and warranties, or equal.

B. Shade Band Material: The selection of density and color of sunscreen shadecloth shall be based on the relationship with the specified glass, in accordance with the specific project requirements for reducing heat loads and glare.

1. Fabric Width: As per manufacturer's standard.
2. Pattern: As per manufacturer's standard.
3. Colors: As per manufacturer's standard.
4. Material Openness Factor: As per manufacturer's recommendation for specified glass type and applicable conditions.
5. Bottom Hem: Fabric wrapped and electronically sealed at ends. **Sewn hems and open hem pockets are not acceptable.**

C. Rollers: Extruded-aluminum tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging; designed to be easily removable from support brackets. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.

D. Provide shade hardware system that allows multi-banded shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.

E. Direction of Roll: Reverse or regular roll, as required. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all manual shade drive end brackets. Universal offset shall be adjustable for future change.

F. Mounting Brackets: Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.

1. Bracket shall be fully integrated with all accessories, including, but not limited to: fascia, room darkening side / sill channels, center supports and connectors for multi-banded shades.
2. Drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
3. The brake shall be an over - running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.

4. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable. The entire assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.

G. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. **Nickel plated steel chain shall not be accepted.**

H. Roller Shade Pocket for recessed mounting in acoustical tile, or drywall ceilings.
1. Provide either extruded aluminum and or formed steel shade pocket, sized to accommodate roller shades, with exposed extruded removable closure panel to provide access to shades.
2. For open return air plenum, provide "Vented Pocket" such that there will be a minimum of four 1 inch (25.4 mm) diameter holes per foot allowing the solar gain to flow above the ceiling line.
3. Provide pocket end caps where required.

I. Fascia:
1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners. Fascia shall be able to be installed across two or more shade bands in one piece. Fascia shall fully conceal brackets, shade roller and fabric on the tube. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets. Notching of Fascia for manual chain shall not be acceptable.
a. Color: Selected from manufacturer's standard colors.

~~J.~~ Manual Operation: Chain locations to be on right hand side of user.

2.2 ROLLER SHADE FABRICATION

A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design.

B. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting roller, and operating hardware and for hardware position and shade mounting method indicated.

C. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.

D. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

E. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range, unless otherwise indicated.

2.3 MOTORIZED SHADE HARDWARE AND SHADE BRACKETS

A. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.

B. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).

C. Provide shade hardware system that allows for operation of multiple shade bands offset by a maximum of 8-45 degrees from the motor axis between shade bands (4-22.5 degrees) on each side of the radial line, by a single shade motor (multi-banded shade, subject to manufacturer's design criteria).

2.4 SHADE MOTOR DRIVE SYSTEM

A. Shade Motors: Tubular, asynchronous (non-synchronous) motors, with built-in reversible capacitor operating at 110v AC (60hz), single phase, temperature Class A, thermally protected, totally enclosed, maintenance free with line voltage power supply equipped with locking disconnect plug assembly furnished with each motor. Conceal motors inside shade roller tube. Maximum current draw for each shade motor of 2.3 amps. Use motors rated at the same nominal speed for all shades in the same room. Total hanging weight of shade band shall not exceed 80 percent of the rated lifting capacity of the shade motor and tube assembly.

2.5 MOTOR CONTROL SYSTEMS

A. Specifications and design of shade motors and motor control system are based on a motor logic control system that provides all of the following performance capabilities. Motor logic control systems not in complete compliance with these performance criteria shall not be accepted as equal systems.
   1. Motor Control System:
      a. Provide power to each shade motor via individual 3 conductor line voltage circuits connecting each motor to the relay based motor logic controllers.
      b. Control system components shall provide appropriate (spike and brown out) over-current protection (+/- 10 percent of line voltage) for each of the four individual motor circuits and shall be rated by UL or ETL as a recognized component of this system and tested as an integrated system.
      c. Motor control system shall allow each group of four shade motors in any combination to be controlled by each of four local switch ports, with up to fourteen possible "sub-group" combinations via local 3 button wall switches and all at once via a master 3 button switch. System shall allow for overlapping switch combinations from two or more local switches.

d. Multiple "sub-groups" from different motor control components shall be capable of being combined to form "groups" operated by a single 3 button wall switch, from either the master port or in series from a local switch port.
e. Each shade motor shall be accessible (for control purposes) from up to four local switches and one master switch.
f. Control system shall allow for automatic alignment of shade hem bars in stopped position at 25 percent, 50 percent, and 75 percent of opening heights, and up to three user-defined intermediate stopping positions in addition to all up / all down, regardless of shade height, for a total of five positions. Control system shall allow shades to be stopped at any point in the opening height noting that shades may not be in alignment at these non-defined positions).
g. Control system shall have two standard operating modes: Normal mode allowing the shades to be stopped anywhere in the window's opening height and uniform mode, allowing the shades to only be stopped at the predefined intermediate stop positions. Both modes shall allow for all up / all down positioning.
h. Control system components shall allow for interface with both audiovisual system components and building fire and life safety system via a dry contact terminal block.
i. Control system components shall allow for interface with external analog input control devices such as solar activated controllers, 24 hour timers, and similar items; via a dry contact terminal block.
j. Reconfiguration of switch groups shall not require rewiring of the hardwired line voltage motor power supply wiring, or the low voltage control wiring. Reconfiguration of switch groups shall be accomplished within the motor control device.

2. Wall Switches:
   a. Three-button architectural flush mounted switches with metal cover plate and no exposed fasteners.
   b. Connect local wall switches to control system components via low voltage (12V DC) 4-conductor modular cable equipped with RJ-11 type connectors supplied, installed and certified.
   c. Connect master wall switches to control system components via low voltage (12V DC) 6-conductor modular cable equipped with RJ-12 type connectors supplied, installed and certified.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance.

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

3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions. Allow clearances for window operation hardware.

B. Installer shall train LAWA's maintenance personnel to adjust, operate and maintain roller shade systems.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by LAWA, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train LAWA's maintenance personnel to adjust, operate, and maintain roller shades.

END OF SECTION 12 24 13

SECTION 14 20 00 – VERTICAL TRANSPORTATION, GENERAL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes vertical transportation for the entire project. The vertical transportation work includes, but is not limited to the, following:

1. All elevator work.
2. All escalator work.
3. All moving walk work.
4. Anchors, embedments, shims, fasteners, inserts, hoisting equipment, fall protection/prevention tie-offs, expansion devices, accessories, support brackets, hoist beams, temporary work platforms, backing and attachments for the above.
5. All testing for the above.
6. CCTV, security system, and BMS components will be incorporated into the vertical transportation work. Coordinate with the CCTV, security system, and BMS component contractors to incorporate CCTV, security system, and BMS components and interface requirements during the course of the Work.

NOTE: During any retrofit, LAWA is to be provided the opportunity to identify any parts they deem beneficial for use at another LAWA location. The Design Professional and Contractor shall work directly with LAWA staff, to identify any salvageable parts and their respective handling requirements.

B. Related work specified elsewhere includes, but is not limited to, the following:
1. Elevator Hoistway and Pit:

a. Clear, plumb, substantially flush hoistway with variations not to exceed 1" at any point.
b. Bevel cants not less than 75° from the horizontal on any rear or side wall ledges and beams that project or recess 2" or more into the hoistway. Not required on hoistway divider beams.
c. Divider beams between adjacent elevators at each floor, pit, and overhead. Supports at each floor for car and counterweight guide rail fastening including supports for car guide rail fastening above top landing. Intermediate car guide rail support when floor heights exceed 14'-0" or as designated on contract drawings. Intermediate counterweight guide rail supports where floor heights exceed 16'-0". Provide rail bracket supports as required to meet Code required bracket spacing and/or Installer needs. Building supports not to deflect in excess of 1/8" under normal conditions, 1/4" under applicable seismic conditions.
d. Continuous vertical car and counterweight guide rail support between floors shown on Contract documents full height of hoistway.

e. Installation of guide rail bracket supports in concrete. Inserts or embeds, if used, will be furnished under Division 14.
f. Hoist machine supports including two (2) additional horizontal supports above the top terminal landing on the machine side of the hoistway. Locate as required for selected providers' equipment.
g. Wall blockouts and fire rated closure for control and signal fixture boxes which penetrate walls.
h. Cutting and patching walls and floors.
i. Concrete wall pockets and/or structural steel beams for support of hoist machine, rope sheaves, and dead-end hitch beams. Support deflection shall not exceed 1/1666 of span under static load.
j. Erect front hoistway wall after elevator entrances are installed.
k. Grout floor up to hoistway sills and around hoistway entrances.
l. Lockable, self-closing, fire-rated pit door, if pit depth exceeds 10'-0" (3.048 m).
m. Pit access ladder for each elevator and pit divider screens.
n. Structural support at pit floor for buffer impact loads, guide rail loads.
o. Waterproof pit. Indirect waste drain or sump with flush grate and pump. Locate sump pump outside of hoistway/pit.
p. Protect open hoistways and entrances during construction per OSHA Regulations.
q. Protect car enclosure, hoistway entrance assemblies, and special metal finishes from damage.
r. Hoistway smoke relief venting or hoistway pressurization for smoke control.
s. Hoist machine ventilation, heating and/or cooling. Maintain minimum temperature of 55°F, maximum 90°F at the location of the hoist machine.
t. Seal fireproofing to prevent flaking.
u. Glass enclosed hoistways. Laminated glass to meet the requirements of ANSI Z97.1. Interior ledges created by glass mullions not to exceed 4".
v. Access ladders and platform to governor(s), if required.

2. Elevator Control Room and Machinery Spaces:

a. Enclosure with access. Provide ships ladder or stair with guard railing. Include similar access to overhead machinery space.
b. Self-closing and locking access door.
c. Ventilation and heating. Maintain minimum temperature of 55° F, maximum 90° F. Maintain maximum 80% relative humidity, non-condensing.
d. Paint walls and ceiling.
e. Class "ABC" fire extinguisher in each elevator controller space.
f. Seal fireproofing to prevent flaking.
g. Self-closing and locking governor access door and access means.
h. Fire sprinklers.

3. Elevator Electrical Service, Conductors and Devices:

a. Lighting and GFCI convenience outlets in pit, controller space, and overhead machinery spaces. Provide one additional non-GFCI convenience outlet in pit for sump pump.
b. Three-phase mainline copper power feeder to terminals of each elevator controller in the controller space with protected, lockable "open," disconnecting means.

c. Single-phase copper power feeder to each elevator controller for car lighting and exhaust blower with individual protected, lockable "open," disconnecting means located in the controller space.

d. Emergency telephone line to each individual elevator control panel in elevator controller space.Fire alarm initiating devices in each elevator lobby, for each group of elevators or single elevator and each controller space to initiate firefighters' return feature. Device at top of hoistway if sprinklered. Provide alarm initiating signal wiring from hoistway or controller space connection point to elevator controller terminals. Device in machine room and at top of hoistway to provide signal for general alarm and discrete signal for Phase II firefighters' operation.
e. Temporary power and illumination to install, test, and adjust elevator equipment.
f. Category 6 (distance≤300 feet) or Fibre Optic (distance >300 feet) Ethernet connection and junction box in each elevator machine room space.
g. Firefighters' telephone jack and announcement speaker in car with connection to individual elevator control panels in the controller space and elevator control panel in firefighters' control room.
h. Conduit from the closest hoistway of each elevator group or single elevator to the firefighters' control room and/or main control console. Coordinate size, number, and location of conduits and junction boxes with Elevator Contractor.
i. Means to automatically disconnect power to affected elevator drive unit and controller prior to activation of the controller space fire sprinkler system, and/or hoistway fire sprinkler system. Manual shut-off means shall be located outside bounds of the controller space.
j. When sprinklers are provided in the hoistway all electrical equipment, located less than 4'-0" above the pit floor shall be identified for use in wet locations. Exception, seismic protection devices.
k. Single-phase power feeders to main control console and firefighters' control panel.
l. Single-phase power feeder to elevator intercom amplifier in the elevator controller space.
m. Single-phase power feeders to controller(s) for CCTV with lockable "open" disconnecting means.
n. 10 footcandles illumination level in elevator lobbies of elevator threshold.

4. Elevator Standby Power Provision:

a. Standby power of normal voltage characteristics via normal electrical feeders to run one elevator at a time in each elevator group and/or single elevator unit at full-contract car speed and capacity.
b. Conductor from auxiliary form "C" dry contacts, located in the standby power transfer switch to a designated elevator control panel in each elevator group and/or single elevator unit. Provide a time delay of 30 - 45 seconds for pre-transfer signal in either direction.
c. Standby single-phase power to group controller, and each elevator controller for car lighting, exhaust blower, emergency signaling device, intercom amplifier and hoist machine cooling fan.
d. Means for absorbing regenerated power during an overhauling load condition per NEC 620.91. Elevator(s) will employ IGBT drive, presenting a non-linear active load.
e. Standby power to hoist machine and control room ventilation or air conditioning.
f. Standby power to emergency communications device(s).

5. Escalator Wellway and Pit

a. Clear, plumb, wellway with variations not to exceed 1" at any point.
b. Floor pockets and/or structural beams for support of escalator truss at each end and at intermediate locations as shown on Architect's drawings. Steel supports, if used, shall meet deflection requirements of AISC Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings.
c. Fire rated enclosure of escalator truss including ends, sides and bottom in ceiling plenum.
d. Patching and finishing around escalator landing plates after installation.
e. Cladding and finishing of exposed truss surfaces.
f. Waterproof pit. Sump pit with flush grate and pump or indirect waste drain with oil separator for outdoor units.
g. Protect exposed exterior escalators with weatherproof canopy entire length of truss per Code.
h. Protect open wellways during construction per OSHA Regulations.
i. Protect escalator truss, steps, landing plates, balustrades, handrails, and special metal finishes from damage.
j. Venting or other means to prevent accumulation of smoke and gas in escalator truss as required by Local Building Code.
k. Fire sprinklers per local Code requirement with protective guards.
l. Finished flooring surrounding floor landing plates. All patching of flooring including floor covering adjacent to the escalators. Any damage caused by the Contractor shall be replaced at no additional cost to LAWA. Expansion joint treatment at the lower escalator support to accommodate sliding escalator attachment.
m. Well way railing at top openings, pit edge angles and pit drains.

6. Escalator Electrical Service, Conductors and Devices

a. Light with guard and GFCI convenience outlet in each pit and machine room space.
b. Three phase mainline copper power feeder to terminals of each escalator controller in the machine room space with protected, lockable "open", disconnect switch. Auxiliary disconnect, as required, for multiple drive units.
c. Telephone and/or CATV Ethernet line to each individual escalator control panel in escalator machine space.
d. Supports, conduit and wall blockouts for remote controller installations.
e. Fire alarm initiating devices in each escalator pit. Provide alarm initiating signal wiring from connection point to escalator controller terminals. Device to provide signal for general alarm and interruption of escalator operation.
f. Temporary power and illumination to install, test, and adjust escalator equipment.
g. Category 6 (distance≤300 feet) or Fibre Optic (distance >300 feet) Ethernet connection and junction box in each escalator machine room space.
h. Conduit from the closest wellway of each escalator group or single escalator to the firefighters' control room and/or the control console. Coordinate size, number and location of conduits and junction boxes with escalator contractor.
i. Single phase copper power feeder to each lower end intermediate location, and upper end escalator pit for under handrail lighting with individual protected, lockable "open", disconnect switch located in machine room space.

7. Moving Walk Wellway and Pit

    a. Clear, plumb, wellway with variations not to exceed 1" at any point.
    b. Floor pockets and/or structural beams for support of moving walk truss at each end and at intermediate locations as shown on drawings. Steel supports, if used, shall meet deflection requirements of AISC Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings.
    c. Fire rated enclosure of moving walk truss including ends, sides and bottom in ceiling plenum.
    d. Patching and finishing around moving walk landing plates after installation.
    e. Cladding and finishing of exposed truss surfaces.
    f. Waterproof pit. Sump pit with flush grate and pump or indirect waste drain with oil separator for outdoor installations.
    g. Protect exposed exterior moving walks with weatherproof canopy entire length of truss per Code.
    h. Protect open wellways during construction per OSHA Regulations.
    i. Protect moving walk truss, pallets, landing plates, balustrades, handrails, and special metal finishes from damage.
    j. Venting or other means to prevent accumulation of smoke and gas in moving walk truss as required by Local Building Code.
    k. Fire sprinklers per local Code requirement with protective guards.
    l. Finished flooring surrounding floor landing plates. All patching of flooring including floor covering adjacent to the moving walks. Any damage caused by the Contractor shall be replaced at no additional cost to LAWA.

8. Moving Walk Electrical Service, Conductors and Devices

    a. Light with guard and GFCI convenience outlet in each pit and machine room space.
    b. Three phase mainline copper power feeder to terminals of each moving walk controller in the machine room space with protected, lockable "open", disconnect switch. Auxiliary disconnect, as required, for multiple drive units.
    c. Telephone and/or CATV Ethernet line to each individual moving walk control panel in moving walk machine space.
    d. Supports, conduit and wall blockouts for remote controller installations.
    e. 10 footcandles minimum illumination escalator landings and along the entire escalator run.
    f. Fire alarm initiating devices in each moving walk pit. Provide alarm initiating signal wiring from connection point to moving walk controller terminals. Device to provide signal for general alarm and interruption of moving walk operation.
    g. Temporary power and illumination to install, test, and adjust moving walk equipment.
    h. Category 6 (distance≤300 feet) or Fibre Optic (distance >300 feet) Ethernet connection and junction box in each moving walk machine room space.
    i. Conduit from the closest wellway of each moving walk group or single moving walk to the firefighters' control room and/or the control console. Coordinate size, number and location of conduits and junction boxes with moving walk contractor.

j. Single phase copper power feeder to each lower end intermediate location, and upper end moving walk pit for under handrail lighting with individual protected, lockable "open", disconnect switch located in machine room space.

1.2 QUALITY REQUIREMENTS

A. Manufacturer Qualifications: Award the fabrication of the vertical transportation work to one of the following firms who are specialized in the fabrication of vertical transportation equipment and who have successfully produced work similar in design and extent to that required for the project:

1. Schindler Elevator Corporation
2. Otis Elevator Company.
3. KONE Inc.
4. Substitutions: Other manufacturer's products may be incorporated into the Work if approved by LAWA.

B. Installer Qualifications: Engage the vertical transportation manufacturer or an experienced Installer approved by the vertical transportation manufacturer who has completed not less than 3 elevator, escalator, and moving walk installations similar in material, design, and extent to that indicated for this Project, as determined by LAWA, for a period of 5 years and with a record of successful in-service performance and who is acceptable to LAWA.

C. Contractor's Statement: The Contractor shall furnish a statement giving a complete description of all parts wherein the vertical transportation systems that he proposes to furnish do not comply with these specifications, or are in conflict with the Contract Documents. Failure to furnish such a statement will be interpreted to mean that the Contractor agrees to meet all requirements of this specification, and any conflicts with the work of other trades brought about by the use of the selected manufacturer's equipment will not result in any added cost to LAWA.

D. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of California and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of elevators and escalators that are similar to those indicated for this Project in material, design, and extent.

E. Standards: The following standards shall govern the vertical transportation work. Where standards conflict, that standard with the more stringent requirements shall be applicable.

1. Elevator, Escalator and Moving Walk Code: In addition to requirements of authorities having jurisdiction, comply with the latest edition of ASME A17.1, "Safety Code for Elevators and Escalators", ASME A17.2 “Guide for Inspection of Elevators, Escalators and Moving Walks”, and ASME A17.5 “Requirements for Elevator and Escalator Electrical Equipment”, including supplements, as published by the American Society of Mechanical Engineers. Wherever “Code” is referred to in the vertical transportation specifications, the ASME A17.1 Code shall be implied.

a. The vertical transportation systems shall be designed to resist the seismic loads required under the 2007 California Building Code taking into account IBC Seismic Design Category, IBC Design Spectral Response Acceleration (SDS), IBC Importance Factory and Seismic Story Drift. Conform to the applicable portions of Section 8.4 'Elevator Safety Requirements for Seismic Risk Zone 2 or Greater' of ASME A17.1 and Section 8.5, "Escalator and Moving Walk Safety Requirement for Seismic Risk Zone 2 or greater" of ASME A17.1 also comply with CCR Title 8, Rules 3137(a) and 3137(d).

2. Electrical Code: For electrical Work included in the vertical transportation Work, comply with "National Electrical Code" (ANSI C1), by NFPA, all applicable local codes, and the Authorities having jurisdiction.
3. Welding: Comply with AWS standards.
4. Americans with Disabilities Act (ADA).
5. Local fire Jurisdiction.
6. Requirements of IBC and all other Codes, Ordinances and Laws applicable within the governing jurisdictions.
7. Life Safety Code, NFPA 101 and CCR Title 19.
8. California Code of Regulations Title 8 and California Building Code Title 24.
9. City of Los Angeles Elevator Code.

F. Electrical Devices and Equipment:

1. Elevators:

a. Furnish and install all necessary wiring for proper operation of the equipment including conduit and fittings for machine rooms beginning at the light and power outlets furnished under Division 26 ELECTRICAL sections. Include all wiring and connections required to elevator devices remote from hoistway and between elevator machine rooms. Provide additional components and wiring to suit machine room layout.
b. Provide grounded metal shielded GFCI receptacles for work lights on the underside of each platform and the crosshead of each car.

2. Escalators/Moving Walk:

a. Furnish and install all necessary wiring for proper operation of the equipment including all wiring, conduit and fittings beginning from the disconnect switch in the escalator machine space to all electrified escalator equipment.
b. Install all conductors, except control panel wiring, in rigid conduit except short connections where equipment may require shifting for adjustments. Conduit shall be liquid tight on outdoor installations. Such wiring shall be installed in liquid tight flexible metal conduit not exceeding 6' in length.
c. Provide flame retardant panel wiring.
d. Provide grounded metal shielded GFCI receptacles for work lights in the upper and lower pit areas.

3. All electrical and wiring interconnections shall comply with the governing codes, ASME A17.1, ASME A17.5 and NFPA 70.

    a. Conductors: Copper throughout with individual wires coded and all connections at accessible, numbered terminal blocks and connected with lugs and pressure connectors. Use no splices or similar connections in wiring except at terminal blocks, control cabinets, junction boxes and conduits. Provide 10% spare conductors throughout.
    b. Elevator Traveling Cables: All wiring shall be insulated with a moisture-proof, flame retardant, outer covering. Non-traveling cable hoistway wiring shall be run in tubing, conduit, or electrical wireways. Provide flexible traveling cables which are properly suspended to relieve stress on individual cables. Provide six (6) pairs of 18 ga. shielded wire in the traveling cables for telephone or other electronic equipment in the car. Provide 10% spare conductors. Provide four space pair of shielded communication wires. Terminate them to barrier-type terminal strip behind each elevator return panel at one end of cable and within a machine room security junction box. Provide two RG-6 traveling coax cables for CCTV equipment in the car. Provide two pair 14 gauge wires for CCTV power. Prevent traveling cables from rubbing or chafing against hoistway or car items.
    c. Conduit and Fittings: Galvanized steel conduit. Minimum conduit size shall be 3/4" diameter unless larger size is required per NFPA 70 for use intended. Fittings may be steel compression type unless otherwise permitted or required by NFPA 70.

G. Testing and Inspections: Advise LAWA in advance of dates and times that tests and inspections are to be performed.

1. Regulatory Testing and Inspections: Upon nominal completion of each elevator, escalator, and moving walk installation, and before permitting use of the same (either temporary or permanent), perform tests as required and recommended by the "Code" and applicable law. Verification that such tests have been completed, all corrective work accomplished and installation approved for issuance of a permit or certificate to operate, shall be required before acceptance of each unit.

    a. Before final acceptance, the Contractor shall furnish permits, or certificates, by the Building Department or other City, County or State departments having legal jurisdiction, as required to allow the use of each unit. All certificates shall be furnished to LAWA through the Contractor.

2. Acceptance Testing: Upon completion of each elevator, escalator and moving walk installation and before final acceptance, make a contract load test of each in the presence of the local authorities having jurisdiction with full maximum load, (or in accordance with local code requirements) to determine whether the equipment as installed meets the speed, capacity and all other requirements of the specifications.

H. Manufacturer Labeling: Names, trademarks and other identifying symbols shall not be permitted on surfaces visible to the public.

I. Obtain and pay for permits, fees, licenses, and inspections necessary to complete the vertical transportation installations.

1.3 SUBMITTALS

A. Submit shop drawings and required material samples for review in accordance with Section SPECIAL CONDITIONS, Submittals. Include certification or other data verifying compliance with required characteristics. Indicate by transmittal form that copy of each has been distributed to the installer.

1. Scaled Fully Dimensioned Layout: Plan of pit, hoistway, wellway and machine room indicating equipment arrangement, elevation section of hoistway, and wellway, details of car enclosures, hoistway entrances, car/hall signal fixtures, and seismic attachments.
2. Design Information: Indicate equipment lists, reactions, and design information on layouts.
3. Power Confirmation Information: Design for existing conditions for Elevators, Escalators and Moving Walks. Provide complete power data submittals including heat emission data.
4. Fixtures: Cuts, samples, or shop drawings.
5. Finish Material: Submit 3" x 12" samples of actual finished material for review of color, pattern, and texture. Compliance with other requirements is the exclusive responsibility of the Provider. Include, if requested, signal fixtures, lights, graphics, Braille plates, and detail of mounting provisions.
6. Design Information: Provide calculations verifying the following;

    a. Adequacy of existing electrical provisions.
    b. Adequacy of retained equipment relative to Code requirements if car weight increased by more than 5%.
    c. Machine room heat emissions in B.T.U.' s.
    d. Adequacy of existing retained elevator machine beams and escalator supports.
    e. Adequacy of existing car platform structure for intended loading.

B. Senate Bill 1886 Submittals: Provide copies of all Code Authority/Permit submittals to the Architect.

C. Submittal review shall not be construed as an indication that submittal is correct or suitable, nor that the work represented by submittal complies with the Contract Documents. Compliance with Contract Documents, Code requirements, dimensions, fit, and interface with other work is Provider's responsibility.

D. Acknowledge and/or respond to review comments. Promptly incorporate required changes due to inaccurate data or incomplete definition so that delivery and installation schedules are not affected. Identify and cloud drawing revisions, including Provider elective revisions on each re-submittal. Revision response time is not justification for equipment delivery or installation delay.

E. Perform review and evaluation of all aspects of its work prior to requesting Design Consultant's final review. Work shall be considered ready for Consultant's final contract compliance review

when copies of Provider's test and review sheets are available for Design Consultant's review and all elements of work or a designated portion thereof are in place and a unit or group are deemed ready for service as intended.

F. Documents required prior to final payment:

1. Provide three sets of neatly bound written information necessary for proper maintenance and adjustment of equipment within 30 days following final acceptance of the project. Final retention will be withheld until data is received, accepted, and approved by Engineer and reviewed by Design Consultant. Include the following as minimums:

    a. Straight line wiring diagram of "as installed" circuits, with index of location and function of components. Provide one reproducible master set. Mount one set wiring diagrams on panels, racked, or similarly protected, in machine room. Provide remaining set rolled and in a protective drawing tube. Maintain machine room set with addition of all subsequent field changes. These diagrams are LAWA's property.
    b. Lubricating instructions, including recommended grade of lubricants.
    c. Parts catalogs for all replaceable parts including ordering forms and instructions.
    d. Four sets of neatly tagged keys for all switches and control features properly tagged and marked.
    e. Neatly bound instructions explaining all operating features including all apparatus in the car, exterior escalator and moving walk switches and remote control panels.
    f. Neatly bound maintenance and adjustment instructions explaining areas to be addressed, methods and procedures to be used and specified tolerances to be maintained for all equipment.
    g. Diagnostic test device complete with access codes, adjusters manuals and set-up manuals for adjustment, diagnosis and troubleshooting of elevator system and performance of routine safety tests.

2. Preventive Maintenance Contract: Furnish properly executed contract for continuing, preventive maintenance. Utilize contract form provided, by LAWA.
3. Acceptance of such records by LAWA/Design Consultant shall not be a waiver of any Provider deviation from Contract Documents or shop drawings or in any way relieve Provider from his responsibility to perform work in accordance with Contract Documents.

G. Materials, And Tools: General: Within sixty days following initial acceptance of the elevator/escalator/moving walk installation, provide written information and diagnostic tools necessary for proper maintenance and adjustment of the equipment, as follows:

1. Provide two copies and one mylar reproducible of all wiring diagrams, including straight-line wiring diagrams of all "as built and installed" elevator electrical circuits with index of location and function of all components. Provide logic diagram for all microprocessors. NOTE: Leave one complete set of corrected installation diagrams and wiring dope sheets on the job for each unit.
2. Provide two copies of all "final" construction and installation drawings.
3. Provide three neatly bound and indexed sets of the following:

a. Sequence of operation and/or floor charts of the motion control and supervisory control panels, and related operating equipment, including individual and group microprocessors.
b. Operating instructions and complete, detailed adjustment and application data and instructions for all equipment components including controller, microprocessor, selectors, motors, drives, valves, switches, etc.
c. Lubricating instructions, including recommended grade of lubricants.
d. Parts catalogs for all replaceable parts, including ordering forms and instruction. If a given component is made up of smaller parts, the smaller parts shall also be clearly identified by number.
e. Provide a summary of contract data for each type of equipment furnished, including quantity and part number.
f. Supplemental data required or requested by LAWA to facilitate equipment maintenance and adjustment.

4. Provide all special tools, including top-level solid-state diagnostic equipment, which the Manufacturer and Installer supplies to his adjusters and service personnel for proper maintenance and adjustment of all equipment. Special tools shall become the property of LAWA. NOTE: If solid-state microprocessor or group supervisory diagnostic equipment and/or tools are not available for sale Elevator Contractor shall quote LAWA on lease or rental of this equipment, including acceptable terms. Quote as a separate item.
5. The following supplemental information will be required by LAWA for this project.

a. Step-by-step adjusting procedures, as used by elevator Manufacturer's/Installer's field adjustor, for each type of equipment used in this specific installation. This shall include, but not be limited to the following:

1) Selectors / encoders.
2) Brakes: Shoe clearance, core clearance, brake switch, brake torque and all other adjustments necessary to give a satisfactory functioning brake.
3) Controllers: Relay air gaps, current operated relays, timed circuits, set-reset relays, and all other necessary adjustments and settings.
4) Electronic devices and circuits.
5) Dispatching controller: Timed circuits, etc.
6) Computer type dispatcher: Data and procedure to change settings.
7) Overload relays: Current settings upon tripping, testing and maintenance procedures.
8) Acceleration and deceleration patterns, including time and slow-down settings.
9) Governor: Over-speed switch. Jaw pull-through in pounds.
10) Hydraulic elevators: Pump flow and leveling control valves, relief valves, and jack packing gland.
11) Hoistway switches and cams.
12) Terminal landing slow down device.
13) Leveling and re-leveling units in hoistway.
14) Load compensation: Load weighing device settings and load compensation adjustments.

15) Safeties: Clearance to rails and pull out in pounds for the releasing carrier. Setting of safety operated switch.
16) Door protective devices: Focusing, testing, maintenance, and adjusting procedures.
17) Roller guides: Spring tension and stop settings.
18) Motors: Air gap, compounding, neutral setting and all other necessary adjustments.
19) Door operator and doors: Door operator control switches, door operator control potentiometers or resistances, door motor, door checks, door closers, door and gate locks, clutches/bayonets, door unlocking cams, encoders, and door restrictors.
20) Communications, annunciating, and security systems.
21) Escalator Safety devices
22) Escalator Code clearances

b. List of necessary tools, instruments, and other equipment used in the adjusting procedure, including method for incorporating them in procedures.
c. Final adjusting data for each elevator/escalator/moving walk, including, but not limited to, settings for the following:

1) Load compensation sensing device in voltage or current for empty fully loaded car.
2) Selectors/encoders.
3) Brakes: Shoe running clearance and brake coil current. Escalator brake torque settings.
4) Hatch switches and devices.
5) Door operator control switch settings.
6) Safety device: Full-load, full-speed, test data.
7) Full-load starting and running current.
8) Current settings or current operated relays.
9) Motor field resistance settings.
10) Timers: Time delay settings, including method and equipment needed to program microprocessor.
11) Electronic power supply voltages necessary for correct functioning of equipment and from where measured.
12) Skirt/Step clearance settings.
13) Safety switch settings.

6. Warranty: Submit a copy of the following written warranty for the vertical transportation work. The Contractor will correct defects and non-compliant work which develop or become known within one year from the date of acceptance by LAWA to the satisfaction of LAWA at no additional cost. Make modifications, adjustments, improvements, etc., to meet the specified performance requirements. No earlier than 1 month prior to the conclusion of the warranty period each elevator, escalator, and moving walk, will be inspected jointly by LAWA, and the Contractor. All maintenance and warranty deficiencies requiring correction by the Contractor shall be mutually agreed to at this time. A written report shall be provided by LAWA detailing the required actions.

a. The warranty shall not deprive LAWA of other rights LAWA 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.Elevator/Escalator Maintenance Agreement: Provide full preventative maintenance service of the elevator equipment for a period of 12-months from the date of acceptance by LAWA. This service shall include a monthly examination of not less than 1 hour per examination per hydraulic elevator, a semi-monthly (twice per month) examination of each traction elevator, of not less than 1 hour and a weekly examination of each escalator/moving walk of not less than 1 hour by competent and trained personnel and shall include all necessary adjustments, greasing, oiling, cleaning, supplies, and replacements of parts to keep the equipment in perfect operation, except such parts made necessary by negligence not caused by this Contractor. Use parts and supplies as used in the manufacture and installation of original equipment. All costs in connection with such maintenance shall be included in the agreement price.

b. Include 24 hour per day, 7 day per week emergency Call Back Service for all elevators, escalators and moving walks should operational problems or shut downs develop between service periods.

    1) Response Time: Two hours or less.

c. Take equipment out of service for scheduled routine preventative maintenance during non-peak usage of the equipment, as approved by LAWA.
d. Perform preventative maintenance during regular working hours.
e. Require service and emergency personnel to report to the LAWA representative on site upon arrival at the building and again on completion of the required work. Furnish a copy of the work ticket containing a complete description of the work performed to the County's representative.
f. Maintain a preventative maintenance checklist in the machine room to itemize individual component parts, as determined by the original equipment manufacturer, which require weekly, monthly, quarterly or yearly inspection. Include on the checklist the building name, elevator/escalator serial numbers, examination or service frequency, examination hours, individual elevator/escalator components examined or serviced.
g. Maintain an inventory at all times and available for immediate delivery and installation, a sufficient supply of emergency parts for repair of each unit. Provide materials or parts to be used which are genuine original manufacturer’s renewal parts.
h. Regularly and systematically examine, inspect, properly adjust, clean, lubricate, and if conditions warrant, repair or replace, all mechanical, structural and electrical elevator and escalator/moving walk equipment components, including, but not limited to, the following:

    1) Controller, selector, dispatching equipment, solid state drive units and all related equipment, including but not limited to relays, solid state components, resistors, condensers, transformers, contacts, leads, overloads, dash pots, timing devices, computer devices, selectors components, cables,

safety devices and tapes and all switches in the machine rooms, hoistways, wellways and pits.

2) Motors, including but not limited to, windings, rotating elements, bearings, brakes and gear boxes.
3) Door operating equipment, including but not limited to, operators, interlocks, gate switches, hangers, tracks, rollers, door gibs and closers.
4) Bull gears, sheaves and pulleys including bearings and shafts.
5) Car guide rails, guide rail brackets and backing, guide rail lubricators, buffers, buffer supports, guide shoes, guide shoe mounts, guide shoe rollers and guide shoe gibs.
6) Car frame, platform and sill, including all related components.
7) Car and corridor operating and signal fixtures components, including light bulbs.
8) Car fan and emergency lighting units.
9) Electric wiring and traveling cables necessary for the operation of the elevators equipment and associated accessory equipment.
10) Hydraulic cylinders, plungers, packing, and related components.
11) Pump unit and all related components, including but not limited to tank, filters, strainers, pumps, motors, belts, pipe, valves and all component parts thereof, muffler and scavenger pump.
12) Hydraulic oil.
13) All hydraulic piping, valves, and fittings.
14) Governor, including but not limited to governor sheave and shaft assembly, bearings, contacts, governor jaws and governor tension sheave assembly.
15) Escalator/Moving Walk tracks, chains, chain and step/pallet rollers, handrails, steps, pallets and safety devices.
16) Repair and replacement coverage is intended to be full and complete, and to include the cost of providing all elevator replacement components, including those not mentioned above.

i. Provide fireman's recall tests as required by the governing code.
j. Maintain the efficiency, safety and speeds of the equipment at all times, including acceleration, retardation, contract speed, with or without full load, floor to floor time, door opening and closing time. Maintain escalator hand rail speed within 2 fpm of step tread. Maintain the vertical transportation system monitoring system at all times.
k. Housekeeping: Provide and maintain industry standard parts cabinets for the orderly storage of replacement parts. Keep the premises free of accumulation of waste material or rubbish. Store combustible materials in closed metal containers. Regularly brush lint and dirt from the guiderails, car tops, bottom of platform and remove dirt, excess lubricant and accumulated rubbish from pits, and machine room floors. Take necessary actions to prevent oil and grease from creating unsightly appearances on the equipment and/or accumulating on the floor of equipment room, elevator pit, escalator pits, escalator steps, moving walk pits or pallets.

l. Clean all of the elevator/escalator/moving walk equipment. Cleaning of the equipment shall occur at regular intervals sufficient in frequency to maintain a professional appearance and preserve the life of the equipment. Perform complete clean down of escalator/moving walk interiors and elevator hoistways during the 11th month of Warranty Maintenance. Report to LAWA the need for cleaning and/or janitorial services for all items not covered by the Contract.Lubricate all moving parts of the equipment requiring lubrication. Apply lubricants at intervals recommended by the equipment manufacturer. Provide lubrication more frequently, if dictated through use of the equipment. Utilize lubricants suitable for the purpose intended that meet or exceed the minimum requirements specified by the manufacturer of the equipment to which the lubricant is applied. Remove and properly dispose of used and oily wiping materials from the building on the same day that they are used.

m. Adjust the equipment as necessary in accordance with the check list and when the operation of the equipment varies from its normal or originally designed performance standards. Utilize qualified individuals properly equipped with tools and instruments, employed by the installer for adjustments. Parts or assemblies which have worn (or otherwise deteriorated) beyond "normal" adjustment limits shall be replaced as provided for under the following paragraphs titled "Replace" and "Repair".

1) Replace: Replace items during the course of scheduled preventative maintenance, when such replacement will prevent an unscheduled equipment shutdown and/or ensure the continued safe normal operation of the equipment or which otherwise will extend the useful life of the equipment. Make all replacements using original manufacturer's parts or LAWA approved equals.

2) Repair:

a) Repairs which are the Responsibility of the Installer: Make (or cause to made) all repairs stipulated herein, made necessary due to normal wear and use of the elevator or escalator/moving walk system. All costs for labor, materials, expanses, and supplies which occur as a result of the stated repair.

n. Periodic Tests: Perform periodic safety tests of the elevator and escalator/moving walk components, as required by Code. The periodic tests shall be conducted as indicated in the code. Test results shall be witnessed as required and recorded on forms supplied by or acceptable to LAWA. Provide certified copies of the completed test forms to LAWA. Coordinate the periodic testing with LAWA Inspection/Clean Down Procedure which is required once annually by LAWA.

7. Elevator/Escalator/Moving Walk Extended Preventative Maintenance Agreement: Quote monthly cost for a five year preventative maintenance agreement commencing upon completion of the warranty maintenance. Price adjustment will be made at Agreement commencement date and thereafter as provided in the Agreement. Use competent personnel, acceptable to LAWA, employed by and supervised by the equipment installer.
8. Escalator/Moving Walk Maintenance Agreement: Provide full preventative maintenance service of the equipment for a period of 12-months from the date of acceptance by

LAWA. This service shall include weekly examinations of not less than 1 hour per examination per escalator/moving walk by competent and trained personnel and shall include all necessary adjustments, greasing, oiling, cleaning, supplies, and replacements of parts to keep the equipment in perfect operation, except such parts made necessary by negligence not caused by this Contractor. Use parts and supplies as used in the manufacture and installation of original equipment. All costs in connection with such maintenance shall be included in the agreement price.

a. Include 24 hour per day, 7 day per week emergency Call Back Service for all escalators, and moving walks should operational problems or shut downs develop between service periods.

    1) Response Time: Two hours or less.

b. Take equipment out of service for scheduled routine preventative maintenance during non-peak usage of the equipment, as approved by LAWA.
c. Perform preventative maintenance service during regular working hours.
d. Require service and emergency personnel to report to LAWA's representative on site upon arrival at the building and again on completion of the required work. Furnish a copy of the work ticket containing a complete description of the work performed to the LAWA representative.
e. Maintain a preventative maintenance checklist in the machinery space to itemize individual component parts, as determined by the original equipment manufacturer, which require weekly, monthly, quarterly or yearly inspection. Include on the checklist the building name, equipment serial numbers, examination or service frequency, examination hours, individual escalator components examined or serviced. Make check list adjustment intervals frequent enough to maintain the escalators and moving walks in optimum operating condition.
f. Maintain an inventory at all times and available for immediate delivery and installation, a sufficient supply of emergency parts for repair of each unit. Provide materials or parts to be used which are genuine original manufacturers renewal parts.
g. Regularly and systematically examine, inspect, properly adjust, clean, lubricate, and if conditions warrant, repair or replace, all mechanical, structural and electrical escalator/moving walk equipment components, including, but not limited to, the following:

    1) Machine and related components including but not limited to thrust bearings, sprockets, gears, shafts, bearings, brake and component parts, motors, and chains.
    2) Controller and all related equipment, including but not limited to relays, solid state components, resistors, condensers, transformers, contacts, leads, overloads, dash pots, timing devices, computer devices, and mechanical and electrical driving equipment, including all switches.
    3) Motors, including but not limited to, windings, rotating elements and bearings.
    4) Handrails, brush guards, guide rollers, and alignment devices.
    5) Stop switches and related components.
    6) Conductor cables and wiring.

7) Truss, steps, step treads, pallets, wheels, rollers, axle bushings, comb plates and tracks.
8) All sprockets, chains and bearings.
9) Demarcation lighting.
10) Safety switches.
11) Step Demarcation
12) Repair and replacement coverage is intended to be full and complete, and to include the cost of providing all escalator and moving walk replacement components, including those not mentioned above.

h. Maintain the efficiency, safety and speeds of the equipment at all times. Maintain the vertical transportation system monitoring system at all times.

i. Housekeeping: Provide and maintain industry standard parts cabinets for the orderly storage of replacement parts. Keep the premises free of accumulation of waste material or rubbish. Store combustible materials in closed metal containers. Clean step treads, pallets, and comb plates on a monthly basis. Regularly brush lint and dirt from the units and remove dirt, excess lubricant and accumulated rubbish from pans, pits, and machine spaces. Take necessary actions to prevent oil and grease from creating unsightly appearances on the equipment and/or accumulating on pans in escalator, and moving walk pits.

j. Conduct weekly evaluations of equipment performance, including smoothness of ride, unusual vibration or noise, condition of handrails. Inspect comb plates at both ends of escalators for broken teeth and check for proper clearance between combs and step treads. Inspect comb plates at both ends of moving walks for broken teeth and check for proper clearance between combs and pallets. Check for broken step treads and check clearance between steps and skirt panel. Check for broken pallets and check clearance between pallets and skirt panel. Look for anything (loose trim, screws or bolts) that could snag or damage clothing and luggage, or cause injury. Check condition of handrail brushes. Proceed immediately to make, or cause to be made, replacements, repairs and corrections found as a result of the weekly evaluations.

k. Clean all of the escalator equipment. Cleaning of the equipment shall occur at regular intervals sufficient in frequency to maintain a professional appearance and preserve the life of the equipment. Report to LAWA the need for cleaning and/or janitorial services for all items not covered by the Contract.

l. Lubricate all moving parts of the equipment requiring lubrication. Apply lubricants at intervals recommended by the equipment manufacturer. Provide lubrication more frequently, if dictated through use of the equipment. Utilize lubricants suitable for the purpose intended that meet or exceed the minimum requirements specified by the manufacturer of the equipment to which the lubricant is applied. Remove and properly dispose of used and oily wiping materials from the building on the same day that they are used.

m. Adjust the equipment as necessary in accordance with the check list and when the operation of the equipment varies from its normal or originally designed performance standards. Utilize qualified individuals properly equipped with tools and instruments, employed by the installer for adjustments. Parts or assemblies which have worn (or otherwise deteriorated) beyond “normal” adjustment limits shall be replaced as provided for under the following paragraphs titled “Replace” and “Repair”.

1) Replace: Replace items during the course of scheduled preventative maintenance, when such replacement will prevent an unscheduled equipment shutdown and/or ensure the continued safe normal operation of the equipment or which otherwise will extend the useful life of the equipment. Make all replacements using original manufacturer's parts or LAWA approved equals.Repair:Repairs which are the Responsibility of the Installer: Make (or cause to made) all repairs stipulated herein, made necessary due to normal wear and use of the escalators, and moving walks. Absorb all costs for labor, materials, expanses, and supplies which occur as a result of the stated repair.

n. Periodic Tests: Perform periodic safety tests of the escalator, and moving walk components, as required by Code. The periodic tests shall be conducted as indicated in the code. Test results shall be witnessed as required and recorded on forms supplied by or acceptable to LAWA. Provide certified copies of the completed test forms to LAWA. Coordinate the periodic testing with LAWA.

9. Escalator/Moving Walk Extended Preventative Maintenance Agreement: Quote monthly cost for a five year preventative maintenance agreement commencing upon completion of the warranty maintenance. Price adjustment will be made at Agreement commencement date and thereafter as provided in the Agreement. Use competent personnel, acceptable to LAWA, employed by and supervised by the escalator installer.
10. Test Reports: Submit test results to governing authorities and to LAWA. Include computer generated events and results.
11. Maintenance and Operating Instructions: Submit six (6) sets of maintenance manuals. Each maintenance manual shall include operation and maintenance instructions, parts listing with sources indicated; recommended parts inventory listing, emergency instructions for elevators, escalators, and moving walks. Include diagnostic and repair information for disassembly, inspection/gaging/torque requirements, reassembly, testing and other related information. Detailed lubrication and cleaning schedule indicating weekly, monthly, quarterly, semiannual, and annual lubrication; and a description of each lubrication point, lubrication type, and specification. Provide exploded view drawings to facilitate repair and maintenance functions. Assemble manuals for component parts into a single binder. In addition provide the following for escalators and moving walks:

    a. Procedures for adjusting brake, handrail tension, handrail chain drive tension, step and pallet chain tension, track system, and mechanical components, including pictorials.
    b. Instructions for removing floor plate, replacing comb segments, and removing and installing steps and pallets.

12. Maintenance Log: Upon completion of the installation submit and provide 1 copy of the following in each machine room:

    a. Maintenance log and Maintenance Control Program for each unit, indicating the various items requiring examination, the procedure to be followed, the frequency of the examination and place to record compliance with the recommended procedure. The log shall cover a period of at least 1 year.

b. Call back log, indicating permanent record of visits. The log shall indicate the date of the visit, person making the visit, unit involved, reason for the visit and work accomplished.
c. Fire firefighters service test log for each elevator to comply with the requirements of the code.
d. Hydraulic elevator oil usage log, to record all hydraulic oil added to the system. Log to include reason for loss of hydraulic oil.
e. Replace maintenance logs when available space within the maintenance log is filled. Furnish to LAWA a copy of the maintenance log that is being replaced.

13. All 'as-built' record drawings, wiring diagrams, parts manuals, catalogs, instructions, keys, etc. shall be submitted before final payment.
14. Submit copies of Installer qualifications.

H. Certificates and Permits: Submit inspection and acceptance certificates and operating permits as required by authorities having jurisdiction for normal, unrestricted use of vertical transportation systems.

1.4 JOB CONDITIONS

A. Temporary Use: Do not use vertical transportation components during construction period, unless permitted in writing by LAWA.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protect vertical transportation work components during delivery storage, handling, erection and construction period against damage and stains.

B. Do not deliver the vertical transportation components to Project site until they can be placed in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

1.6 COORDINATION

A. Coordinate fabrication and installation of vertical transportation systems with HVAC, EMS, security, telephone/data, audio/visual, CCTV, and fire alarm systems.

B. Coordinate start up and testing of vertical transportation systems with other Work required for complete installation and operation.

C. Field verify all conditions affecting the work of this section.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

A. Refer to the specification sections for materials, components and fabrication criteria for the vertical transportation systems:

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the spaces and areas to receive the vertical transportation work, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of the vertical transportation work. Examine wellways, hoistways, hoistway openings, pits, terminal end truss pits, and machine rooms, as constructed; verify critical dimensions; and examine supporting structure and other conditions under which vertical transportation work is to be installed. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Verify dimensions of supporting structure from the working drawings and shop drawings so that the vertical transportation work will be accurately fabricated and fitted to the structure. The Contractor shall satisfy himself by review of the working drawings that the clearances and the alignments are proper for the installation of his equipment.

B. Coordinate vertical transportation work with the work of other trades and provide items to be placed during the installation of other work at the proper time so as to avoid delays in the overall work. Place such items, including inserts and anchors, accurately in relation to the final location of vertical transportation components. Use Contractor's bench marks.

3.3 INSTALLATION

A. General: Install component parts of the vertical transportation work in accordance with referenced standards and the manufacturers printed instructions and recommendations, unless otherwise shown or specified. Keep work areas orderly and free from debris during progress of the work. Remove all loose materials and filings resulting from this work from wellway and hoistway surfaces.

B. Elevator Hoistway Entrances: Coordinate the installation of hoistway entrances with the installation of elevator guide rails, for accurate alignment of entrances with cars. Wherever possible, delay the final adjustment of sills and doors until the car is operable in the shaft. Set sills flush with finished floor surface at landings. Reduce clearances between hoistway entrance sill and car sill to minimum, safe, workable dimension at each landing. Hanger supports shall be erected in perfect alignment, with edges of the sills, sill grooves and head jambs to insure smooth operation of the doors. Guide grooves in the thresholds shall be cleaned and free of debris.

C. Elevator Guide Rails: Erect guide rails plumb and parallel and secure guide rail joints without gaps and file any irregularities to a smooth surface. Fasten guide rail brackets to concrete structures with proper inserts and insert bolts, through bolts, or adhesive anchors. Fasten guide rail brackets to structural steel with through bolts and attach guide rails to brackets with throughbolts or steel clips. Compensate for expansion and contraction movement of guide rails. Balance cars to equalize pressure of roller guide shoes on rails.

D. Escalators: Set escalators true to line and level, or to indicated slope, properly supported, and anchored to building structure. Use established benchmarks, lines, and levels to ensure dimensional coordination of the Work.

E. Machine Room and Machine Space Equipment: Install machine room and machine space equipment with clearances complying with the referenced codes and standards. Install items so that they may be removed by portable hoists or other means for maintenance and/or repair. Install items so that access for maintenance is safe and readily available. Mount rotating and vibrating equipment on vibration-isolating mounts designed to effectively prevent transmission of vibrations to structure and thereby, eliminate sources of structure-borne noise from vertical transportation equipment.

1. Pack wall openings thru which oil lines and conduit pass with fire resistant, sound isolating, mineral wool insulation and fire stopping material.

F. Lubrication and Adjustment: Adjust installed components for smooth, efficient operation, complying with required tolerances and free of hazardous conditions.

1. Traction Elevators: Lubricate operating parts of system. Adjust motors, brakes, controllers, leveling switches, limit switches, stopping switches, door operators, interlocks and safety devices to achieve required performance levels.
2. Hydraulic Elevators: Lubricate operating parts of system. Adjust pumps, valves, motors, brakes, controllers, leveling switches, limit switches, stopping switches, door operators, interlocks and safety devices to achieve required performance levels.
3. Escalators and Moving Walks: Lubricate operating parts, including bearings, tracks, chains, guides, and hardware. Test operating devices, equipment, signals, controls, and safety devices. Install oil drip pans and verify that no oil drips outside of pans.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to the vertical transportation Installer, that ensure vertical transportation equipment is without damage or deterioration at the time of acceptance by LAWA.

B. Repair damaged finishes so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

3.5 FIELD QUALITY VERIFICATION

A. General: On completion of each type of vertical transportation equipment installation and before permitting use thereof, perform acceptance tests as required and recommended by ASME A17.1, procedures with the following additions or adaptations, and by authorities having jurisdiction.

1. Traction Elevators/Hydraulic Elevators, Escalators and Moving Walks: Comply with ASME 17.2 "Inspectors Manual for Traction Elevators, Hydraulic Elevators, Escalators and Moving Walks" procedures:

a. Contractor shall perform the following tests on each escalator without load:

1) Comb impact device shall be tested and calibrated with an appropriate scale at both ends of the escalator in both the horizontal and vertical direction.
2) Brakes: Measure deceleration rate with no load over 5 consecutive stops in the down direction using test equipment designed to obtain this information.
3) Skirt/Step Index test.

b. Contractor shall perform the following tests on each escalator under full load:

1) Brake test. The stopping distance in the down direction shall meet all requirements of ASME A17.1.
2) Twenty Four Hour Test: Each escalator shall be operated continuously for 24 hours after the acceptance test with no faults. If any fault occurs that shuts the escalator down, the fault shall be corrected. Run additional 24 hour tests until all faults are corrected.

B. Perform testing during times approved by LAWA. Perform tests that are disruptive to normal building operations, as determined by LAWA, after normal building occupancy hours.

1. Supply all required labor, material, supervision, material, tools, test weights and test instruments for all required tests, inspections and reviews.
2. In all elevator test conditions, obtain specified speed, performance times, floor accuracy without re-leveling, and ride quality.
3. In all escalator test conditions, obtain specified speed, and ride quality.
4. Label each device with calibration sticker indicating test results and date of test.
5. Provide permanently affixed escalator brake torque tag.
6. Affix mental safety, buffer and governor test tags.

C. Performance Guarantee: Should these tests indicate defects or poor workmanship, variance or noncompliance with the requirements of the specified codes and/or ordinances or variance or noncompliance with the requirements of these specifications, the following work and/or repairs shall be completed at no expense to LAWA.

1. Replace all equipment that does not meet Code or specification requirements.
2. Perform all work and furnish all materials and equipment necessary to complete the specified operation and/or performance.
3. Perform all retesting required by the governing Code Authority and LAWA to verify the specified operation and/or performance.

3.6 DEMONSTRATE, INSTRUCT

A. Instruct LAWA personnel in proper use, operations, and daily maintenance of elevators, escalators and moving walks. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train LAWA personnel in procedures to follow in identifying sources of operational failures or malfunctions. Confer with LAWA on requirements for a complete vertical transportation maintenance program.

B. Make a final check of each type of vertical transportation equipment with LAWA personnel present and before date of acceptance by LAWA. Determine that operation systems and devices are functioning properly.

3.7 VERTICAL TRANSPORTATION SCHEDULES

END OF SECTION 14 20 00

Guide Specification
Los Angeles World Airports

SECTION 14 21 00 - HEAVY DUTY TRANSIT TYPE MACHINE ROOM-LESS ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes heavy duty machine-room-less electric traction passenger and service elevators. Conventional geared or gearless equipment should be employed where passenger capacity needs or material movement needs exceed those offered within machine room-less product lines.

1.2 DEFINITIONS

A. Definitions in the latest version of ASME A17.1 apply to work of this Section.

B. Defective Elevator Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

C. Service Elevator: A passenger elevator that is also used to carry freight.

D. Reference to a device or a part of the equipment applies to the number of devices or parts required to complete the installation.

1.3 SUBMITTALS

A. Refer to Section 14 20 00, 3.7.2.

B. Product Data

1. Submit manufacturer's product data for each product and material.
2. Indicate manufacturer, trade names, and model numbers, components, arrangement, optional and accessories being provided.
3. Include applicable literature, catalog material or technical brochures.
4. Include material and equipment specifications, sizes, types, dimensions, weights, rated capacities, and performance curves.
5. Include utility requirements for wiring, piping, and service connection data, motor sizes complete with electrical characteristics.

C. Shop Drawings

1. Six (6) copies of the layout and shop drawings shall be provided by the contractor for review within three weeks of notice to proceed.
2. All drawings, views and details shall be developed and presented in accordance with ANSI Y14.3 Multi and Sectional View Drawings.
3. Drawings shall clearly reflect dimensional data for elevator hoistways including cross references to building column lines and finish elevations depicted in the Contract Drawings.
4. Elevator layout shall be shown in three orthogonal views and shall include key dimensions, support details, power connection locations and power connection terminal points.
5. Shop drawings: Six (6) copies of the shop drawings shall be provided by the Installer. Submit approval layout drawings to scale. Drawings shall include, but not be limited to the following:

    a. Car, guide rails, buffers and other components in hoistway.
    b. Maximum rail bracket spacing.
    c. Maximum loads imposed on guide rails requiring load transfer to the building structure.
    d. Loads on hoisting beams.
    e. Clearances and travel of car and counterweight run-by.
    f. Clear inside hoistway and pit dimensions.
    g. Location and sizes of access doors, hoistway entrances and frames.
    h. Car & Hall signal and operating fixtures.
    i. Remote wiring layouts for each elevator.
    j. Refuge space on top of car and pit.
    k. Control room, machine area, pit and hoistway layout.
    l. Cab design, dimensions and layout.
    m. Hoistway-door and frame details.

6. Complete assembly detail of machine, machine mounting, machine beam assembly, dead end hitch and beam assemblies, governors, safeties, counterweights, with all load calculations.
7. Shop drawings shall include complete schematic and connection diagrams for the controller and all electrical devices including a legend for components.
8. Controller information should include complete I/O list.
9. All drawings shall be provided on CD-ROM in AutoCAD 2008 format.

D. Samples

1. Submit six (6) samples minimum 4” by 4” in size of all finish materials including but not limited to the following:

    a. Cab Flooring.
    b. Ceiling, including surface material, supporting frame and light fixture.
    c. Cab Interior including car door, front return, wall finish etc.
    d. Fixture faceplate.

2. Samples shall be clearly labeled to reflect:

    a. Project Name
    b. Contract Number
    c. Description of Sample

E. Maintenance Control Programs: within sixty (60) days after notice to proceed, and prior to installation, Installer shall submit detailed equipment specific interim and revenue service Maintenance Control Programs, showing functions to be performed and their scheduled frequency.

F. Operating and Maintenance manuals: Prior to installation, Installer shall submit six (6) complete sets of Operation and Maintenance manuals for approval. After LAWA approval and prior to the beginning of acceptance testing, six (6) sets of the approved manuals shall be provided by the Installer. Provide all material on CD-ROM in a format approved by LAWA. The manuals shall include the following:

1. Complete table of contents.
2. Complete instructions regarding operation and maintenance of equipment, including complete illustrated, exploded views of all assemblies, and a complete, illustrated, exploded view for identifying all system parts.
3. Complete nomenclature of replaceable parts, part numbers, current cost, and warehouse location. If product source is another vendor, Installer shall include name and address of other vendor.
4. Sample copies of a preventive maintenance chart.
5. Descriptions of safety devices.
6. Safety rules, tests, and procedures, including testing of all systems and subsystems.
7. Procedures for adjusting all elevator equipment, including pictorials.
8. Troubleshooting techniques.
9. Detailed lubrication and cleaning schedule indicating weekly, monthly, quarterly, semiannual, and annual lubrication; and a description of each lubrication point, lubrication type, and specification.
10. Control and schematic electrical wiring diagrams of controller, including wiring of safety devices to connections with remote indication and control panels for each elevator or group of elevators.
11. Electrical layout showing placement of lighting, light switches, receptacles, light fixtures, disconnect switches, and convenience outlets in machinery/control room spaces and pits.
12. Complete detailed drawings and wiring diagram of elevator system fault-finding device and connection to annunciator panel.
13. As built drawings for final elevator installation, controller and truss wiring. Also provide As-built drawings on CD-ROM in AutoCAD 2008 format.

G. Certification

1. The elevator manufacturer shall provide copies of all documents related to maintenance, safety, operations, design changes, modifications, retrofits, etc., which relate to any part, component, equipment, system, subsystem, or material and services applicable to the elevators provided.
2. All of the above referenced shall be provided as it pertains to the original installation and for a period of ten (10) years after final acceptance of the last elevators provided under any contract.
3. The referenced material shall be provided within thirty (30) days of publication or internal distribution by the elevator manufacturer. The material, even if labeled PROPRIETARY, shall be delivered without prejudice or delay and at no additional cost.
4. Provide all material on CD-ROM in a format approved by the Owner.

H. MSDS and product data sheets: Shall be submitted with an index listing each product, along with the application method of the product, approximate quantity of product per elevator and the component the product is applied to or associated with. The Installer shall allow 6 (six) weeks for review of MSDS.

I. Senate Bill 1886 Submittals: Provide copies of all Code Authority/permit submittals.

1.4 QUALITY ASSURANCE

A. Regulatory agencies: elevator design, materials, construction clearances, workmanship, and tests shall conform to the requirements of the codes and regulations listed in Part 1.5.

B. Welding: Welding shall be performed in accordance with the requirements of AWS or CWB. Welders shall produce evidence of current certification by AWS or CWB.

C. Requirements of Regulatory Agencies

1. Installer shall obtain and pay for all necessary permits, and perform such tests as may be required for acceptance and approval of elevators by jurisdictional agencies.
2. Installer shall notify the proper inspectors to witness required testing.

D. Factory Visit

1. The Installer shall provide for the costs of up to three of LAWA's representatives to visit the factory where the elevators are being manufactured, per contract, per unit type.
2. Installer shall not ship the elevator without the approval of LAWA's representative after the conclusion of the factory visit.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping Packing, Shipping, Handling, and Unloading

1. Accept equipment, materials, and other Products on site in factory containers, bundles, and shipping skids.

B. Delivery and Acceptance at Site

1. Deliver material in original packages, containers, skid loads, or bundles bearing brand names and identification of source of manufacture or supply.
2. Inspect deliveries for damage.

C. Storage and Protection

1. Store materials inside under cover and in a dry location.
2. Protect from weather, direct sunlight, surface damage, corrosion, and construction traffic and activity.
3. Installer shall make necessary provisions to protect systems from damage, deterioration, and environmental conditions during installations and until elevator systems are fully operative.

D. Handling

1. Handle material to prevent damage to edges, ends, surfaces, and finishes.

1.6 INSTALLATION CONTRACT ACCEPTANCE, WARRANTY, INTERIM SERVICE AGREEMENT AND SERVICE AGREEMENT

A. Warranty: The Contractor shall warrant in writing that all equipment manufactured and installed under this Contract be free of defects in design, materials, and workmanship, under normal use and service (“Warranty”) for a period of twelve (12) months. Defects in design, materials, and workmanship shall be repaired or replaced with all materials and labor at no additional cost to LAWA (“Warranty Work”). (Defects shall include, but not be limited to, noisy, rough, or substandard operation; failures; loose, damaged, and missing parts; and fluid leaks.)

B. In addition to the Warranty

1. Contractor shall provide, concurrently with each Warranty Period, a 1-Year Preventative Maintenance (“PM”) service for all units.
2. Beginning one year after the Contract Completion Date, the Contractor shall provide a 5-Year Extended Preventative and Routine Maintenance Service Agreement (“SA”), per Section 14 20 00, 3.7.2 and Exhibit A, for all units installed in this Contract.
3. The 5-year SA period shall be executed in strict compliance with all of the terms and conditions set forth in Exhibit A (“Exhibit A”). Upon conclusion of the SA, the parties

may mutually agree to extend the SA for an additional sixty (60) months, via a renewable option ("Option").

C. The Contract/Warranty, PM, Interim and SA services shall include all services necessary to maintain the equipment in proper working order for use at a major international airport including, but not limited to.

1. "Tasks":

a. Inspection of completed installation and periodic testing to maintain elevators in completely operable, like new condition.
b. Provide preventative maintenance on elevators for a minimum of four (4) hours each month (Total On-Site Time). Provide monthly documentation of the same to LAWA.
c. Periodic lubrication of parts and equipment components as per OEM's recommendation. Charts are to be provided for each elevator indicating when services are provided.
d. Perform work without removing elevators from service during peak traffic periods determined by LAWA as 7:00 a.m. to 10:30 p.m. daily.
e. Provide twenty (24) hour emergency service during the maintenance period consisting of a prompt response (within 30 minutes) to emergency request by telephone or otherwise from LAWA or designated representative if an elevator is inoperable or in case of injury, entrapment, or potential injury to persons.
f. Unlimited regular time callbacks are included with a required response time of one (1) hour. Regular time will be Monday through Friday, 8:00am to 4:30pm, exclusive of holidays. Overtime\Premium time call backs originating from an operational error related to the performance requirements of the equipment shall be borne by the Contractor.
g. All other services as required by Section 14 20 00, 3.7.2 and Exhibit A.

1.7 EXTENDED PREVENTATIVE AND ROUTINE MAINTENANCE SERVICE AGREEMENT

A. The Contractor shall perform the SA (including all tasks listed herein and in Exhibit A) for a period of sixty (60) months from the date of Elevator Warranty expiration, or one year after the Contract Completion Date, whichever is later. A Faithful Performance Bond and a Payment Bond ("SA Bonds"), each for 100 percent of the contract price for the SA shall be submitted for LAWA approval no less than 30 days prior to Contract Completion Date. The SA Bonds shall be submitted to the City Attorney for approval as to form.

B. Optional Second 5-year SA: No less than six (6) months prior to the conclusion of the 60 month SA, the parties may mutually agree to extend the SA ("Extended SA") for a single, additional 60 month period at a cost no greater than 9percent more than the amount of the initial SA. Should the parties mutually agree, a Faithful Performance Bond and a Payment Bond, each for 100 percent of the contract price for the Extended SA shall be submitted for LAWA approval no less than one (1) month prior to the conclusion of the initial 60 month SA.

C. All Contract Provisions, Appendices and Addenda, as well as the Conditions of Section 14 20 00, 3.7.2 and Exhibit A shall govern the SA and the Extended SA.

1.8 GUARANTEES

A. Notwithstanding the Specifications forming a part of this Contract, any inspection or approval of the Work, or the existence of any patent or trade name, the Installer nevertheless unconditionally guarantees that the equipment furnished and installed hereunder shall be of the best quality, shall be fully fit for the purpose for which it is intended, and shall be of the heavy duty transit type in compliance with APTA guidelines unless augmented per these contract documents.

1.9 LAWA INSTRUCTION/DEMONSTRATION AND COORDINATION

A. The manufacturer shall provide eight (8) hours of onsite demonstration and instructions to LAWA and existing service personnel upon completion of the elevator installation. Instructions are to include safety procedures, proper operation of all equipment, and routine maintenance procedures. All instructions and demonstrations are to be video recorded and remain the property of LAWA.

B. Check operation of the elevators with LAWA's personnel or designated representative present not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

PART 2 - PRODUCTS:

2.1 GENERAL:

A. Installer shall furnish and install elevators that shall comply with the following requirements:

1. All elevators supplied under this contract shall be the product of a single manufacturer.

B. Subject to compliance with the requirements of the Section, Elevator Cab design shall be per Contract Drawings.

2.2 MATERIALS:

A. Except where product conformance to specific standards is indicated on the Contract Drawings and in ASME/ANSI A17.1, OEM's standard materials and equipment may be used in elevator construction, subject to approval. Materials cited below are intended to establish the standard of quality for comparable materials used by the manufacturer.

B. Structural Shapes, Plates, Sheets, and Tubing: ASTM A36 Steel.

C. Sheet Steel: ASNI/ASTM A446, Grade B.

D. Stainless Steel: ASTM A167, Type 316L

1. Stainless steel with embossed texture to be rolled into exposed surface.
2. Type 304 or 316L, match specified color/finish in drawings.
3. No. 4: Directional polish (satin finish). Graining directions as shown or, if shown, in longest dimension.
4. No. 8: Reflective polish (mirror finish).
5. Textured: 5WL or 4LB as manufactured by Rigidized Metals or Windsor pattern 5-SM as manufactured by Rimex Metals or approved equal with .050 inches mean pattern depth with bright directional polish (satin finish).
6. Burnished: Non-directional, random abrasion pattern.

E. Aluminum: ASTM B211 or ASTM B221, Alloy 6061, T6.

F. Flooring: as specified.

G. Plastic Laminate: ASTM E84 Class A and NEMA LD3.1, Fire-Rated Grade (GP-50), Type 7, 0.050" plus or minus.005" thick, color and texture as follows:

1. Exposed Surfaces: Color and texture selected by Architect.
2. Concealed Surfaces: Provider's standard color and finish.

H. Fire-Retardant Treated Particle Board Panels: Minimum 3/4 inch thick backup for natural finished wood and plastic laminate veneered panels, edged and faced as shown, provided with suitable anti-warp backing; meet ASTM E84 Class "I" rating with a flame-spread rating of 25 or less, registered with Local Authorities for elevator finish materials.

I. Natural Finish Wood Veneer: Standard thickness, 1/40-inch thoroughly dried conforming to ASME/HPMA HP-1983, Premium Grade. Place veneer, tapeless spliced with grain running in direction shown, belt and polish sanded, book-matched. Species and finish designated and approved by Architect.

J. Paint: Clean exposed metal parts and assemblies of oil, grease, scale, and other foreign matter and factory paint one shop coat of standard rust-resistant primer. After erection, provide one finish coat of industrial enamel paint. Galvanized metal need not be painted.

K. Prime Finish: Clean all metal surfaces receiving a baked enamel paint finish of oil, grease, and scale. Apply one coat of rust-resistant primer followed by a filler coat over uneven surfaces. Sand smooth and apply final coat of primer.

L. Baked Enamel Finish: Prime finish per above. Unless specified "prime finish" only, apply and bake three (3) additional coats of enamel in the selected solid color.

M. Glass: Laminated safety glass, minimum 9/16-inch thick, conforming to ANSI Z97.1 and CPSC 16 CFR Part 1201.

2.3 SPECIAL FEATURES:

A. General

1. Elevator size, arrangement and capacity shall be justified via thorough analysis of passenger and material transport needs and shall comply with design criteria specified in this Section 3.7.1 and 3.7.2. Elevators shall be provided in accordance with the requirements of CCR Title 8 and the ASME A17.1-Safety Code for Elevators and Escalators, hereinafter in this Section the "Code".
2. Provide all material and equipment necessary for the complete execution of all elevator work as specified in this Section and as shown on the Contract Drawings.
3. Provide hoistway guards for protecting hoistway during construction. In existing terminals, hoistway protection shall include high solid panels surrounding each hoistway opening at each floor.
4. All electric equipment, conduit, fittings and wiring shall conform to the requirements of ANSI/NFPA No. 70 National Electric Code.
5. Provide concrete inserts and other similar anchoring devices for the installation of guide rails, machinery and other elevator components. Epoxy ceiling anchors or epoxy side wall anchors shall not be permitted.
6. Clearance around equipment located in each elevator control room and machine area shall comply with the applicable provisions of ANSI/NFPA No. 70 National Electrical Code.

2.4 SUMMARY OF FEATURES:

A. Machine Room-Less Passenger Elevators

Elevator Use	Passenger C-3 Loading
Contract Load, in Pounds	4000 minimum
Contract Speed, in FPM	350 for travel distances of 20'-0" or more. 200 for travel distances of less than 20'-0"
Machine Location	Overhead in hoistway
Machine Type	Gearless
Type of Control	AC variable voltage, variable frequency
Operation	Simplex selective collective or Group automatic

Platform Size	8'-0" wide by 6'-2" deep
Clear Car Inside	7'-8" wide by 5'-5" deep
Car and Hoistway Door Size	4'-0" wide by 7'-0" high
Car and Hoistway Door Type	Single speed, side slide center opening
Car and Hoistway Door Operation	Power operated. High-speed, heavy-duty (minimum opening speed 3.0 FPS)
Hoistway Entrance	As specified
Cab Enclosure	As specified
Car Operating Station	Dual
Direction Indicator	Hall
Hall Call Stations	Single riser
Special Features:	Fire Control Panel, Machine Room Monitor, Load Weighing Device, Communication System, Security Features, Handicap Features, Standby Power, Monitoring Features

B. A. Machine Room-Less Service Elevators

Elevator Use	Service C-3 Loading
Contract Load, in Pounds	5000 minimum
Contract Speed, in FPM	350 for travel distances of 20'-0" or more. 200 for travel distances of less than 20'-0"
Machine Location	Overhead in hoistway
Machine Type	Gearless
Type of Control	AC variable voltage, variable frequency
Operation	Simplex selective collective or Group automatic
Platform Size	6'-0" wide by 9'-4" deep
Clear Car Inside	5'-8" wide by 8'-4" deep
Car and Hoistway Door Size	4'-6" wide by 7'-0" high
Car and Hoistway Door Type	Two speed, side slide

Car and Hoistway Door Operation	Power operated. High-speed, heavy-duty (minimum opening speed 3.0 FPS)
Hoistway Entrance	As specified
Cab Enclosure	As specified
Car Operating Station	Single (Dual with front and rear entrances)
Direction Indicator	Hall
Hall Call Stations	Single riser
Special Features:	Fire Control Panel, Machine Room Monitor, Load Weighing Device, Communication System, Security Features, Handicap Features, Standby Power, Door Hold Button, Monitoring Features

2.5 CAR PERFORMANCE:

A. Car Speed: ±3% of contract speed under any loading condition.

B. Car Capacity: Safely lower, stop and hold 125% of rated load.

C. Car Leveling Zone: ±1/4" under any loading condition.

D. Door Opening Time:

1. Passenger Elevators: 1.8 seconds.
2. Service Elevators: 3.0 seconds.

E. Door Closing Time:

1. Passenger Elevators: 2.7 seconds.
2. Service Elevators: 5.1 seconds.

F. Car Floor-to-Floor Performance Time: Seconds from start of doors closing until doors are -3/4 open and car level and stopped at next successive floor under any loading condition or travel direction. (Based on a floor height of 16'-0". Adjust .3 seconds per foot of travel for 200 fpm elevators and .2 seconds for 350 fpm elevators.)

G. Car Ride Quality

1. All elevators shall have a maximum decibel reading of 65 dBA with the doors closed during a run in the up direction, measured 5 feet above the floor in the center of the cab.
2. All elevators shall have a maximum vibration of 15 milligrams in the X, Y and Z axis measured with an A95 filter.
3. Acceleration and Deceleration: Smooth constant and not more than 3 feet/second^2 with initial ramp between 0.5 and 0.75 second.
4. Sustained Jerk: Not more than 8 feet/second^3.

2.6 DOOR OPERATOR EQUIPMENT

A. Provide GAL's MOVFRW-HSL door operator with encoder-less VVVF drive or approved equal. Closed loop door operator designed to operate car and hoistway doors simultaneously at the speed specified. Door shall open automatically when car stops at landing to discharge passengers or to answer valid calls and close automatically after predetermined time interval has elapsed. The doors shall be capable of smooth and quiet operation without slam or shock. Door operator to have the following features.

1. 1/2 hp motor and heavy duty sprocket, chain, belt, and sheaves.
2. Closed loop regulated speed performance.
3. Hand-held keypad programming.
4. Adjustments can be stored in the keypad and downloaded to another operator.
5. Adjustable door obstruction reversal unit.
6. Optical cams with LED indicators.
7. Test switches for open, close, nudging and speed zone set up.
8. Universal inputs for open, close, and nudging.
9. Reversing switch to back up the door reversal device.

B. Cab Door Interlock. The doors on cab doors shall be equipped with approved cab door interlocks of the cab unit system type tested as required by the Code.

1. Interlock shall prevent operation of the car away from a landing until doors are locked in the closed position. Interlock shall prevent doors from opening at any position within the hoistway and or landing from the cab side unless car is at rest at that landing, or is in the leveling zone and stopping at that landing.
2. Provide an electric contact mounted on the car that will prevent the car from moving away from landing unless car doors are closed.

C. Door Control Device

1. Door Protection – Electronic Entrance Detector Screen: Provide an electronic door detector device and or approved equal, which projects a three dimensional infrared curtain of light guarding the door opening. Arrange to reopen doors if one beam of the curtain is penetrated. Unit shall have transmitters and receivers spaced at a minimum distance to provide the maximum amount of protection within the height of the doorway. Systems, which have the availability to turn Off or On individual zones within the curtain, will not be allowed.
2. Nudging Operation: After beams of door control device are obstructed for a predetermined time interval (minimum 20.0 – 25.0 seconds), a warning signal shall sound and doors shall attempt to close with a minimum of 2.5 foot pounds kinetic energy. Activation of the door open button shall override nudging operation and reopen doors.
3. Interrupted Beam Time: When beams are interrupted during initial door opening, hold door open a minimum of 3.0 seconds. When beams are interrupted after the initial 3.0 second hold time, reduce time doors remain open to an adjustable time of approximately 1.0 – 1.5 seconds after beams are reestablished.
4. Differential Door Time: Provide separately adjustable timers to vary time that doors remain open after stopping in response to calls.

    a. Car Call: Hold open time adjustable between 3.0 and 5.0 seconds.
    b. Hall Call: Hold open time adjustable between 5.0 and 8.0 seconds.

2.7 HOISTWAY EQUIPMENT

A. Guide Rails

1. Guides shall be steel T-section rails. Rail surfaces shall be machined smooth to ensure proper operation of guides. Rail ends shall be accurately machined with tongue and matching groove centrally located on web. Non wearing rail surfaces are to be painted in color selected by the Architect/LAWA.
2. Guides shall be joined and installed in accordance with Section 2.23 of the Code.
3. Guide rails are not to be in view from within the elevator cab.

B. Car Buffers: Oil type with blocking and support for car contract speeds exceeding 200 fpm. Spring type for speeds of 200 fpm or less.

C. Counterweight Buffers: Oil type with blocking and support for contract speeds exceeding 200 fpm. Spring type for speeds of 200 fpm or less.

D. Roller Guides: Roller guides shall be mounted on top and bottom of the car and counterweight frames to engage the guide rails. Provide slide guides with renewable oil less inserts where C3 loading is required.

E. Suspension Means: If steel core ropes are supplied, a means to provide constant lubrication shall be provided.

F. Machine: AC gearless machine, with permanent magnet synchronous motor, direct current electromechanical disc brakes and integral traction drive sheave. Machine to be mounted to the car guide rail or support beam mounted at the top of the hoistway.

G. Deflector Sheaves: Provide machined and grooved sheave for diameter of ropes. All bearings are to be shielded or sealed.

H. Stop Switch: An enclosed stop switch, mounted in the pit of each elevator in accordance with the Code, shall prevent operation of elevator when switch is activated. Switch shall be of the type described in Rule 2.2.6 of the Code.

I. Emergency Auxiliary Stop Switch: An enclosed stop switch, mounted in the over-head machine area and/or on the machine of each elevator in accordance with Rule 2.7 of the Code, shall prevent operation of elevator when switch is activated. Switch shall be of the type described in Rule 2.7 of the Code.

J. Dead End Hitch Assemblies: Provide dead end hitch assemblies in accordance with engineered loading requirements.

K. Counterweight: Counterweights shall consist of a steel frame welded or bolted together and necessary steel weight sections. These weight sections shall be held securely in place within the frame. A minimum of two (2) tie rods shall pass through the holes in all weight sections. Paint color as selected.

1. A required counterweight screen where no compensation is used.
2. The bottom of the counterweight shall have a buffer striking plate and means to attach knock-off blocks during rope stretch.

L. Idler Sheave: To be located directly above the counterweight frame and integral with counterweight frame. The sheave material shall be accurately machined of semi-steel of hardness BHN 220-250 or as per manufacturer's requirements.

M. Governor: Friction type over-speed self-resetting governor rated for the duty of the elevator specified and to operate the car safety. The finish of pit tension sheave shall be factory paint.

1. Locate the governor where the car or the counterweight in case of over-travel cannot strike it, and where there is adequate space for full movement of governor parts.
2. An electrical governor overspeed protective switch that, where operated, shall remove from the driving machine motor and brake before or at the time of application of the safety.
3. Seal and tag the governor with the running speed, tripping speed, and date last tested as required by Code.
4. Operation/rest of the governor shall not require the installation of an overhead access panel. Status of the governor shall be capable of being monitored remotely at the elevator controller.

N. Tension Sheave: Provide tension sheave in accordance with OEM's governor and car safety loading requirements.

O. Terminal Limits: Limit switches shall slowdown and stop the car at the terminals if the primary automatic stopping system fails.

P. Life Safety Provisions: Life safety hooks and/or other life safety devices for fall protection or prevention to be in accordance with OSHA standards/guidelines. Life safety hook, and/or other life safety devices locations to be coordinated and installed by the Installer.

2.8 MACHNE COMPONENTS

A. Motor

1. The motors shall be of the alternating current reversible asynchronous or synchronous type of a design adapted to the severe requirements of elevator service. Motor shall be capable of developing the torque required to meet or exceed an acceleration rate of 2 ft/sec^2 for the elevator car.
2. A means to protect the windings and bearings from airborne dust shall be provided.
3. Insulation of all windings shall be impregnated and baked to prevent absorption of moisture and oil. The insulation resistance between motor frame and windings shall not be less than one meg-ohm. The motor windings shall stand a dielectric test of twice the normal voltage plus 1000 RMS volts of 60 Hertz, alternating current for one minute.
4. Motor leads in the conduit box shall have the same insulation class as the windings. Motor lead wire shall be rated 125 C and shall be sized for 105 C at the motor nameplate amperes at 1.0. Power Factor per Electrical Apparatus Service Association (EASA) recommendations. Leads are to be numbered for clockwise rotation when facing opposite the shaft end.
5. The motor shall be designed to stand the severe loads encountered in elevator service and the windings shall have a minimum insulation temperature rating two ratings higher than the actual temperature rise of the motor, with a minimum rating of NEMA class F.
6. The motor shall be designed to the ASME A17.1 rated load requirements.

B. Brake

1. Provide dual brakes that shall be of the self-adjusting fail-safe (spring applied and electrically released) type provided with a remotely operated, in the controller room, manual brake release and designed to meet the service factor demand of its intended use. Access panels at the top of hoistway shall not be required. Dual brakes shall operate independent of each other for ascending car over speed and unintended car movement. Provide operation to prevent the elevator from striking the hoistway overhead or unintended car movement per the requirements of Code.

C. Gearless Machine

1. Sheave: The sheave material shall be accurately machined of semi-steel of hardness BHN 220-250.
2. Anti-vibration Mounts: For machines that are support beam mounted, anti-vibration mounting pads are to be provided.

2.9 CONTROLLER

A. General

1. The elevator control equipment shall contain diagnostic capabilities as required for the ease of complete maintenance. The diagnostic system shall be an integral part of the controller and provide user-friendly interaction between the service person and the controls. All such systems shall be free from decaying circuits that must be periodically reprogrammed by the manufacturer.
2. Switch gear shall be mounted in cabinets and labeled terminal strips.
3. The Main controller shall be a non-proprietary programmable automation controller (PAC) based on SCADA compliant Allen Bradley CompactLogic™ 1769-L32E, or equal, to control and monitor the status of the elevator. The PAC shall be designed to communicate in TCP/IP format over Ethernet or approved equal.
4. The controller shall store the last 99 faults, accessible via laptop connection, panel view or remote communications.
5. Provide a copy of all working programs on approved computer medium as well as a printed program listing.
6. The Controller shall have one dedicated serial port, which supports RS-232-C signals. It must be usable for programming purposes or for access to remote programmers via modems.
7. Provide Lift-Net, or equal, ready serial port and signals. Elevator monitoring system shall be building monitoring system compatible and capable of monitoring various elevator control systems.

2.10 OPERATION

A. Simplex Selective Collective

1. Momentary pressure of car or hall button, other than landing at which car is parked, shall automatically start the car and dispatch the car to the corresponding floor for which that call was registered. If a call is registered at the floor when the car is idle, the doors shall automatically open.
2. When the direction of travel has been established, the car shall answer all calls corresponding to the direction of travel and shall not reverse direction until all car and hall calls, in that direction, have been answered.
3. Calls registered for the opposite direction of car travel shall remain registered and shall be answered after car has completed its calls in the direction of travel.
4. If no car buttons are pressed, and car starts up in response to several down calls, the car shall answer highest down call first and then reverse to collect other down calls.
5. The car shall remain at the arrival floor for an adjustable interval to permit passenger transfer. Doors shall close after a predetermined interval after opening unless closing is interrupted by car door reversal device or door open button in car.

B. Group Automatic – Groups of Two or More Elevators:

1. Approved microprocessor-based, group dispatch, car and motion control systems as follows.

2. Include as a minimum, the following features:

    a. Operate cars as a group, capable of balancing service and providing continuity of group operation with one or more cars removed from the system.
    b. Register service calls from pushbuttons located at each floor and in each car. Slow cars and stop automatically at floors corresponding to registered calls. Make stops at successive floors for each direction of travel irrespective of order in which calls are registered except when bypassing hall calls to balance and improve overall service; stop only one car in response to a particular hall call. Assign hall calls to specific cars and continually review and modify those assignments to improve service. Simultaneous to initiation of slow-down of a car for a hall call, cancel that call. Render hall pushbutton ineffective until car doors begin to close after passenger transfer. Cancel car calls in the same manner. Give priority to coincidental car and hall calls in car assignment.
    c. Operate system to meet changing traffic conditions on a service demand basis. Include provisions for handling traffic which may be heavier in either direction, intermittent or very light. As traffic demands change, automatically and continually modify group and individual car assignment to provide the most-effective means to handle current traffic conditions. Provide means to sense long-wait hall calls and preferentially serve them. Give priority to coincidental car and hall calls in hall call assignment. Accomplish car direction reversal without closing and reopening doors.
    d. Use easily reprogrammable system software. Design basic algorithm to optimize service based on equalizing system response to registered hall calls and equalizing passenger trip time to shortest possible time.
    e. Serve floors below main floor in a manner which logically minimizes delay in passing or stopping at main floor in both directions of travel. Provide manual means to force a stop at the main floor when passing to or from lower levels.
    f. Required Features:

        1) Dispatch Protection: Backup dispatching shall function in the same manner as the primary dispatching.
        2) Delayed Car Removal: Automatically remove delayed car from group operation.
        3) Position Sensing: Update car position when passing or stopping at each landing.
        4) Hall Pushbutton Failure: Provide multiple power sources and separate fusing for pushbutton risers.
        5) Communication link: Provide serial or duplicate communication link for all group and individual car computers.

C. Independent Service: Provide controls to remove elevator from normal operation and provide control of the elevator from car buttons only. Car shall travel at contract speed and shall not respond to corridor calls.

D. Car Top Operation: Provide per Code requirements.

E. Emergency Recall Operation (Fire Service): Provide operation and equipment per Code requirements. Contractor shall provide relays, wiring, and terminal strips to receive signals from the fire alarm system.

F. Earthquake Operation: Provide operation and equipment per Code.

G. Load Weighing: Provide automatic load weighing device set at approximately 80% of full load. The device when activated shall cause the elevator to bypass corridor calls and shall initiate dispatch of car at main terminal prior to elapse of normal dispatching interval. Provide adjustable setting from 50 to 80 percent of full load.

H. Load Weighing Security Operation: Provide load weighing device to notify ACAMS Controller of weight status in elevator cab when in security mode of operation.

I. Fan and Light Output Timer: Provide an adjustable timer (Range 1 to 10-minutes) that when activated will turn off the fan and light within the car. The time will start when the car becomes inactive.

J. Door Hold Operation: Provide controls and a button within operating panel that shall hold the doors open for an adjustable period of 30 to 90 seconds. The following shall resume normal door operation.

1. Activation of door close button.
2. Expiration of time period.

K. Standby Power Panel and Operation – Contractor shall provide operation as follows: When standby power is detected by an input, one elevator at a time in each group, and single elevators, shall be returned to the main lobby one elevator at a time, and remain there with the doors open. Once all cars have been returned to the lobby, one elevator in each group, and single elevators may be selected to run under standby power. Selection of the cars shall be done automatically. This automatic selection may be overridden through manual selection. Provide necessary wiring and contacts to allow elevator systems to sequence under standby operation. Provide group selection switches in the fire control panel. Provide standby power indicators in the fire control panel and main floor hall station.

L. Tenant Security Operation

1. The Elevator Contractor shall coordinate with the Sections 28 13 00 - ACCESS CONTROL and ALARM MONITORING SYSTEM (ACAMS) and SECTION 28 23 00 VIDEO SURVEILLANCE SYSTEM (VSS) to provide elevator controls as described below:

    a. Card readers shall be installed as directed adjacent to, and interfaced with the elevator call button. The call button will be enabled by an authorized card read of the ACAMS system.
    b. Card readers with keypads shall be installed in each elevator cab and interfaced with the car buttons for as directed.
    c. Access to and from secured floors shall be by card reader only.

d. Elevator departing unsecured floors shall require an authorized card read/PIN to enable the registration of a car call to access secured floors, as programmed in the ACAMS system through access permissions and levels.
e. Provide strobe in car transom that illuminates upon notification from ACAMS Controller that weight or motion is detected in elevator cab.
f. Fire Service Operation overrides the Security Service Operation.

2.11 HOISTWAY ENTRANCES

A. Hoistway Frames and Doors
1. Entrance frames shall be of welded and mitered construction for complete one-piece unit assembly. All frames shall be sound deadened and securely fastened to fixing angles mounted in the hoistway. Finish shall be 420 ferritic stainless steel per ASTM A 240/240M.
2. Entrance frames shall be provided with an extended sill floor plate the full width and depth of each entrance frame assembly.
3. Hoistway doors shall be reinforced and provided with operating mechanisms and door hangers. Door panels shall be hollow metal flush door construction, 16-gauge furniture steel. Fill with fireproof, sound deadening material. Provide reinforcement by formed vertical sections running full height of door. Doors shall be provided with two removable, non-metallic gibs with fire tabs, located at the leading and trailing edge of the door panel. There shall be no visible exposed or protruding fasteners.
4. Provide die cast jamb markings (2 per entrance) mounted at 5'-0". Secure with adhesive and unexposed fasteners.
5. Hoistway door hangers and door operator shall be as specified herein.

B. Struts and Closer Support Angles: Hoistway entrances adjacent to non-load bearing walls (gypsum dry wall, gypsum block, etc.) shall have hanger housing and door closers supported by steel angles of adequate size. Angles shall be continuous between sill and building beams above and shall be bolted to the hanger support. For load bearing walls (masonry, concrete block), submit for approval Shop Drawings of the method to be used to support hanger housing and door closers on the wall.

C. Landing Sills: Landing sills shall be designed for Class C-3 loading and shall conform to Section 2.11 of the Code and shall be extruded stainless steel sills supplied with grooves and trash slots for door guides and machine planed for minimum clearance. Mount sills on combination of concrete/grout and steel supports anchored to floor construction.

D. Hanger Supports and Cover Plates: Hanger supports shall be T bolted to strut angles and closer support angles. Hanger cover plates shall be nominal 0.078 inch thick stainless minimum and shall extend, as indicated in the contact drawings. Covers shall be made in sections for convenient access when servicing hangers. Hanger sections above door openings shall be removable from within elevator car.

E. Dust Cover: Dust cover shall be reinforced as necessary to ensure a flat even surface throughout. Dust cover shall extend at least the full width of door opening on each side and fastened to hanger housings. Dust cover shall extend above entrance opening as indicated on Contract drawings.

F. Interlocks and Contacts:

1. The doors at each hoistway entrance shall be equipped with approved hoistway door interlocks of the hoistway unit system type tested as required by the Code.
2. Interlock shall prevent operation of the car away from a landing until doors are locked in the closed position. Interlock shall prevent doors from opening at any landing from the corridor side unless car is at rest at that landing, or is in the leveling zone and stopping at that landing.
3. Hoistway door unlocking devices shall conform to the requirements of the Code and shall be provided to permit authorized persons to gain access to hoistway when car is away from landing. Ferrules shall be supplied for all hoistway unlocking device keyholes to protect elevator hoistway doors.
4. Provide an electric contact mounted on the car that will prevent the car from moving away from landing unless car doors are closed.

2.12 CAB ENCLOSURE COMPONENTS

A. General

1. Elevator car and car components shall meet the applicable requirements of the Code. Car control station(s) and position indicator(s) shall be per Contract drawings.
2. Entire car assembly, including car frame and platform, shall be free from warps, buckles, and squeaks and rattles. Joints shall be lightproof.

B. Car Frame and Platform

1. Loading Classification and Requirements: The elevator shall be designed for Class A C-3 freight elevator loading following the design data and formulas identified in the Code, including, but not limited to, the car frame, platform, sills and guides.
2. Car frame and platform shall be welded galvanized steel units designed and fabricated in accordance with applicable requirements herein and Rule 2.14 of the Code.

3. Protect car platform with fire retardant material. The platform shall be recessed as required to accept floor finish.
4. Sub floor shall be suitably reinforced to support live loads of the elevator cab.

C. Car Guides: Car guides shall be designed for C3 loading. Provide spring dampened roller guides or swivel type oil less slide guides with renewable inserts.

D. Sills: Car sills shall be extruded stainless steel sills supplied with grooves and trash slots for door guides and machine planed for minimum clearance. Provide with matching sill extensions to face of front return(s).

E. Car Enclosures:

1. General: The enclosure shall be adequately reinforced and ventilated to meet Code requirements. Provide sound-deadening mastic to exterior.
2. Shell:

    a. Passenger Elevators: Sides and back shall be 14-gauge sheet steel with baked enamel interior finish as selected by the Architect. Arrange shell to accept interior panels as indicated in drawings.
    b. Service Elevators: Sides and back shall be 14-gauge, rigidized stainless steel sheet steel. Pattern 5WL or as selected by the Architect. Provide sample.

3. Canopy: Provide minimum 8'-0" clear height under canopy. Reinforced 14-gauge stainless steel No. 4 brushed finish. Arrange for hinged top emergency exit including lock and electrical contact as required by Code.
4. Suspended Ceiling and Lighting:

    a. Provide as shown in Architect’s drawings.
    b. Provide clear access to the emergency exit per Code requirements.

5. Floor Covering:

    a. Passenger Elevators: Floor by others Wt/Ft = 10#.
    b. Service Elevators: 1/4" checker plate stainless steel.

6. Front Return Panels and Entrance Columns: 14-gauge sheet steel. Return panel shall be stationary type applied type. Provide faceplate to allow access to car station wiring and fixtures. Provide cabinets for special operating features and flush mounted speaker grills for the “Hands Free” telephone and intercom. Finish shall be stainless steel No. 4 brushed finish.
7. Transoms: 14-gauge sheet steel finishes matching front return panels and entrance columns.
8. Car Door Panels: Same construction as hoistway door panel. Finish shall be stainless steel No. 4 brushed finish.
9. Handrails: Provide a 1 1/2" diameter stainless steel tubular handrail at the rear of each passenger elevator. Return ends to wall. Provide adequate mounting. Top of handrail to be 32" above the finished floor. Provide service elevators with side and rear wall

mounted handrails and bumper rails. Return ends. Bolt handrails and bumper rails through car shell. Provide backing plates and captive nuts.

10. Bases: Provide a 4" high base. Finish as shown in Architect's drawings.
11. Pads and Hooks: Provide pad hooks and pads. Pad hooks shall be conspicuous type (buttons) at all walls. Mount pad hooks at sides and rear above suspended ceiling line. Pads shall cover all walls and front return panels and include cutouts for access to the operating fixtures.
12. Ventilation: Two-speed exhaust blower. Provide OE type in passenger elevators and AA type in service elevators.

F. Emergency Car Lighting and Alarm System: Unit shall provide emergency light in car upon failure or interruption of normal car lighting. Emergency lighting unit shall provide a minimum illumination of 0.2 footcandles at 4' above car floor approximately 1' in front of main car operating panel for not less than 4 hours. Battery shall be 6 volt minimum, sealed rechargeable lead acid or equal. Battery charger shall be capable of restoring battery to full charge within 16 hours after resumption of normal power. Provide means within the car service panel for testing battery, lamps, and alarm bell. When multiple units are provided in a car all units shall illuminate. Illuminate a portion of normal car lighting.

2.13 SAFETIES

A. General: Provide a governor actuated mechanical safety device mounted under the car platform and securely bolted to the car sling.

1. When tripped, the safety mechanism shall engage the rails with sufficient force to stop a fully loaded car with an average rate of retardation within the limits given by the ASME A17.1 Code for the capacity
2. Make provisions to release the car safety. In no event shall the safety be released by downward motion of the car. Raising the car to reset the safety shall be allowed.
3. Include an electrical safety plank switch that will interrupt the power to the hoist machine when the safety is set. Resetting the plank switch shall be separate from resetting the safety jaws.
4. Install a car safety marking plate of corrosion resistant metal showing the data required by the Code.

2.14 SIGNAL DEVICES AND FIXTURES

A. General: Provide vandal resistant signal fixtures and control devices for each elevator. Buttons and signals shall be tamper resistant of the illuminated type that light-up when activated and remain lit until call or other function has been fulfilled. All signal fixture and control device faceplates shall be nominal 0.135 inch thick, unless otherwise shown on the Contract Drawings.

B. Car Operating Station

1. Provide car operating stations with faceplates flush with front returns. Station shall have illuminating pushbuttons numbered to conform to floors served. Buttons shall light to show registration and extinguish when car stops in response to a call. Buttons shall have

a minimum dimension of 3/4", be raised 1/8" ±1/32" above the surrounding surface, be of square shouldered design, and have a detectable mechanical motion. A minimum clear space of 3/8" of other suitable means of separation shall be provided. Panel shall include an alarm bell button, Door Open and Door Close buttons. Provide an extended Door Hold button in each service elevator. All operating controls shall be located no higher than 48" above the car floor, the keyed in car stop switch and alarm button shall be located no lower than 35" above finished floor height. Provide in main car station a fire emergency service cabinet containing. Phase II emergency fire service switch, fire jewel, fireman's phone jack, fire operating instructions, Call Cancel button and Door Open and Door Close buttons. Provide second fire jewel outside of Phase II cabinet. Provide in the return panel an intercom grill and flush mounted speaker grill for the "Hands-free" telephone.

a. Braille/Arabic designations shall be identified by a minimum of 5/8" Arabic numeral, standard alphabet character, or standard symbol immediately to the left of the control button. Braille shall be located immediately below the numeral, character or symbol. Controls and emergency equipment shall be identified by raised symbols, including but not limited to, door open, door close, alarm bell, emergency stop and telephone. The call button for the main entry floor shall be designated by a raised star at the left of the floor designations. Braille and Arabic designations shall be flush with inconspicuous mechanical mounting. The plaques shall have raised white colored numerals on a black background.

2. Provide a lockable service cabinet with concealed hinges. Cabinet door shall be flush with the faceplate with hairline joints. Door shall include a flush integral certificate frame for viewing the operating permit. The window shall be constructed of durable Plexiglas or similar material and be accessible from backside of locked door. Minimum window size to be 7" wide by 3" high.

   a. Cabinet shall contain the following type controls:

      1) A light switch.
      2) Two speed fan switch.
      3) Inspection keyswitch, conforming to the ASME Code.
      4) Independent service keyswitch.
      5) Emergency light test button.
      6) Keyed stop switch.
      7) A duplex 120-volt, A.C. G.F.C.I convenience outlet.

3. Provide black paint filled (except as noted), engraved signage as follows with approved size and font.

   a. Phase II firefighters' operating instructions on rear of locked Phase II compartment door.
   b. Car number over main and auxiliary car operating panel.
   c. "No Smoking" over main car operating panel. Include reference to Los Angeles Municipal Code.
   d. Car capacity in pounds on main car operating panel. Include reference to Los Angeles Municipal Code.

e. 3/16" “Push for Alarm” and telephone usage instructions.
f. 1/8" City of Los Angeles Elevator Code anti-panic signage.

C. Car Position Indicators: Provide segmented digital readout type with 2" high (minimum) indications. Locate at top of each car operating panel at a height no lower than 6'-6" above the finished floor. Indicator shall provide car position and direction of travel and include an adjustable electronic floor passing chime. As the car passes or stops at a floor served by the elevator, the corresponding designation shall illuminate, and an audible signal will sound. The audible signal shall be no less than 20-decibles with a frequency no higher than 1500.

D. Floor Annunciator: Provide digitized voice annunciator providing both male and female voices in a system capable of up to 5-minutes of speech. Messages shall include the following announcements:

1. Floor number.
2. Notice of doors closing prior to nudging operation.
3. Emergency operation announcements:

a. Firefighter’s Service, “Elevator returning to lobby.”
b. Seismic operation, “Elevator proceeding to next floor.”
c. Car has exceeded it rated load, reduce load to resume operation.
d. Standby power activated, “Elevator returning to lobby,” upon sequencing.
e. Security operation, “Elevator in Secure Operation, Exit Elevator Immediately”, upon notification from ACAMS Controller.
f. Contractor/Installer to submit messages for Owner approval prior to fabrication.

E. Hall Buttons

1. Provide one riser of vandal resistant hall pushbuttons. Station shall include flush mounted faceplate. Centerline of riser to be at 3'-6" above the finished floor. Buttons shall have a minimum dimension of 3/4", be raised 1/8" ±1/32" above the surrounding surface, be of square shouldered design, and have a detectable mechanical motion. A minimum clear space of 3/8" or other suitable means of separation shall be provided. Button design shall match those used on the car operating panel. Provide red and/or green LED illumination. Provide 3-position Code required Phase I key switch and operational instructions engraved minimum 1/8" high on the faceplate, at the main lobby. Incorporate fire service jewel and standby power jewels. Faceplate edges shall be relieved. Finish shall be stainless steel No. 4 brushed finish. Backfill for engraving shall be epoxy filled. Integral signs shall be as follows:

a. Fire Operational Instructions. Minimum 1/8" high lettering.
b. Fire Service Jewel. Minimum 1/8" high lettering.
c. Standby Power Indicators. Minimum 1/8" high lettering.

2. Provide spanner type security fasteners. Finish matching faceplate.
3. No objects adjacent to, and below, the hall push button station shall project more than 4-inches from the wall.

F. Hall Lanterns: Provide UP and DOWN lanterns at intermediate landings, single lantern at terminal landings. Electronic chimes for each lantern shall sound once for up and twice for the down direction of travel. The lantern shall illuminate for corresponding direction of car travel and the chime shall sound when the elevator is at a predetermined distance from the scheduled floor stop. The design and location of the hall lanterns shall be as selected. Faceplate finish matching hall buttons.

G. Hoistway Access Switches: Provide without faceplate in entrance frame side jamb at all top and bottom terminals.

H. Fire Control Station: Provide a common control panel for all elevators, locate as directed. Panel to contain a digital readout type position and direction indicator per elevator; fireman's return switch per group or individual elevator as required; a jewel to indicate if doors are open at the fire egress floor per elevator; in car fire service jewel per elevator; space for fireman's phone jack; a cabinet containing fire service keys; engraved instructions for fire service operation; and emergency power selector switches and status indicators.

I. Machine Room Monitors: Provide a monitor in each machine room capable of displaying status, position and critical items for trouble shooting the equipment.

2.15 COMMUNICATION SYSTEM

A. Telephone System: Provide automatic dial “Hands-Free” telephone station located in the car station. A button shall suitably identify activation of auto dialer for the visually impaired. Speaker shall be mounted without faceplate or visible fasteners and located either behind the control station or within the telephone box. Communication shall be capable of being heard from any location within the car enclosure.

1. Provide a telephone symbol minimum 2" high, and raised ±1/32" with Braille indications adjacent to a separate activation button mounted on the control panel.
2. Provide engraved emergency instructions above the activation button. Instructions shall read: “To use emergency telephone, press button below. Dialing will occur automatically.”
3. Provide a visual indication, approximately 3/4" in diameter, or a jewel that illuminates once a call has been received by the master station. Instructions under the visual indicator or within the lighted jewel shall read: “Assistance is on the way”.

B. Provide wiring from car to telephone terminal box in elevator machine room.

C. Provide permanent means of communication between the elevator car and the machine room if required by Code.

D. Provide installation of Life Safety speaker provided by others within the elevator cab. Provide wiring from car to Life Safety junction box in machine room.

E. Bell Alarm System: Bell alarm system for each elevator shall be properly located within building and audible outside hoistway when activated by the Alarm call button on each car control station.

2.16 CENTRAL MONITORING SYSTEM

A. Vertical Transportation Central Monitoring/Control System: Provide central monitoring and control system to monitor and record all the building's elevators, escalators and moving walks and their respective operations simultaneously. System shall be compatible with other building monitoring systems. Systems shall be capable of accommodating multiple elevator control systems from various manufacturers.

B. General: In the event of an elevator shutdown or any other designated emergency, the elevator system shall automatically initiate a call to the Elevator Command Center (ECC). The ECC shall be capable of receiving the call, processing the data and routing the received data to the proper storage or output device, i.e., monitor, hard drive, printer, etc. The system shall have the ability to page designated personnel to notify them of an emergency event. The ECC shall store a chronological listing of the emergency reports received from each elevator. The user shall be able to view or print these reports. The following system hardware shall be provided:

1. Pentium based processor, 1.6GHz or faster.
2. 512 MB RAM.
3. 80 GB hard drive.
4. Parallel port.
5. CD-ROM drive.
6. SVGA card and monitor.
7. Parallel printer.
8. Ethernet connectivity.
9. Provide minimum 17-inch LCD monitor displaying real time activity of each group and each escalator and their respective operations status.

C. Provide a Graphical User Interface Central Monitoring System (CMS) with, but not limited to the following features:

1. Simulated hoistway and car configuration.
2. Individual elevator position.
3. Individual elevator car calls.
4. Individual elevator direction.
5. Individual elevator door position.
6. Individual elevator status of operation.
7. Individual elevator communication status.
8. Registered up and down hall calls.
9. Controller real-time clock date and time.
10. Group mode of operation.
11. Remote registration of car and hall calls. Send a car to any floor at any time, regardless of operation mode, i.e. normal operation, independent service, swing car operation, floor lockout, etc.
12. Floor lockout (hall and car).
13. Independent service to remove car from group to respond to car calls only.
14. VIP operation to send a car to any floor and remain there for a predetermined time reassigning all other calls to different cars automatically.
15. Car to lobby feature to call any car to the main lobby. Return car nonstop after answering preregistered car calls, and park with doors open for an adjustable time period of 60-90-

seconds. Upon expiration of time, the car shall automatically resume to normal operation.

16. Standby power operation and selection.

D. As a minimum, the following reports shall be available from the CMS:

1. Average wait time for each hall call, in each direction of travel.
2. Number of hall calls registered per event or time period selected.
3. Emergency faults and events for the selected time period.
4. Number of hall calls answered per elevator.
5. Door dwell times.
6. Calculated car times including: door open times, door close time, floor-to-floor time.

2.17 WIRING AND ELECTRICAL INSTALLATION

A. Conduit and Wiring

1. Unless otherwise specified, all electrical conductors in the pits and hoistways, except traveling cable connections to the car shall be provided in rigid zinc-coated steel conduit with steel outlet boxes, except that a small amount of flexible conduit may be used where conduit is not subject to moisture or embedded in concrete. Terminal boxes and other similar items shall be of approved construction, thoroughly reinforced, and in no case less than number 12 USSG. All electrical boxes exceeding 150 cubic inches shall be supported independently of the conduits. The rigid conduit shall conform to the specifications here in before specified. All raceway shall be threaded rigid steel conduit. Flexible heavy-duty service cord, type SO, may be used between fixed car wiring and switches on car doors for door reversal devices.
2. All conduit terminating in steel cabinets, junction boxes, wire-ways, switch boxes, outlet boxes and similar locations shall have approved insulation bushings. If the bushings are constructed completely of insulation material, a steel locknut shall be installed under the bushing. At ends of conduits not terminating in steel cabinets or boxes, the conductors shall be protected by terminal fittings having an insulated opening for the conductors.
3. Conduit fittings and connections using set screws or indentations as a means of attachment are not permitted.
4. Connect motors and other components subject to movement or vibration, to the conduit systems with flexible conduit.
5. The Contractor shall furnish all materials and completely wire all parts of the electrical equipment of the elevators including electrical devices on hatch doors.
6. The conduits shall be of such size that the wires or cables can be readily installed and replaced, if necessary. No conduit or raceway shall be less than 3/4" trade size, except that for small devices such as door switches, interlocks, etc., 1/2" conduit may be used. The total overall cross sectional area of the wires contained in any conduit shall not exceed 40 percent of the internal area of the conduit.
7. Conduits shall be neatly and systematically run. All exposed conduit and boxes shall be supported by approved and substantial straps, hangers or clamps to the structural steel, reinforced concrete, or other approved supports. Riser conduits in hoistway shall be supported at each floor level.

8. All screws used for terminal connections of all wiring (control room, machine area, hoistway and pit) shall be provided with "star washers" of proper size and type.

B. Conductors

1. No joints or splices shall be permitted in wiring except at outlets. Tap connectors may be used in wire-ways provided they meet all UL requirements.
2. All wiring shall test free from short circuits or grounds. Insulation resistance between individual external conductors and between conductors and ground shall be not less than one meg-ohm.
3. Provide all necessary conduit and wiring between all remote control rooms, machine areas and hoistway.

C. Traveling Cables

1. Shall be Type EO, rated for a maximum of 300 volts, and shall comply with the requirements of UL Standard #62 and Articles 400 and 620 of ANSI/NFPA No.72
2. Travel cables shall include separate coaxial cable shielded for the communications system.
3. Provide 10 percent spares, but not less than 6 spare conductors in each traveling cable.
4. Provide four pairs of CAT 6A cables for communication, CCTV and security.
5. Provide separate traveling cables for car lighting and fan control circuits.
6. Provide traveling cable for telephone in the elevator car. Cable shall extend from junction box in hoistway to telephone box in car.
7. Provide traveling cable for car work lights.
8. All insulated wiring, control wiring and wiring in traveling cables shall be tag coded at their terminals in the motor room or controller location and hoistway junction box, elevator cab junction box, and push-button stations within the cab, and shall agree with the approved wiring diagrams.

9. All cabinets containing motor drives, filter boxes, transformers and power reactors shall be supported on rails and isolated from the base building structure with elastomer pads having a minimum static deflection of 3/8" (Mason Type N, or equivalent). All connections to and from the cabinetry shall be flexible in order not to compromise the isolation system. Use non-rigid conduit for the final electrical connection, with all other conduit supports and clamps provided on a neoprene sponge insert.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to commencing with the installation of elevator equipment, examine the following and verify that no irregularities exist that would affect the quality of execution of work specified.

1. Hoistway size and Plumbness
2. Anchor brackets
3. Sill Support
4. Pit depth
5. Overhead clearance

3.2 INSTALLATION

A. Install elevator in accordance with the OEM's installation procedures and approved Shop Drawings. Install equipment so it may be easily removed for maintenance and repair. Install all equipment to afford maximum accessibility, safety, and continuity of operation.

B. Verify that electrical wiring installation is in accordance with the OEM's submittal.

C. Erect all items square, plumb, straight and accurately fitted with tight joints and intersections.

D. Coordinate with the General Contractor to ensure that the installation of the elevators is not in conflict with the work performed of other trades.

E. Isolate non-compatible, dissimilar materials from each other by providing vibration isolation, gaskets or insulating compounds.

F. Provide protective coverings for finished surfaces.

G. Upon completion, touch up and restore damaged or defaced factory finished surfaces. Touch up any marred finishes and replace as directed.

H. Remove protective coverings and clean exposed surfaces after completion.

I. Welding shall comply with AWS D1.1. Identify field welds with welder's identification stamp.

3.3 FIELD TESTING

A. General: After installation, the Installer shall inspect and test each elevator and related equipment to Owner's satisfaction that operation of every part of the equipment complies with this specification and with applicable requirements of ANSI A17.1 including sound level criteria specified herein. Elevator will be inspected in accordance with the following:

1. Installer shall notify Owner seven (7) days prior to each scheduled test Installer shall perform testing in the presence of the Owner's representative. This test is in addition to those performed by The City of Los Angeles Elevator Inspector.
2. Installer shall notify the appropriate local authorities having jurisdiction a minimum of seven (7) days in advance of final acceptance tests.
3. Installer shall provide all instruments, materials, and labor required for tests specified herein.

B. Acceptance Testing:

1. Inspect and test the elevator and related equipment to the Owner's satisfaction that operation of every part of equipment complies with applicable requirements of ASME/ANSI A17.1 and local codes.
2. Notification Requirements: Notify Owner a minimum of five (5) working days prior to each scheduled test.
3. Full Load Run Test: Run elevator continuously a minimum of four (4) hours with full specified rated load, during which time car shall be stopped at top and bottom landings with a minimum standing period of 10 seconds at each landing.
4. Speed Test: Make tests before and after full load tests. Using a tachometer on guide rail, determine actual speed of car in both directions of travel, both with full-specified rated load and no load in car. Tolerances for determining if car speeds meet the specified requirements are as follows:

    a. Ascending and Descending Car Speed not more than 10 percent above or more than 10 percent below required speed.
    b. Car Leveling Test: Determine accuracy of floor landing tests both before and after full load run tests. Minimum of 1/4 inch leveling must be maintained. Test accuracy of landing at all floors with full load and no load in car, in both directions of travel.
    c. Electrical Tests: Ensure elevator wiring system is free of short circuits and accidental grounds. Test ground resistance of elevator structure, equipment, and raceways for continuity. Using meg ohm-meter, determine that insulation resistance of each circuit is more than one (1) meg ohm or higher as required by the cable manufacturer. Insulation resistance for motors shall be determined under actual conditions after installation.

5. Acceptance: Elevator acceptance will be based upon elevators meeting requirements of Contract Documents and upon evidence of passing specified acceptance tests and inspections. Final testing will be after elevators are connected to permanent power.
6. Test Reports: Within five (5) days after completion of a test, submit a test report stating type of test, test requirements, failures, or problems, and name of certifying Engineer and Title. Safety device failure or defective equipment shall be identified, with description of cause and corrective action taken.
7. Failures for any reasons shall be identified with cause(s) and corrective action taken.

C. Re-Inspection: If any equipment is found to be damaged or defective, or if the performance of the escalators does not conform to the requirements of the contract specifications or the Safety Code, no approval or acceptance of escalators shall be issued until all defects have been corrected. When the repairs and adjustments have been completed and the discrepancies corrected, the Owner and Owner's representative shall be notified and the escalators will be re-inspected. Rejected escalators shall not be used until they have been re-inspected and approved.

D. The certificate of inspection for operational use will be issued to LAWA by the enforcing inspection agency. The certificate shall be posted in the elevator control room and in the car operating station.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train LAWA's maintenance personnel to operate, adjust, and maintain escalators.

B. Check operation of escalators with LAWA's personnel present and before date of Completion. Determine that operation systems and devices are functioning properly.

C. Check operation of escalators with LAWA personnel present not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

END OF SECTION 14 21 00

SECTION 14 31 00 - ESCALATORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes high-traffic, transit type interior escalators.

1.2 DEFINITIONS

A. Definitions in the latest version of ASME A17.1 apply to work of this Section.

B. High-Traffic Escalators: Escalators designed specifically for use where high-traffic volumes produce dense occupancy resulting in structural, machinery, and brake loads much higher than normal.

C. Defective Escalator Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; shipping damage; and similar unusual, unexpected, and unsatisfactory conditions.

D. C.D. Reference to a device or a part of the equipment applies to the number of devices or parts required to complete the installation.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design escalators including attachment to structure, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Operational Requirements: The escalator systems shall:

1. Be capable of operating under full load conditions, at full contract speed, in either direction, and designed to operate quietly and smoothly without bounce.
2. Have a rated nominal speedof 100 ft./min. (.50 m/s) or metric equivalent. The no load to full load speed shall not vary by more than □4% of thecontract speed.
3. Hours of operation shall be considered as twenty-four (24) hours per day, seven (7) days per week, 365 days a year.
4. Direction of travel shall be considered as either direction and unit shall be up and down reversible.
5. Handrail speed shall be consistent with step speed.

C. Braking Performance: Provide brakes that stop escalator in up-running mode at a rate no greater than 3 ft./s^2.

D. Step/Skirt Performance Index: Not more than 0.15.

E. Structural and Mechanical Performance for High-Traffic Escalators: For the purpose of structural design, driving machine and power transmission calculations, and brake calculations, design high-traffic escalators for loads not less than 2 times the design loads required by ASME A17.1.

F. Structural Performance of Balustrades, Deck Barricades, and Handrails: Provide components and assemblies capable of withstanding the effects of loads indicated in ASCE 7 for handrail assemblies and guardrail systems.

G. Regulatory Requirements: Comply with ASME A17.1, CCR Title 8, and escalator design requirements for earthquake loads in ASCE 7.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Refer to Section 14 20 00, Vertical Transportation, General.

B. Installer Qualifications: Refer to Section 14 20 00, Vertical Transportation, General.

C. Professional Engineer Qualifications: Professional Engineer Qualifications: Refer to Section 14 20 00, Vertical Transportation, General.

D. Standards: The following standards shall govern the moving walk work. Where standards conflict, the standard with the more stringent requirements shall be applicable.

1. Escalator Code: In addition to requirements of authorities having jurisdiction, comply with the latest edition of ASME A17.1, "Safety Code for Elevators and Escalators", ASME A17.2 "Guide for Inspection of Elevators, Escalators and Moving Walks", and ASME A17.5 "Requirements for Elevator and Escalator Electrical Equipment", including supplements, as published by the American Society of Mechanical Engineers. Wherever "Code" is referred to in the moving walk specification, the ASME A17.1 Code shall be implied.
2. Electrical Code: For electrical work included in the escalator work, comply with the National Electric Code (NFPA 70), ASME A17.5, all applicable local codes, and the authorities having jurisdiction.
3. Welding: Comply with AWS standards.
4. Americans with Disabilities Act (ADA).
5. Building Code of the City of Los Angeles and the following:

    a. California Code of Regulations (CCR), Title 8.

E. Electrical Devices and Equipment: Refer to Section 14 20 00, Vertical Transportation, General.

F. Manufacturer: Provide all moving walks components from a single source. Where equipment or operation varies from those described, the manufacturer shall provide a complete description of those variations as required under Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL, Article QUALITY ASSURANCE, paragraph 'Contractor Statement'.

G. Testing and Inspections: Refer to Section 14 20 00, Vertical Transportation, General.

1.5 SUBMITTALS

A. Scaled Layouts: Fixtures, barricades, etc.

B. Design Information: Indicate equipment lists, reactions and design information on layouts.

C. Product Data: Include capacities, sizes, performances, safety features, finishes, and similar information.

D. Delegated-design Submittal: for installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Shop Drawings: Show plans, elevations, sections, and details indicating coordination with building structure and relationships with other construction. Indicate variations from specified requirements, maximum loads imposed on building structure at points of support, and power requirements. Indicate access and ventilation for escalator machine space. Provide at scale of 1/4" = 1'-0".

1. Load assumptions for maximum loads imposed on trusses requiring load transfer to building structural framing, individual weight of principal components and their dead and live load reactions at points of support, electrical characteristics and connection requirements, loading imposed by truss cladding and any other information requested by the Architect.

    a. Structural Calculations: Submit, for information only, copies of structural calculations indicating load assumptions. Calculations shall be signed, and sealed by the qualified Professional Engineer responsible for their preparation and who is licensed in the State of California.
    b. Power Confirmation Sheets: Include motor horsepower, code letter, starting current, full-load running current, and demand factor for applicable motors.

F. Glass Treatment Certificates: Submit glass treatment certificates signed by manufacturer of the heat soaked glass products certifying that products furnished comply with requirements.

G. Samples: For exposed finishes, 3-inch- square Samples of sheet materials, and 4-inch lengths of running trim members.

H. Fixtures: Cuts, samples or shop drawings.

I. Manufacturer Certificates: Signed by manufacturer certifying that escalator layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for escalator system being provided.

J. Qualification Data: For Installer.

K. Operation and Maintenance Data: For escalators to include emergency, operation, and maintenance manuals.

1. Include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.

L. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted escalator use.

M. Rigging: Installer shall submit a rigging plan for approval. Any use of existing building structures shall be reviewed and approved by a structural engineer.

N. Operating and Maintenance Manuals: Prior to completion of the installation, contractor shall submit six complete sets of Operation and Maintenance manuals for approval. After LAWA approval and prior to the beginning of acceptance testing, six (6) sets of the approved manuals shall be provided by the Contractor. The manuals shall include the following:

1. Complete table of contents.
2. Complete instructions regarding operation and maintenance of equipment, including disassembly and assembly of drive system, handrail drive assembly, and track system. Included will be complete and illustrated exploded views of all assemblies as well as a complete and illustrated exploded view for identifying all system parts.
3. Complete nomenclature of replaceable parts, part numbers, current cost, and warehouse location. If product source is another vendor, contractor shall include name and address of the other vendor.
4. Sample copies of a preventive maintenance chart.
5. Descriptions of safety devices.
6. Safety rules, tests, and procedures, including testing of all systems and subsystems.
7. Procedures for adjusting brake, handrail tension, handrail chain drive tension, step chain tension, track system, and mechanical components, including pictorials.
8. Instructions for removing floor plate, replacing comb segments, and removing and installing steps, and interior panels.
9. Troubleshooting techniques.
10. Detailed lubrication and cleaning schedule indicating weekly, monthly, quarterly, semiannual, and annual lubrication; and a description of each lubrication point, lubrication type, and specification.
11. Control and schematic electrical wiring diagrams of controller, including wiring of safety devices to connections with remote indication and control panels for each escalator and group of escalators.
12. Electrical layout showing placement of lighting, light switches, receptacles, light fixtures, disconnect switches, and convenience outlets in machinery room, truss envelope, and pits.
13. Complete detailed drawings and wiring diagram of escalator fault finding device and connection to annunciator panel.

O. Certification:The escalator manufacturer shall provide certification that the purchaser of the escalators shall be provided with copies of all documents related to maintenance, safety, operations, design changes, modifications, retrofits, etc.; which relate to any part, component, equipment, system subsystem, or material and services applicable to the escalator provided.All of the above referenced shall be provided as it pertains to the original installation and for a period of twenty (20) years after final acceptance of the last escalator provided under any contract.The referenced material shall be provided within thirty days of publication or internal distribution by the escalator manufacturer. The material, even if labeled PROPRIETARY, shall be delivered to the Authority without prejudice or delay and at no additional cost.

1. Provide all material on CD-ROM in a format approved by the Authority.

P. Material Safety Data Sheets (MSDS): MSDS and product data sheets shall be submitted with an index listing each product, along with the application method of the product, approximate quantity of product per escalator, and the component the product is applied to or associated with. The contractor shall allow six (6) weeks for review of MSDS.

Q. Spare parts and replacement parts list - Contractor shall maintain, at a minimum, a local on site parts inventory for use solely on this Contract. Parts not listed below, including balustrades, decks, skirt panels, handrails and signage shall be available via overnight air delivery. Inventory shall include lubricants, light bulbs, etc. necessary to maintain equipment in original operating condition. The parts listed below shall be made available for inspection by LAWA or its designee. Part storage shall be as directed by LAWA.

1. Parts required for equipment listed under Section 14 31 00: Parts inventory shall be maintained throughout the Warranty Maintenance period and five year contract maintenance period after which parts will become the property of LAWA.

a. Escalators

5 Complete Steps
10 each – Left, Right and Center Step Treads Inserts
15 Comb plate Segments – each kind
17 Step Rollers and Flanges
7 Step Axel Sets
1 Matched Pair Step Chains (Longest Unit)
2 Sets Gear Box Gaskets and Shims
1 Automatic Lubrication Reservoir
2 Sets Skirt and Emergency Switches
2 Sets Start Contacts, each size
3 Stop Switches
10 10' Sections skirt deflection brushes
4 Stop Switch Covers with hardware
2 Key Switches – each kind
1 Motor Starters, each size
2 LH Electric Interlocks, each size
2 RH Electric Interlocks, each size
1 Circuit Breakers, each size
1 Reverse Phase Relays
1 Transformers
2 Step Chain Oilers
2 Handrail Inlet Brushes
7 Handrail Tension Rollers

1.6 QUALITY REQUIREMENTS

A. Installer Qualifications: Escalator manufacturer or manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain escalators and elevators/moving walks specified in other sections through one source from a single manufacturer.

C. Regulatory Requirements: Comply with ASME A17.1, CCR Title 8, and seismic criteria listed above.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials, components, and equipment in manufacturer's protective packaging.

B. Store materials, components, and equipment off of ground, under cover, and in a dry location. Handle according to manufacturer's recommendations to prevent damage, deterioration, or soiling. Step chains exhibiting rust shall be replaced prior to final acceptance.

1.8 COORDINATION

A. Coordinate installation of, escalator equipment with integral anchors, and other items that are embedded in concrete or masonry for escalator equipment. Furnish templates, sleeves, escalator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.

B. Coordinate sequence of escalator installation with other work to avoid delaying the Work.

C. Coordinate locations and dimensions of other work relating to escalators including sumps and floor drains in pits, electrical service, and electrical outlets, lights, and switches in pits.

D. Coordinate and provide hoisting related to escalator installation.

E. Coordinate installation of truss cladding and all other work related to the escalator installations.

F. Coordinate seismic attachment with structural design.

1.9 INSTALLATION CONTRACT ACCEPTANCE, WARRANTY, INTERIM SERVICE AGREEMENT AND SERVICE AGREEMENT

A. Warranty: The Contractor shall warrant in writing that all equipment manufactured and installed under this Contract be free of defects in design, materials, and workmanship, under normal use and service (“Warranty”) for a period of twelve (12) months. Defects in design, materials, and workmanship shall be repaired or replaced with all materials and labor at no additional cost to LAWA (“Warranty Work”). (Defects shall include, but not be limited to, noisy, rough, or substandard operation; failures; loose, damaged, and missing parts; and fluid leaks.)

B. In addition to the Warranty

1. Contractor shall provide, concurrently with each Warranty Period, a 1-Year Preventative Maintenance ("PM") service for all units.
2. Beginning one year after the Contract Completion Date, the Contractor shall provide a 5-Year Extended Preventative and Routine Maintenance Service Agreement ("SA"), per Section 14 20 00, 3.7.2 and Exhibit A, for all units installed in this Contract.
3. The 5-year SA period shall be executed in strict compliance with all of the terms and conditions set forth in Exhibit A ("Exhibit A"). Upon conclusion of the SA, the parties may mutually agree to extend the SA for an additional sixty (60) months, via a renewable option ("Option").

C. The Contract/Warranty, PM, Interim and SA services shall include all services necessary to maintain the equipment in proper working order for use at a major international airport including, but not limited to.

1. "Tasks":

a. Inspection of completed installation and periodic testing to maintain elevators in completely operable, like new condition.
b. Provide preventative maintenance on escalators for a minimum of four (4) hours each month (Total On-Site Time). Provide monthly documentation of the same to LAWA.
c. Periodic lubrication of parts and equipment components as per OEM's recommendation. Charts are to be provided for each escalator indicating when services are provided.
d. Perform work without removing escalators from service during peak traffic periods determined by LAWA as 7:00 a.m. to 10:30 p.m. daily.
e. Provide twenty (24) hour emergency service during the maintenance period consisting of a prompt response (within 30 minutes) to emergency request by telephone or otherwise from LAWA or designated representative if an escalator is inoperable or in case of injury, entrapment, or potential injury to persons.
f. Unlimited regular time callbacks are included with a required response time of one (1) hour. Regular time will be Monday through Friday, 8:00am to 4:30pm, exclusive of holidays. Overtime\Premium time call backs originating from an operational error related to the performance requirements of the equipment shall be borne by the Contractor.
g. All other services as required by Section 14 20 00, 3.7.2 and Exhibit A.

1.10 MAINTENANCE SERVICE

A. Comply with requirements in Section 14 20 00, 3.7.2;"Vertical Transportation, General, Section 14 21 00 and Exhibit A."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Comply with requirements in Section 14 20 00, 3.7.2; "Vertical Transportation, General."

2.2 MATERIALS

A. Structural Steel:

1. Rolled Steel Sections, Shapes and Rods: ASTM A36.
2. Tubing:

   a. Cold Formed: ASTM A500.
   b. Hot Formed: ASTM A501.

3. Sheet Steel: ASTM A446, grade B, zinc coated.

B. Stainless Steel: ASTM A 240/A 240M, Type 304.

1. Satin Finish: No. 4 directional satin.

C. Aluminum Castings and Extrusions:

1. Castings: ASTM B108 alloy and temper as required to meet the strength and performance requirements.

2. Extruded Aluminum: ASTM B221, Alloy 6061 or 6063, T6.

3. Finish: Commercial mill finish.

D. Clear Tempered Glass: ASTM C 1048, Condition A (uncoated surfaces), Type 1 (transparent glass, flat), Class 1 (clear), Quality q3 (glazing, select), Kind FT (fully tempered), 12.0 mm thick. After tempering, heat soak 100% of all fabricated glass units to European Union Standard EN14179 to eliminate inclusion related glass breakage. Statistical heat soaking shall not be permitted. Comply with ASME A17.1, Section 6.1, Rules 6.1.3.3.2 and 6.1.3.3.3.

E. Fasteners: Provide bolts, nuts, washers, screws, rivets, and other fasteners necessary for the proper erection and assembly of the moving walk work. Fasteners shall be compatible with materials being fastened.

F. Welding Materials: Comply with AWS D1.1.

G. Sealants, Joint Fillers and Primers: Sealants, joint fillers and primers internal to the moving walk systems shall be as selected by the moving walk manufacturer. Perimeter sealants, joint fillers and primers are specified under Section 07920, JOINT SEALANTS.

H. Paint and Corrosion Protection: Each moving walk shall have the following minimum corrosion protection.

2.3 COMPONENTS

A. General: Provide high-traffic transit type escalators complying with requirements. Unless otherwise indicated, provide heavy-duty components required by the American Public Transportation Association (APTA) Guidelines and as required for a complete escalator.

B. Performance

1. Step Speed: Unit shall be capable of operating at contract speed under any loading condition in either direction of travel. The no-load-to-full-load speed shall not vary in excess of 4% of the rated speed.
2. Handrail Speed: Consistent with step speed.

C. Operation

1. Each unit shall be capable of operating smoothly and quietly at rated speed with synchronized step and handrail operation and speed in either direction of travel. Units shall be designed to operate twenty-four hours per day, seven days per week.

D. Machine Room Equipment

1. Drive Motor: The driving motors shall be AC induction motors with solid state closed transition starting starters. Voltage 480 V.A.C., 3 phase, Frequency 60 Hertz.
   a. The motors shall be totally enclosed with external cooling fins.
   b. The motor protection class shall be equivalent to IP 55 Insulation group: F.
   c. Driving motors and motor switch gear shall provide a smooth start.
   d. The motor shall be designed for continuous operations under a load as follows:

      1) 1000m wide step with a load of 300 lbs. per step on the incline.

2. Controls and Safety Devices

   a. Operating Controls:

      1) Escalators shall have key operated switches, accessible at both upper and lower landings, located on the exterior deck above the newel base. Alternate locations may be used subject to approval by the Authority.
      2) Each keyed switch shall be clearly and permanently labeled, including starting and direction selection.
      3) Interlocks shall be provided to bring the escalator to a smooth stop, in either direction of travel, before a change of direction may be made.

   b. Safety Devices:

      1) Safety devices include but are not limited to those which are required by the latest edition of ASME A17.1.
      2) A lockable stop switch or disconnect shall be provided in both pits of escalators.
      3) Provide skirt deflection devices (brushes). Provide dual profile brushes with anodized aluminum receptacles. Align joints with skirt panel joints.

   c. A fault-finding device shall be provided in the newels, capable of producing indications of the following data:

      1) Date, time, and cause of escalator stoppages.
      2) The fault indication shall remain visible until reset by an authorized person.
      3) Data shall be transmitted to a remote monitoring location.

3. Brake Operation: Safely decelerate, stop and hold rated load per Code requirements. Brakes shall stop escalator operating in the down direction at a rate not greater than three feet/second/second.
4. Controller: Wire to identified terminal block studs. Identifying symbols or letters identical to those on wiring diagrams permanently marked adjacent to each component on the controller. Enclose all components in steel cabinet removable from machine room for ease of access to switches and wiring. Provide mainline circuit breaker and means to protect against overload and single phasing. Controller shall be labeled with rated load and speed, braking torque, manufacturer serial number and LAWA numbers. Locate controller remote if available space is not sufficient in upper or lower pit.
5. Controller

    a. The escalator control equipment shall contain diagnostic capabilities as required for the ease of complete maintenance. The diagnostic system shall be an integral part of the controller and provide user-friendly interaction between the service person and the controls. All such systems shall be free from decaying circuits that must be periodically reprogrammed by the manufacturer.
    b. Switch gear shall be mounted in NEMA 4X cabinets with labeled terminal strips.
    c. The main controller shall use an Allen Bradley SLC5/03 Programmable Logic Controller (PLC) or approved equal, to control and monitor the status of the escalator. The PLC shall be designed to communicate over Ethernet or approved equal.
    d. The PLC racks shall provide space for two future single-slot modules.
    e. The PLC in the remote control panel shall also have hardware and firmware provisions to communicate with interactive operator interface (monitor).
    f. The PLC shall store the last 99 faults, accessible via laptop connection, panel view or remote communications.
    g. Provide a copy of all working programs on approved computer medium as well as a printed program listing.
    h. The Programmable Controller shall have one dedicated serial port, which supports RS-232-C signals. It shall be accessible in ladder logic and provide support for Point to Point and Lift-Net/Slave SCADA communication protocol systems. Alternatively, it must be usable for programming purposes or for access to remote programmers via modems.
    i. The main control switchgear of an escalator shall contain at least the following devices:

        1) Lockable main switch thermal and magnetic motor protection starter for up and down travel, hour counter, auxiliary contactors, phase failure device, phase sequence monitor, and ground fault monitor.
        2) The controller cabinet shall contain a permanently mounted fault indicator board with indicator lights. Fault data shall also be displayed at the newel. Each group of safety devices shall be connected to one signal lamp.
        3) The indication shall be locked automatically. Reset shall be done by a separate switch installed in the controller. The emergency stop shall not be locked.
        4) All terminals shall have identification markings and all cables shall be provided with cable markers.

5) The controller shall be equipped with an AC induction motor reduced voltage starter; installed in line between the standard type contactor and the drive motor. The starter shall be solid state, capable of starting motors smoothly and gradually, reducing inrush current and mechanical shock upon start up. Adjustable settings for accelerating time and starting torque shall be provided. The starter shall also contain auxiliary contacts and a thermal overload relay for motor protection.
6) Maintenance Receptacles: Electric power receptacles shall be furnished and installed in the upper and lower pits. Each receptacle shall be of the GFCI duplex type, waterproof, grounded, and rated for one hundred and twenty volts at twenty amperes. The receptacles in the pits shall be surface mounted on the walls, not less than thirty inches from the floor.
7) Relays shall be provided with visual indication that they are energized.
8) Adjustable settings for accelerating time and starting torque shall be provided. The starter shall also contain auxiliary contacts and a thermal overload relay for motor protection.

j. Monitoring System Interface: Provide controller with serial data link through RJ 45 Ethernet connection and install all devices necessary to monitor items outlined in Section 2.15. Escalator Contractor responsible to connect monitoring system interface to machine room monitoring compartment and LAN. Wiring from LAN to the machine room monitoring compartment by others.
k. Remote Monitoring and Diagnostics: Equip each controller with standard ports, interface boards, and drivers to accept maintenance, data logging, fault finding diagnostic, and monitoring system computers, keyboards, modems, and programming tools. The system shall be capable of driving remote color CRT monitors that continually scan and display the status of each escalator. System shall be Lift-Net, or equal, ready/compatible. System shall be compatible with other building management systems. Monitoring system shall not be proprietary to any individual control.

6. Maintenance Drive Unit: Means shall be provided for reduced speed maintenance operation that shall be controlled by a manual handset. When operated, the escalator shall run in the direction selected, at a speed of not more than 25% of rated speed. This speed shall be maintained when steps are removed for servicing. Escalator operation shall be continuous so long as an up or down button on the handset is being pressed. The handset shall be a ten foot retractable type cord with a plug connector. When plugged into receptacle, there shall be no means of operating or running the escalator except by the service handset. Receptacles shall be located in both the upper and lower pits.
7. Step Drive Assembly: Direct or indirect drive. Machine sprockets at each side over which step chains or step chain rollers shall pass and transmit motion from machine to steps. If indirect chain drive is used between machine and drive sprocket, provide emergency brake on drive assembly to automatically set if drive chain fails. Provide roller-type sealed bearings.
8. Stop Switch: Per Code.

E. ESCALATOR POWER SAVING CONTROL

1. CERTIFICATIONS

a. The motor controlling device shall be certified to meet US elevator / escalator code (ASME-A A17.5 and CSA B44.1) standard for industrial control equipment as well as CE for the European Standard.

2. PERFORMANCE

a. The supplier shall provide documented proof that the motor controlling device has been tested on an escalator by at least one electric utility in the United States of America and shown positive energy savings test results. Furthermore, the supplier shall provide documented proof that the electric utility approved the motor controlling device for an energy efficiency rebate (if applicable).
b. The motor controlling device shall continually monitor motor and be able correct energy requirement within 8ms and be able to respond to a 50% change in load within 1 second without changing the speed of the motor by over 0.5%. The motor controlling device shall be able to provide full power to a motor without using more than 0.5% more energy that an electrical mechanical motor starter.

3. EQUIPMENT MANUFACURER ACCEPTANCE

a. The supplier shall show broad industry acceptance of the motor control device by documenting that all major escalator service providers, including Otis Elevator, KONE Inc. Schindler, ThyssenKrupp, and Mitsubishi Electric, have experience installing such device on an escalator.

4. FUNCTIONS

a. The motor controlling device must include the following functions:
b. Overload Current Protection
c. Over Voltage Protection
d. Under voltage Protection
e. Over Current
f. Under Current
g. Phase Loss
h. Reverse Direction
i. S.C.R. Failure
j. Fault logging capability
k. Remote monitoring capability

5. MOUNTING HARDWARE

a. The mounting hardware and enclosure shall be rated NEMA - 1 for indoor installations and NEMA 4 for exterior installations rated and specifically designed for ease of installation in escalator applications.

6. CONTROL VOLATAGE CONNECTION

a. The motor controlling device shall not require an external dedicated power source to operate and shall operate based on existing line serving the escalator.

7. DISCRETE INPUTS AND OUTPUTS

    a. The motor controlling device shall have one input connection that controls the starting and stopping of the motor. The motor controlling device shall have two output contacts to provide the run and fault status of the motor controlling device.

8. MOTOR CONTROL FUNCTIONALITY

    a. The motor controlling device shall provide a timed soft start with a start up time range of 0 to 10 seconds or more, to appropriately integrate with other motor starters and reduce the mechanical stress on the escalator system during the starting of the motor.

9. HEAT SINK MATERIAL

    a. The motor controlling device shall utilize a metal heat sink material to dissipate operating heat without requiring external cooling devices.

10. SUBMITTAL REQUIREMENTS

    a. The supplier shall provide motor controlling device drawings including schematic wiring diagram and mounting dimensions.

11. DELIVERABLES

    a. The supplier shall provide an installation and user's manual.

12. WARRANTY

    a. The supplier shall warrant the motor controlling device for a period of two years from the date of sale.

F. Wellway Equipment

1. Truss: Steel truss to safely carry entire load of escalator, including all components, full-capacity load and weight of exterior truss and balustrade covering material; (not to exceed 10 lb. p.s.f.). Provide factor of safety per Code. Provide clearly identified exterior cladding support attachment locations on exposed sides and bottom of the entire length of truss. Escalator intermediate support points shall be provided by installer where required. Submit details and calculations. Provide mounting angles. Truss shall be designed to be accommodated by the existing wellway dimensions.
2. Truss Extensions: Provide truss extensions at upper and/or lower landings as required and/or as shown contract drawings.
3. Noise and Vibration Control: Provide sound isolation within truss as required to limit noise levels relating to escalator equipment and its operation to no more than 60 dBA, measured 3'-0" above escalator at any point of its length.
4. Drip Pans: Oil-tight, steel pans with sufficient strength to withstand weight of workmen, entire width and length of truss. Fabricate all oil pans, chutes, etc. shall be fabricated of galvanized steel.

5. Step Tracks: Construct from steel. Tracks shall be bolted sections including transitions to facilitate maintenance and replacement if required. Track sections, including transitions, shall be factory installed and aligned to insure smooth, quiet operation of running gear under all conditions. The individual track section, together with transition section, step chain tension carriage, main drive shaft and handrail drive shaft shall form a fully independent assembly. The rolling surface of the track be a minimum thickness of 3 mm.
6. Guiding System: The guiding system for the step chains and step wheels shall be of zinc plated or galvanized steel profiles with smooth and even running surfaces and with the joints cut diagonally to the running direction. The guide profiles shall not be welded together at the joints. A second, continuous guiding profile shall be provided above the step chain rollers so that the step chains are positively guided in the area of the escalator open to passengers.
7. Electrical Wiring

    a. Conductors: Copper throughout with individual wires coded and all connections identified on studs or terminal blocks. Type SO cable may be utilized for wiring conducting 30 volts or less, per NEC 620-21.
    b. Conductors: 31 Volt RMS or greater. Provide conduit, junction boxes, connections and mounting means per requirements of Division 16. Provide painted or galvanized steel or aluminum conduit. Conduit size minimum 3/8". Flexible conduit exceeding 18" in length shall not be used.

8. Step Chains: Steel links with hardened pins connecting adjacent steps and engaging drive sprockets. Pins shall have a minimum diameter of 5/8". Provide polyurethane roller assemblies with sealed bearings. A shielding device shall be provided to protect chain, track guides and rollers against water, dirt, and debris. Escalator design shall permit chain inspection and operation while unit is running with steps removed. Roller shall be a minimum of 4" in diameter.
9. Step Chain Tension Carriage: Spring tensioning device to take up chain slack and maintain constant tension.
10. Step Assembly: Single piece die-cast aluminum, fastened to the step chain axles. Step rollers shall have sealed bearings and be tired with synthetic composition material. Treads and riser shall be cleated. Steps shall be covered on the underside with sound-deadening material. Steps shall be removable from unit without disassembly of balustrade or decking. Provide renewable step demarcation inserts on rear edge of each step tread and both sides of each step tread. Paint step tread and riser black between machined surfaces of cleats.
11. Fire Protection

    a. Escalators shall be constructed of noncombustible materials as defined in ASTM A136 throughout, with the exception of handrails, handrail rollers, chain step wheels, and electrical equipment.
    b. Handrails shall have a flame spread rating of seventy-six to two hundred when tested in accordance with ASTME 84.
    c. Bearings shall be rated for an AFBMA L10 life as specified, under a fluctuating bearing load. All bearings shall have basic dynamic load ratings.

G. Handrails

1. Construction: Laminated canvas and rubber running on brass, bronze or steel guides. Handrail shall be spliced and vulcanized with smooth joint. Handrail shall be driven at the same speed as the steps. Provide tensioning device and slack-tension switch.

H. Balustrade

1. Interior Panel: Reinforced 14 gauge stainless steel.
2. Skirt Panels: Reinforced 14 gauge metal. Install to maintain clearance of step treads to skirt of not more than 3/16". Extend skirt panel beyond combplates to meet front plates.
3. Deck Boards: Reinforced 14 gauge metal. All deck section joints shall abut to provide a smooth surface to surface connection with curved transition, top and bottom, horizontal to incline sections.
4. Finishes

    a. Interior Panels: No. 4 stainless steel reinforced vertical panels with section joints vertical to horizontal.
    b. Skirt Panels
        1) Black, low friction material applied to metal panels.
    c. Inner and Outer Deck
        1) No. 4 stainless steel.

5. Trim and Moldings: Match deck finish.
6. Anti-Slide Knobs: Provide outer high deck configuration of immediately adjacent units with anti-slide knobs. Finish of knobs to match deck finish.
7. Floor Intersection Guards: Provide clear plexiglass intersection guards at floor penetrations as required per Code.

NOTE: In areas where luggage carts are used, glass balustrades are not permitted.

I. Landings

1. Flat Steps: Provide upper and lower landings with a minimum two flat steps on vertical travel distances of 15 feet or less. For travel distance above 15 feet, provide three flat steps.
2. Comb plates: Non-corrosive metal provided with non-slip surface. Provide removable comb sections. Apply yellow powder coat finish. Provide comb plate lighting in skirt panel on both sides of units at both upper and lower landings. Comb teeth shall be designed to withstand a load of two hundred and fifty pounds applied in an upward direction at the tip of any one tooth.
3. Landing Plates: Aluminum or other alloy with non-slip surface. Plate shall extend from combplates to equipment access plates at upper and lower ends. Plates shall extend full width of truss. Plates shall be supported by Type 316 stainless steel frames.
4. Equipment Access Plates: Aluminum or other alloy with non-slip surface. Provide removable access plates to provide for entry into equipment spaces at upper and lower

ends. Plates shall cover entire truss openings. Access plates shall match material and finish of adjacent landing plates. Provide landing plate and access floor plate without visible manufacturers name or logo.

J. Signal and Control Fixtures

1. Provide upper and lower newel or stanchion mounted operating stations. Mount on right side when facing unit. Match deck finish. Function and operating positions of switches and buttons shall be identified with engraved characters which are readily visible from a standing position. Each station shall contain the following:

    a. Red "emergency stop" button. The button shall be covered with a transparent cover which can be readily lifted or pushed aside. When the cover is moved, an audible warning signal shall be activated. The signal shall have a minimum sound intensity of 80 dBA at the button location.
    b. The cover shall be engraved "EMERGENCY STOP"; "MOVE COVER" or equivalent legend (i.e. "LIFT COVER," "SLIDE COVER," etc.); and "PUSH BUTTON." "EMERGENCY STOP" shall be in letters not less than 1/2" (13mm) high. Other required wording shall be in letters not less than 3/16" (4.8mm) high. The cover shall be self-resetting.
    c. Key switch to "start" unit.
    d. Key directional control switch.
    e. Speed selection switch.

K. Signs

1. Landing Signs: Provide caution signs at top and bottom landings per Code. Provide engraved stainless steel plate with material and finish to match decking and comply with Code coloring requirements.

L. Environmental Requirements

1. General: Escalators shall be capable of operating with full-specified performance capability while exposed to the following climatic and environmental conditions.

    a. Interior installations: Escalators shall be designed to operate in a temperature range of plus five to plus one hundred and twenty degrees Fahrenheit, dry bulb; and all conditions of relative humidity while exposed to airborne dust and debris.
    b. Exterior installations: Escalators shall be designed to operate while exposed to the natural elements of weather including sunlight, rain, slush, snow and ice; all conditions of relative humidity while exposed to salt, de-icing chemicals, airborne dust, and debris, and corrosive elements; and in a drybulb temperature range of minus ten to plus one hundred and five degrees Fahrenheit. Exterior installations shall follow APTA Guidelines for material selection/protection water diversion and environmental protection.

M. Monitoring System

1. General: Provide an interactive system to monitor and manage the escalator equipment ("units"), hereinafter called "system". Data collection, data storage and real-time monitoring portion of the system shall be based on Microsoft Windows and be able to run

on Windows 2000 Pro, XP Pro, or later operating systems. Provide the following features:

a. Network based, capable of interfacing with control systems via either serial data link or hardwired interface connections.
b. Operate on any TCP/IP based network system including but not limited to an Ethernet, Token Ring, Arc-Net, Lift-Net, etc.
c. Expansion capability to add unlimited number of monitoring terminals on the network.
d. Monitoring terminals shall operate "peer" to peer" or with a single client server. Failure of a single network device shall not affect the operation of the remainder of the system.
e. Complete backup of system data shall be accomplished at any single terminal/server location.
f. Display multiple banks, including multiple buildings, on a single monitoring terminal screen.

2. Monitoring Display: The system shall be capable of simultaneous monitoring of at least five hundred units on a single monitoring station utilizing a graphical representation of a plan view of the facility. Each escalator shown on the plan view shall be individually displayed and shall be visible on the monitoring system display terminal without the need to scroll. Each individual unit, when operating "normally," shall be displayed in green. In the event of a malfunction of any individual unit, the unit shall be displayed by a red blinking light on the monitoring system display. Units which are intentionally placed out of service shall be shown as yellow in the display mode. When malfunctioning units, or units intentionally placed out of service, are returned to normal operation the graphical representation for that unit(s) shall automatically return to green. The user shall have the ability to display additional information, such as the cause of fault/alarm, for all units by selecting the unit with a "mouse click" from the plan view of the facility. All monitored units shall be visible from any monitoring terminal on the network. Entry into the network shall be multi-level password protected.
3. System Capabilities:

a. The system shall be capable of real time display of all monitored status points on all monitored equipment. Fault and event notification screens and audible alarms shall be immediately displayed on selected monitoring stations. Different fault and event tables shall be defined on a per-bank basis. The system shall collect and store all status, fault and event information for later reporting and analysis. The system shall provide statistical analysis of hall call response times, traffic patterns, fault conditions, service logs and security usage in graphical and tabular format.
b. The system shall maintain a record of every status point change occurring on the monitored equipment, and provide the ability to replay these events in a simulation at a later time in real time, slow speed, and single pallet, reverse or fast forward. This information shall be retained for a period of at least twenty-six weeks and a mechanism shall be provided whereby this information may be archived.
c. The system shall store traffic fault and statistical data for a period of at least three years. The system shall log error type, car number, floor position and major system status points whenever a fault or logged event occurs.
d. The system shall provide interactive control of certain features provided in the escalator control system. These features may be revised as the requirements of the

building change. Some of these interactive controls may include, but are not limited to, tandem operation, individual safety switches, remote start/stop feature, etc.

e. In the case of a power failure the system shall be capable of connecting to emergency power back-up unit. The loss of power shall not affect any stored data. The system shall have the capability to detect the loss (disconnect) of any individual unit from the monitoring system by periodically polling all units to ensure that normal communications between the unit(s) and the terminals/server are maintained.

f. The system will automatically re-boot the program and continue to operate after a power loss or other system malfunction.

4. Monitoring Equipment: The monitoring equipment shall have these minimum characteristics:

a. Monitoring Station Hardware: Provide a minimum of two Monitoring Stations.

1) Central processing unit - IBM compatible microcomputer - desk top or mini-tower (multiple machine rooms or lobby displays)
2) Type - Pentium or most current high-performance processor
3) Speed - most current high-performance
4) Internal hard drive - adequate storage for three years data for entire system
5) Modem - most current high-performance
6) Display monitor (19" - 20" LCD flat panel) - color, capable of simultaneous display of all monitored units
7) Printer - current HP Color Desk Jet Series
8) Keyboard - MS Windows compatible
9) Mouse - MS Windows compatible
10) Power requirements - 90 - 230 Volts AC 50 - 60Hz @ 8A

b. Machine Room Hardware (Retained Control):

1) Controller interface panels shall utilize high quality printed circuit boards
2) Input voltage range - 5 - 250V AC/DC
3) Compatible with all types and makes of controllers
4) Operating temperature range - 45 - 112 degrees Fahrenheit
5) Humidity range - 10% - 85% non-condensing
6) Modular design - capable of future expansion
7) Power requirements - 90 - 230 VAC 50 - 60Hz @ 3A
8) The following electrical specifications for interface circuitry shall apply:

a) Input circuit loading: < 2 ma
b) Input impedance: > 1.5 Megohm @ 100VDC
c) Inputs - Optical isolation: > 3500 VRMS @ 1 sec.
d) Outputs - Relay form "C" contact rated 1/3 HP inductive, 3A, 250VDC

c. Monitoring Station Operating System Software

1) MS Windows 2000 Pro, XP Pro, or later

2) MS Windows 2000 Server, or later

5. Network requirements:
   a. Maximum local network rated distance (2-20 gauge shielded TP): > 10 miles
   b. Maximum number of nodes (combined PC, inputs/outputs): 500
   c. Maximum I/O points per node (input or output): 2040
   d. Access time to status bit change (typical 6-car bank): < 25ms
   e. Must be capable of operating on RS485, RS422, Ethernet, Token Ring, Arc-net, Lift-Net, Fiber-Optic and mixed WAN TCPIP Networks

6. Monitoring Requirements: The system shall display and record the following information for each monitored unit. Serial data links may include many more points. Items listed below are minimum requirements.

   a. Escalators:

      1) Power on/off
      2) Emergency stop switch, lower
      3) Emergency stop switch, upper
      4) Travel up
      5) Travel down
      6) Broken pallet chain device #L
      7) Broken pallet chain device #R
      8) Comb-pallet impact device, horizontal switch #TL, TR
      9) Comb-pallet impact device, horizontal switch #BL, BR
      10) Comb-pallet impact device, vertical switch #TL, TR
      11) Comb-pallet impact device, vertical switch #BL, BR
      12) Handrail entry device #TL
      13) Handrail entry device #TR
      14) Handrail entry device #BL
      15) Handrail entry device #BR
      16) Handrail-speed monitoring device #L
      17) Handrail-speed monitoring device #R
      18) Pallet level device #T
      19) Pallet level device #B
      20) Broken pallet device #1
      21) Broken pallet device #2
      22) Broken pallet device #3
      23) Broken pallet device #4
      24) Skirt obstruction device (landing) #TL
      25) Skirt obstruction device (landing) #TR
      26) Skirt obstruction device (landing) #BL
      27) Skirt obstruction device (landing) #BR
      28) Missing bridge (if applicable)
      29) Disconnected motor safety device
      30) Pit stop switch #T
      31) Pit stop switch #B
      32) Pallet lateral displacement (if applicable)
      33) Tandem operation
      34) Cumulative run time

35) Pit high water level (Pit Float Switch)
36) Drive machine oil temperature
37) Overspeed shutdown at greater than 20% over rated speed
38) Underspeed shutdown at less than 20% under rated speed
39) Truss heater/air conditioner

7. Reporting Requirements: System shall provide reports in color graphical format both on-screen and in printed form capability to conveniently switch from one report type to another and from one bank to another using minimal mouse clicks and key strokes. Reports shall be displayed after minimal waiting time. Data for all reports shall be continuously recorded and stored. Reports shall be displayed by simply selecting a date and time range, bank of equipment and report type. Date and time range selections shall carry forward from one report selection to the next. Reporting functions shall be sub-divided into the following categories:

   a. Events recorded (all status changes in a selected period)
   b. Faults recorded (all selected faults in a selected period)
   c. Faults per day/week/month (fault distribution on a per unit basis)
   d. Run time Vs. Down time

8. Interface to Third Party Building Management Systems: The escalator monitoring system shall be capable of interfacing and exchanging data with a variety of third party building management systems such as Siemans, Landis & Staefa, Johnson Controls, SCADA, and others. Information shall be exchanged by Modbus protocol, open protocol or other suitable methods as required. Integration to FMS:

   a. Provide one summary alarm point to the FMS for each escalator and escalator being monitored. Coordinate with LAWA to identify which functions monitored by the system for each escalator and escalator will activate the summary alarm message
   b. Coordinate message format with LAWA and the FMS contractor. The message shall include the escalator and escalator number and location at a minimum.
   c. Communications from the escalator and escalator MDS server/workstation to the FMS server/workstation shall be over the LAWA IT Infrastructure IP network.
   d. Coordinate message protocols with the FMS contractor. Provide software programming to communicate messages to the FMS.

9. Paging Feature: The monitoring system shall be capable of paging a service technician or other personnel based on pre-defined parameters of escalator faults or conditions. The paging system shall provide the ability to page multiple numbers determined by the type of event triggering the notification and shall be able to page different numbers based on preset times of day (i.e. different shifts). The system shall be capable of sending text messages to full text pagers in addition to supporting standard DTMF pagers.
10. Remote Access Feature: The monitoring system shall be capable of allowing approved individuals under multi-level password control, to access all system features via the local area network, internet, or via modem over the public telephone network to review the performance of the equipment or to evaluate a fault condition. The remote access feature shall be integrated into the monitoring system and shall not use third party "remote control" software products.

11. Data Transmission to Central Support Location: The system shall be capable where desired of transmitting fault, car usage and other data to a remote service desk or other office location for further processing, technician dispatch or other purposes. The data may be transmitted via the local area network, internet, or via modem over the public telephone network.

N. Seismic

1. Provide per ASME A17.1-2004 and CCR Title 8, Group IV requirements. Provide all conduit and wiring for seismic switches.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine escalator areas, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance. Examine supporting structure, machine spaces, and pits; verify critical dimensions; and examine conditions under which escalators are to be installed.

1. Proceed with installation only after unsatisfactory conditions have been corrected.
2. For the record, prepare written report, endorsed by Installer, listing dimensional discrepancies and conditions detrimental to performance or indicating that dimensions and conditions were found to be satisfactory.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions.

B. Set escalators true to line and level, properly supported, and anchored to building structure. Use established benchmarks, lines, and levels to ensure dimensional coordination of the Work.

C. Adjust installed components for smooth, efficient operation, complying with required tolerances and free of hazardous conditions. Lubricate operating parts, including bearings, tracks, chains, guides, and hardware. Test operating devices, equipment, signals, controls, and safety devices. Install oil drip pans and verify that no oil drips outside of pans.

D. Repair damaged finishes so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

3.3 FIELD QUALITY VERIFICATION

A. Comply with requirements in Division 14 Section "Vertical Transportation, General."

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train LAWA's maintenance personnel to operate, adjust, and maintain escalators.

B. Check operation of escalators with LAWA's personnel present and before date of Completion. Determine that operation systems and devices are functioning properly.

C. Check operation of escalators with LAWA personnel present not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

3.5 ESCALATOR SCHEDULE

A. Number Required:

B. Unit Numbers:

C. Location:

D. Vertical Rise:

E. Lengths: As required by the escalator manufacturer.

1. Provide two flat steps at top and bottom for each escalator.

F. Step Width: 40” (1000 m).

G. Maximum Speed: 100 feet/minute (.50 m/s).

H. Power Characteristics: 480 Volts, 3 Phase, 60 Hertz.

END OF SECTION 14 31 00

SECTION 14 32 00 - MOVING WALKS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes moving walks.

1. BMS components will be incorporated into the moving walk work. Coordinate with the BMS component contractors to incorporate BMS components during the course of the Work.

B. Single Subcontract Responsibilities: Refer to Section 14 20 00 Vertical Transportation, General for the requirements of single subcontract responsibilities for moving walks.

1.2 DEFINITIONS

A. Definitions in the latest version of ASME A17.1 apply to work of this Section.

B. Defective Moving Walk Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

C. Reference to a device or a part of the equipment applies to the number of devices or parts required to complete the installation.

1.3 PERFORMANCE REQUIREMENTS

A. Operational Requirements: The moving walk systems shall:

1. Be capable of operating under full load conditions, at full contract speed, in either direction, and designed to operate quietly and smoothly without bounce.
2. Have a rated speed of 100 ft./min. (0.51 m/s) or the metric equivalent. The no load to full load speed shall not vary more than □4% from the contract speed.
3. Hours of operation shall be considered as twenty-four (24) hours per day, seven (7) days per week.
4. Handrail speed shall be consistent with pallet speed.

B. Structural Performance of Balustrades: Per ASME A17.1-2004. Provide balustrades designed to resist the simultaneous application of a static lateral force of 40 lbf/ft and a vertical load of 50 lbf/ft, both applied at the top of the handrail stand.

C. Environmental Requirements: Moving walks shall be capable of operating with full-specified performance capability while exposed to the design climatic and environmental conditions: Climatic and environmental design conditions are available from the mechanical engineer.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Refer to Section 14 20 00, Vertical Transportation, General.

B. Installer Qualifications: Refer to Section 14 20 00, Vertical Transportation, General.

C. Professional Engineer Qualifications: Professional Engineer Qualifications: Refer to Section 14 20 00, Vertical Transportation, General.

D. Standards: The following standards shall govern the moving walk work. Where standards conflict, the standard with the more stringent requirements shall be applicable.

1. Moving Walk Code: In addition to requirements of authorities having jurisdiction, comply with the latest edition of ASME A17.1, "Safety Code for Elevators and Escalators", ASME A17.2 “Guide for Inspection of Elevators, Escalators and Moving Walks”, and ASME A17.5 “Requirements for Elevator and Escalator Electrical Equipment”, including supplements, as published by the American Society of Mechanical Engineers. Wherever “Code” is referred to in the moving walk specification, the ASME A17.1 Code shall be implied.
2. Electrical Code: For electrical work included in the moving walk work, comply with the National Electric Code (NFPA 70), ASME A17.5, all applicable local codes, and the authorities having jurisdiction.
3. Welding: Comply with AWS standards.
4. Americans with Disabilities Act (ADA).
5. Building Code of the City of Los Angeles and the following:

    a. California Code of Regulations (CCR), Title 8.
    b. City of Los Angeles Elevator Code.

E. Electrical Devices and Equipment: Refer to Section 14 20 00, Vertical Transportation, General.

F. Manufacturer: Provide all moving walks components from a single source. Where equipment or operation varies from those described, the manufacturer shall provide a complete description of those variations as required under Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL, Article QUALITY ASSURANCE, paragraph 'Contractor Statement'.

G. Testing and Inspections: Refer to Section 14 20 00, Vertical Transportation, General.

NOTE: The intent of this Guide Specification is to specify the robust equipment with the maintainability features required by APTA. Compliance with other APTA Guideline requirements that do not apply to escalators in an interior airport environment is not necessary.

1.5 SUBMITTALS

A. General: Refer to Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL.

B. Warranty and Maintenance Agreement: Warranties and maintenance agreements are required, refer to Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL and Exhibit A.

C. Maintenance and Operating Manuals: Maintenance and operating manuals are required, refer to Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL.

D. Shop Drawings: Submit complete information for all components for review prior to the fabrication of the moving walk work. Items which shall be detailed shall include the following:

1. Fully dimensioned layout for moving walks in plan, elevation, and section at a scale of ¼" = 1'-0". Indicate component locations, structural supports, access spaces, and points of entry. Indicate the interface of the moving walk work with adjacent work, including but not limited to, the following:

    a. Finished flooring surrounding landing plates.

2. Load assumptions for maximum loads imposed on trusses requiring load transfer to building structural framing, individual weight of principal components and their dead and live load reactions at points of support, electrical characteristics and connection requirements, and any other information requested by the Architect.

    a. Structural Calculations: Submit, for information only, copies of structural calculations indicating load assumptions. Calculations shall be signed, and sealed by the qualified Professional Engineer responsible for their preparation.

3. Pallet linkage details for material, configuration, arrangement, and lubrication requirements.
4. Drive motor, controller, safety devices, and switches including brakes.
5. Complete layout of electrical system including motor, control panel; disconnect switches; panelboards, truss lighting, light fixtures and light switches; receptacles; and safety, surveillance and control devices.
6. Complete single line wiring diagrams of all circuits in the moving walk systems. Show component location within each system, terminals with numbers, connection between components, conductor identification, interface connections with remote surveillance and control system, include an explanation of basic operation.

    a. Provide a record set of drawings with all changes made during the installation of the work. At the completion of the job, submit to the Owner for the Owner's use a complete set of "AS INSTALLED" plans and wiring diagrams.

E. Product Data: Submit manufacturers design data, material specifications, installation instructions, and other data pertinent to the components used in the moving walk work.

1. Provide the Owner with special tools, solid state microprocessor tools, including appropriate programs relative to the specific type of microprocessor or computer controls installed on this project, necessary to trouble shoot, service, test and maintain the moving walks. Special tools become the property of the Owner. Tools provided shall be useable throughout the life of the equipment.

a. Tools may be hand held or built into the control system and may be factory programmed to operate only with this project's equipment.

F. Samples: Submit samples as follows:

1. For exposed finishes, 3-inch- (75-mm-) square samples of sheet materials, and 4-inch (100-mm) lengths of running trim members. Acceptable low and high range of variation in color and finish shall be governed by the control samples in the Architect's office.

G. Certificates and Permits: Refer to Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL.

H. Rigging: Installer shall submit a rigging plan for approval. Any use of existing building structures shall be reviewed and approved by a structural engineer.

I. Operating and Maintenance Manuals: Prior to completion of the installation, contractor shall submit six complete sets of Operation and Maintenance manuals for approval. After LAWA approval and prior to the beginning of acceptance testing, six (6) sets of the approved manuals shall be provided by the Contractor. The manuals shall include the following:

1. Complete table of contents.
2. Complete instructions regarding operation and maintenance of equipment, including disassembly and assembly of drive system, handrail drive assembly, and track system. Included will be complete and illustrated exploded views of all assemblies as well as a complete and illustrated exploded view for identifying all system parts.
3. Complete nomenclature of replaceable parts, part numbers, current cost, and warehouse location. If product source is another vendor, contractor shall include name and address of the other vendor.
4. Sample copies of a preventive maintenance chart.
5. Descriptions of safety devices.
6. Safety rules, tests, and procedures, including testing of all systems and subsystems.
7. Procedures for adjusting brake, handrail tension, handrail chain drive tension, pallet chain tension, track system, and mechanical components, including pictorials.
8. Instructions for removing floor plate, replacing comb segments, and removing and installing pallets, and interior panels.
9. Troubleshooting techniques.
10. Detailed lubrication and cleaning schedule indicating weekly, monthly, quarterly, semiannual, and annual lubrication; and a description of each lubrication point, lubrication type, and specification.
11. Control and schematic electrical wiring diagrams of controller, including wiring of safety devices to connections with remote indication and control panels for each moving walk and group of moving walks.
12. Electrical layout showing placement of lighting, light switches, receptacles, light fixtures, disconnect switches, and convenience outlets in machinery room, truss envelope, and pits.
13. Complete detailed drawings and wiring diagram of moving walk fault finding device and connection to annunciator panel.

J. Certification:

1. The moving walk manufacturer shall provide certification that the purchaser of the moving walks shall be provided with copies of all documents related to maintenance, safety, operations, design changes, modifications, retrofits, etc.; which relate to any part, component, equipment, system subsystem, or material and services applicable to the moving walk provided.
2. All of the above referenced shall be provided as it pertains to the original installation and for a period of twenty (20) years after final acceptance of the last moving walk provided under any contract.
3. The referenced material shall be provided within thirty days of publication or internal distribution by the moving walk manufacturer. The material, even if labeled PROPRIETARY, shall be delivered to the Authority without prejudice or delay and at no additional cost.
4. Provide all material on CD-ROM in a format approved by the Authority.

K. Material Safety Data Sheets (MSDS): MSDS and product data sheets shall be submitted with an index listing each product, along with the application method of the product, approximate quantity of product per moving walk, and the component the product is applied to or associated with. The contractor shall allow six (6) weeks for review of MSDS.

L. Spare parts and replacement parts list - Contractor shall maintain, at a minimum, a local on site parts inventory for use solely on this Contract. Parts not listed below, including balustrades, decks, skirt panels, handrails and signage shall be available via overnight air delivery. Inventory shall include lubricants, light bulbs, etc. necessary to maintain equipment in original operating condition. The parts listed below shall be made available for inspection by LAWA or its designee. Part storage shall be as directed by LAWA.

1. Parts required for equipment listed under Section 14 31 00: Parts inventory shall be maintained throughout the Warranty Maintenance period and five year contract maintenance period after which parts will become the property of LAWA.

a. Moving Walks

5 Complete Pallets	4 Stop Switch Covers with hardware
10 each – Left, Right and Center Pallets Treads Inserts	2 Key Switches – each kind
15 Comb plate Segments – each kind	1 Motor Starters, each size
17 Pallets Rollers and Flanges	2 LH Electric Interlocks, each size
7 Pallets Axel Sets	2 RH Electric Interlocks, each size
1 Matched Pair Pallets Chains (Longest Unit)	1 Circuit Breakers, each size
2 Sets Gear Box Gaskets and Shims	1 Reverse Phase Relays
1 Automatic Lubrication Reservoir	1 Transformers
2 Sets Skirt and Emergency Switches	2 Pallets Chain Oilers
2 Sets Start Contacts, each size	2 Handrail Inlet Brushes
3 Stop Switches	7 Handrail Tension Rollers

1.6 JOB CONDITIONS

A. General: Refer to Section 14 20 00, Vertical Transportation, General, Section 14 21 00 and Exhibit A.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. General: Refer to Section 14 20 00, Vertical Transportation, General and 14 31 00, Escalators.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Comply with requirements in Section 14 20 00, 3.7.2, Vertical Transportation, General.

2.2 MATERIALS

A. Structural Steel:

1. Rolled Steel Sections, Shapes and Rods: ASTM A36.
2. Tubing:

    a. Cold Formed: ASTM A500.
    b. Hot Formed: ASTM A501.

3. Sheet Steel: ASTM A446, grade B, zinc coated.

B. Stainless Steel:

1. Sheet, Plate and Strip: ASTM A 666 or ASTM A240, Type 304.
2. Shapes and Bars: ASTM A276, Type 304.
3. Finish: No. 4 satin finish. Brush marks shall run parallel with the moving walk travel.

C. Aluminum Castings and Extrusions:

1. Castings: ASTM B108 alloy and temper as required to meet the strength and performance requirements.
2. Extruded Aluminum: ASTM B221, Alloy 6061 or 6063, T6.
3. Finish: Commercial mill finish:

D. Clear Tempered Glass: ASTM C 1048, Condition A (uncoated surfaces), Type 1 (transparent glass, flat), Class 1 (clear), Quality q3 (glazing, select), Kind FT (fully tempered), 12.0 mm thick. After tempering, heat soak 100% of all fabricated glass units to European Union Standard EN14179 to eliminate inclusion related glass breakage. Statistical heat soaking shall not be permitted. Comply with ASME A17.1, Section 6.1, Rules 6.1.3.3.2 and 6.1.3.3.3.

E. Fasteners: Provide bolts, nuts, washers, screws, rivets, and other fasteners necessary for the proper erection and assembly of the moving walk work. Fasteners shall be compatible with materials being fastened.

F. Welding Materials: Comply with AWS D1.1.

G. Sealants, Joint Fillers and Primers: Sealants, joint fillers and primers internal to the moving walk systems shall be as selected by the moving walk manufacturer. Perimeter sealants, joint fillers and primers are specified under Section 07920, JOINT SEALANTS.

H. Paint and Corrosion Protection: Each moving walk shall have the following minimum corrosion protection.

1. Cast metal parts such as gear housings, chain sprockets, shall be painted with a rust inhibitive primer coat after preparation by sandblasting.
2. Steel parts which are not specified to be galvanized shall be painted as follows:

    a. Primer coat two (2) mil (dry film thickness), minimum thickness.
    b. Second finish coat two (2) mil (dry film thickness), minimum thickness.

3. Bright or uncoated axles, shafts, etc. Shall be protected by zinc chromate, or chrome plating.
4. Oil drip pans shall be fabricated of factory primed carbon steel.

2.3 COMPONENTS

A. General: Provide moving walks complying with requirements. Each moving walk shall be a self-contained unit consisting of trusses, center supports, tracks, pallet drive units, pallets, pallet chains, comb plates, handrails, driving machine, controller, safety device, balustrades, and all other parts required to provide a complete operating moving walk or ramp.

B. Trusses: The moving walk trusses shall be fabricated of welded structural steel components and be designed and constructed so as to safely carry the passenger capacity load and machinery components, including the weight of the balustrade. A drive machine shall be located in the terminal end truss pit at one end of the wellway and the reversing station shall be located in the terminal end truss pit at the opposite end of the wellway. Provide a machinery space covered with removable landing plates all within the outline of the trusses in the terminal end truss pits. The trusses shall have a factor of safety in accordance with the requirements of the ASME Code. The trusses shall come in sections in sizes that can be installed without disturbing the building structure as detailed.

1. The center supports of each walkway shall be constructed using stanchions typically spaced 36” apart. Each stanchion shall be designed to carry a portion of the weight of the passenger load, pallets, and track system, and balustrades. The center supports shall rest on and be firmly secured to supporting framing members provided in the wellway structure. Center supports shall be ample strength to rigidly maintain the alignment of moving parts. All center supports, including bolts, angles, shims, and bearing pads shall be provided and installed for a complete installation.
2. Provide isolation, designed of rubber and steel, at all moving walk support locations.

C. Oil Drip Pan: Provide factory primed, 3mm thick, steel drip pans under full width and length of moving walks to collect and hold oil and grease drippings from lubricated components. Design and fabricate drip pan to sustain a load of 250 lbf (1.1 kN) on a 1.0-sq. ft. (0.9-sq. m) area at any location.

1. Drip pans shall be of a sufficient size to collect and maintain, within the truss area, all oil, water and grease droppings from the pallet linkage and all forms of loose debris that may be deposited in the drip pans from the pallets in the turn around point at the terminal portions of the moving walks. An access shall be provided to the drip pans at the lower landings of all moving walks for cleaning the drain catch basin. The drip pans in the wellways shall be removable for cleaning, or otherwise be accessible for easy cleaning.

D. Balustrades: Profile as indicated and arranged with moving handrails on guide rail that is supported by 12 mm thick clear tempered glass panels without mullions between panels, with stainless steel deck covers, skirts, trim, and accessories.

1. Handrails:

a. The handrail drive shall be of the traction type and provided with tension device. The handrails shall receive their motion through gear or chain, from the treadway chain drive mechanism to obtain the same ratio of speed and direction of travel as the moving pallets on the treadway.
b. All handrail rollers shall be provided with sealed ball or roller bearings rated at L10, 100,000 hours and have provision for retention of lubricant to ensure satisfactory lubrication and operation. The color of handrails shall be black.
c. Friction drive sheaves and idlers shall be designed and positioned so that lubricant cannot reach surface of handrail. Marking and spotting of handrail by drive equipment shall not be permitted. Provide sealed bearings rated at L10, 100,000 hours.
d. The handrails shall be constructed of laminated, steel, wire mesh, or steel cable reinforced, flexible elastomer material vulcanized into an integral, seamless, smooth handrail resistant to environmental conditions. Each handrail shall operate on formed guides except when in contact with the driving sheaves. A specially coated finish to minimize frictional wear on the underside of the handrail shall be provided. The formed guides shall be fabricated from a material not subject to corrosion or pitting and having a polished or specially coated permanent finish to minimize the frictional wear on the under surface of the handrail.
e. The handrail rollers and guides shall be so arranged that the handrail cannot be easily thrown off or` disengaged while running. Handrails shall be provided with substantially square edges at points of contact with the balustrading.
f. The extending newels shall be so designed and built that the handrails will disappear into the balustrading at a point difficult to reach.

NOTE: In areas, such as, but not limited to Ticketing, glass balustrades are susceptible to breakage from luggage carts and therefore are not permitted.

2. Deck Covers, Skirts, and Trim: Minimum 3 mm thick, satin stainless steel or black with clear Teflon coating at skirt panels. Skirts shall be fastened to the truss with hidden fastenings. Skirt panels shall be installed without overlapping joints or requiring trim pieces to cover where two skirt panels meet. Inner decks shall attach to the upper edge of the skirt and shall extend to the glass inner surface. The inner deck shall be attached to the skirt with oval head stainless steel screws. Outer decks shall be attached with concealed fasteners and shall extend outward from the outer glass surface with a turn down at the finished width and either capture the adjacent wall finish or be concealed behind it as accepted on the shop drawings.
3. During construction, exposed metal finishes shall be protected as recommended by the moving walk manufacturer. Upon completion of the balustrades, the exposed work shall be cleaned and polished.

E. Comb Plates: Fabricate comb plate assemblies from wear resisting, non-corrosive metal material, with exposed anti slip surfaces. Plastic comb plates will not be acceptable. Provide comb plate sections at the end truss landings of moving walks and at the top and bottom landings of ramps and meeting the following requirements:

1. Removable to permit ease of replacement.
2. Yellow in color for safety/demarcation.
3. Have not less than three (3), nor more than seven (7), comb plate sections per comb plate assembly.
4. Provisions for lateral and vertical fine adjustments shall be provided so that cleats of pallet treads pass between comb teeth with minimum clearances.
5. Comb teeth shall be designed so as to withstand a load of two hundred and fifty (250) pounds applied in an upward direction at the tip of any one (1) tooth.

F. Pallet Treads: One-piece, unpainted, die-cast aluminum with demarcation grooves at front and rear of tread surface. The pallet treads shall be cleat type, designed to insure a secure foothold and comfortable tread surface; the cleats shall be fabricated to meet code requirements.

1. Cleats shall be so spaced that the ends are flush with the side of the pallet treads. The tread surface shall be adjacent to adjustable skirt guards on each side of the pallet tread and the overall width of the pallet tread shall be machined to accurate limits to maintain a minimum clearance between the skirt guards and the pallet tread.
2. Pallet treads and their various attachments shall permit removal of pallet treads without disturbing balustrades or dismantling any part of the chains.
3. The design shall permit the running of the drive without pallet treads for convenience in cleaning and inspection.
4. Pallet Rollers: Pallet rollers shall have polyurethane tires on a sealed hub and bearing and be manufactured for quiet operation. Bearings shall be of the ball or roller type, be factory sealed. Rollers shall not require any additional lubrication and must be rated for severe, heavy-duty service. Rollers shall be mounted so as to prevent tilting and rocking of the pallet treads.
5. Pallet treads shall be constructed so as to be driven by chain linkages.

G. Landing Floor Plates and Frames: Landing floor plates shall be provided to cover the full width of the truss at each terminal end truss pit, extending from the comb plate and the floor line of the balustrade, to the end of the truss. Exposed portions of the landing floor plates shall be of finish metal matching pallet and comb plate. Plates shall be die cast aluminum in a ribbed pattern transverse to the moving walk axis. Ribs shall be designed to provide maximum traction, and shall be finished in the same manner as the comb plates. Landing plates shall be removable. Plates shall be reinforced, as necessary, to be rigid and able to withstand a live load of two hundred and fifty (250) pounds per square foot with zero permanent deformation. Landing plates shall be installed flush with the elevation of the finished floor. Provide a frame around the floor openings to receive the landing floor plates fabricated from metal matching the plates. The upper edge of the frames shall be flush with the elevation of the finished floor.

1. In cases where two moving walks are installed side by side, landing plates shall be designed to allow the adjacent moving walk to remain operational while work is being performed on the in-operable moving walk.

H. Pallet Chains:

1. Chain shall be endless, roller type chains specifically designed for moving walk application; one (1) on each side of pallet. The chains shall be made of high grade, heat treated, flat steel links with hardened pins and accurate rollers designed to accurately engage the drive sprockets to insure smooth operation. Each pair of pallet chains shall be a matched set.
2. Provisions shall be made to prevent sagging or buckling of the linkages, to prevent the pallets from coming in physical contact with one another, and to maintain a constant distance between the pallet axles. Automatic tensioning devices shall be provided to maintain tension under load and to compensate for wear.
3. A means for individual fine adjustment of tension for each linkage shall be provided.
4. Pallet chains shall be constructed to permit removal of segments as may be required for replacement purposes.
5. Support rollers shall be spaced to distribute load and to guide linkage throughout run. Rollers shall be constructed of polyurethane material, with diameter sufficient to provide reliability, maintainability, smoothness of motion, and to operate within noise level requirements specified. Rollers shall be affixed in a manner that ensures positive roller retention but allows for replacement.
6. Pallet chain and chain pins shall have a minimal diameter of at least five-eighths (5/8) of an inch and have a tensile strength suitable for the application. The chains shall have a factor of safety of not less than six (6).
7. A test certificate for the chain breaking load shall be provided.

I. Tracks: The tracks shall be constructed of continuous structural steel sheet, strip or plate throughout the truss, incline and transition curves at the landings in order to restrain the lateral displacement of the pallets, ensure the rollers are retained in their proper position on the track and to provide a smooth ride without discernible vibration.

1. Design and fabrication of tracks shall retain pallets, rollers, and running gear safely under load requirements and at the highest speed specified.
2. Contractor shall assemble and secure sections of track together for easy removal and replacement of defective sections. The system shall be adjustable, and welding of the track sections is not acceptable.
3. Design of the mechanical components shall provide for easy installation and removal without the dismantling of parts of the truss or building structure.
4. Tracks shall be properly supported on trusses to provide correct alignment and smooth, even operation of running gear. The rolling surface of the track shall be a minimum thickness of 3 mm.
5. The guiding system for the chains and rollers shall be fabricated from zinc plated or galvanized steel profiles with smooth and even running surfaces. The guide profiles shall not be welded together at the joints.

J. Pallet Driving Machines: The driving machines shall be of the electric motor driven, worm gear type, especially designed for moving walk service, provided with precision cut and matched ground steel worms and worm gears; ball thrust bearings and roller shaft bearings and driven by single speed motors. Run gearing in oil bath in an oil tight housing with appropriate shaft seals. Mount the driving machine within and to the truss and connect the main drive shaft to the pallet drive sprocket assembly, with a gear and chain driven by the driving machine. Design driving motor and motor switch gear to provide a smooth start, and prevent undue strain on drive components. The motor shall be of sufficient size, to operate the moving walk at full rated capacity, per Code without exceeding the rated horsepower. The motor shall be AC, polyphase, induction type continuous rated with a temperature rise not exceeding those in the NEMA and IEEE Standards.

1. A reservoir with a low oil signal to the controller, and a minimum capacity of two and one half (21/2) gallons shall be provided.
2. Reservoir level indications shall be provided where lubricants are contained within housings, supply tanks and larger filler cups.
3. Provide a sight glass or dipstick method of determining oil level in the case. The case shall provide a convenient method of draining the oil.
4. The sprockets shall be precision machined to distribute the load evenly on the sprocket teeth and on the chain rollers and shall be designed for smooth operation.
5. Shafts shall be designed for ease of assembly or disassembly.
6. Main drive bearings shall be rated for L10, 200,000 hours

K. Sprocket Assemblies:

1. Attach the main sprocket assembly rigidly to the truss, at both sides, to ensure and maintain proper alignment.
2. Mount the take up sprocket assembly on rollers, operating on tracks, rigidly attached to the truss at both sides, to automatically maintain proper tension on the pallet chains, by means of weights or compression springs.
3. Provide roller type main drive shaft bearings.
4. Design chain sprockets to accurately distribute the load evenly on the sprocket teeth and chain rollers.

L. Brake:

1. Provide each moving walk with a permanent magnet ceramic brake, located on the high speed shaft which, when activated, shall stop the moving walk or ramp in the event of a normal stop control, activation of stop button, activation of any safety device, o upon loss of power.
2. Provide a load compensating brake system capable of automatically stopping a moving walk or ramp quickly but gradually, and able to hold the moving walk or ramp stationary under full load whenever the power is interrupted. The brake shall be "fail safe" and electrically released. When a stop is initiated, the system shall maintain a relatively constant deceleration independent of the load. The brake shall not cause the moving walk or ramp to come to an abrupt stop. It shall be designed to meet ASME A17.1 Code for deceleration requirements without adjustment. Design of brake shall provide ease of access for inspection.
3. Controller: Wire to identified terminal block studs. Identifying symbols or letters identical to those on wiring diagrams permanently marked adjacent to each component on the controller. Enclose all components in steel cabinet removable from machine room for ease of access to switches and wiring. Provide mainline circuit breaker and means to protect against overload and single phasing. Controller shall be labeled with rated load and speed, braking torque, manufacturer serial number and LAWA numbers. Locate controller remove if available space is not sufficient in upper and lower ot.
    a. The moving walk control equipment shall contain diagnostic capabilities as required for the ease of complete maintenance. The diagnostic system shall be an integral part of the controller and provide user-friendly interaction between the service person and the controls. All such systems shall be free from decaying circuits that must be periodically reprogrammed by the manufacturer.
    b. Switch gear shall be mounted in NEMA 4X cabinets with labeled terminal strips.
    c. The main controller shall use an Allen Bradley SLC5/03 Programmable Logic Controller (PLC) or approved equal, to control and monitor the status of the moving walk. The PLC shall be designed to communicate over Ethernet or approved equal.
    d. The PLC racks shall provide space for two future single-slot modules.
    e. The PLC in the remote control panel shall also have hardware and firmware provisions to communicate with interactive operator interface (monitor).
    f. The PLC shall store the last 99 faults, accessible via laptop connection, panel view or remote communications.
    g. Provide a copy of all working programs on approved computer medium as well as a printed program listing.
    h. The Programmable Controller shall have one dedicated serial port, which supports RS-232-C signals. It shall be accessible in ladder logic and provide support for Point to Point and Life-Net/Slave SCADA communication protocol systems. Alternatively, it must be usable for programming purposes or for access to remote programmers via modems.
    i. The main control switchgear of an moving walk shall contain at least the following devices:

        1) Lockable main switch thermal and magnetic motor protection starter, hour counter, auxiliary contactors, phase failure device, phase sequence monitor, and ground fault monitor.
        2) The controller cabinet shall contain a permanently mounted fault indicator board with indicator lights. Fault data shall also be displayed in the newel. Each group of safety devices shall be connected to one signal lamp.

3) The indication shall be locked automatically. Reset shall be done by a separate switch installed in the controller. The emergency stop shall not be locked.
4) All terminals shall have identification markings and all cables shall be provided with cable markers.
5) The controller shall be equipped with an AC induction motor reduced voltage starter; installed in line between the standard type contactor and the drive motor. The starter shall be solid state, capable of starting motors smoothly and gradually, reducing inrush current and mechanical shock upon start up. Adjustable settings for accelerating time and starting torque shall be provided. The starter shall also contain auxiliary contacts and a thermal overload relay for motor protection.
6) Maintenance Receptacles: Electric power receptacles shall be furnished and installed in the upper and lower pits. Each receptacle shall be of the GFCI duplex type, waterproof, grounded, and rated for one hundred and twenty volts at twenty amperes. The receptacles in the pits shall be surface mounted on the walls, not less than thirty inches from the floor.
7) Relays shall be provided with visual indication that they are energized.
8) Adjustable settings for accelerating time and starting torque shall be provided. The starter shall also contain auxiliary contacts and a thermal overload relay for motor protection.

j. Monitoring System Interface: Provide controller with serial data link through RJ 45 Ethernet connection and install all devices necessary to monitor items outlined in Section 2.15. Moving Walk Contractor responsible to connect monitoring system interface to machine room monitoring compartment and LAN. Wiring from LAN to the machine room monitoring compartment by others.
k. Remote Monitoring and Diagnostics: Equip each controller with standard ports, interface boards, and drivers to accept maintenance, data logging, fault finding diagnostic, and monitoring system computers, keyboards, modems, and programming tools. The system shall be capable of driving remote color CRT monitors that continually scan and display the status of each moving walk. System shall be Lift-Net, or equal ready/compatible. System shall be compatible with other building management systems. Monitoring system shall not be proprietary to any individual control. Provide features described in Section 14 31 00, Escalators.

M. Control Station: Provide a control station at both the drive end and return end, located near the handrail inlet, include a key actuated direction starting switch at each station. Restarting shall require first positioning the key to "normal" (center position), and then selecting the appropriate direction. Restarting with the key in the “normal” position shall be prevented by the controller.

1. Per Reference Standard RS-18 the right side position for starting the moving walk in the upward direction shall be marked “start-up”, and the left side position for starting the moving walks in the downward direction shall be marked “start-down”. The starting devices shall be protected by a locked, transparent cover plate that can be opened by the starting key and clearly marked “For Start Only”. Starting devices shall be located at the top and bottom of the moving walk or ramp on the right side facing newel.

2. Provide a manual reset switch adjacent to each control station at top and bottom landings.

N. MOVING WALK POWER SAVING CONTROL

1. CERTIFICATIONS

   a. The motor controlling device shall be certified to meet US elevator / escalator / moving walk code (ASME-A A17.5 and CSA B44.1) standard for industrial control equipment as well as CE for the European Standard.

2. PERFORMANCE

   a. The supplier shall provide documented proof that the motor controlling device has been tested on a moving walk by at least one electric utility in the United States of America and shown positive energy savings test results. Furthermore, the supplier shall provide documented proof that the electric utility approved the motor controlling device for an energy efficiency rebate (if applicable).
   b. The motor controlling device shall continually monitor motor and be able correct energy requirement within 8ms and be able to respond to a 50% change in load within 1 second without changing the speed of the motor by over 0.5%. The motor controlling device shall be able to provide full power to a motor without using more than 0.5% more energy that an electrical mechanical motor starter.

3. EQUIPMENT MANUFACURER ACCEPTANCE

   a. The supplier shall show broad industry acceptance of the motor control device by documenting that all major moving walk service providers, including Otis Elevator, KONE Inc. Schindler, ThyssenKrupp, and Mitsubishi Electric, have experience installing such device on a moving walk.

4. FUNCTIONS

   a. The motor controlling device must include the following functions:
   b. Overload Current Protection
   c. Over Voltage Protection
   d. Under voltage Protection
   e. Over Current
   f. Under Current
   g. Phase Loss
   h. Reverse Direction
   i. S.C.R. Failure
   j. Fault logging capability

k. Remote monitoring capability

5. MOUNTING HARDWARE

a. The mounting hardware and enclosure shall be rated NEMA - 1 for indoor installations and NEMA 4 for exterior installations rated and specifically designed for ease of installation in moving walk applications.

6. CONTROL VOLATAGE CONNECTION

a. The motor controlling device shall not require an external dedicated power source to operate and shall operate based on existing line serving the moving walk.

7. DISCRETE INPUTS AND OUTPUTS

a. The motor controlling device shall have one input connection that controls the starting and stopping of the motor. The motor controlling device shall have two output contacts to provide the run and fault status of the motor controlling device.

8. MOTOR CONTROL FUNCTIONALITY

a. The motor controlling device shall provide a timed soft start with a start up time range of 0 to 10 seconds or more, to appropriately integrate with other motor starters and reduce the mechanical stress on the moving walk system during the starting of the motor.

9. HEAT SINK MATERIAL

a. The motor controlling device shall utilize a metal heat sink material to dissipate operating heat without requiring external cooling devices.

10. SUBMITTAL REQUIREMENTS

a. The supplier shall provide motor controlling device drawings including schematic wiring diagram and mounting dimensions.

11. DELIVERABLES

a. The supplier shall provide an installation and user's manual.

12. WARRANTY

a. The supplier shall warrant the motor controlling device for a period of two years from the date of sale.

O. Additional Safety Devices: Provide all safety devices required by Code including, but not limited to, the following. Design all safety devices to operate in accordance with the requirements of the Code.

1. Emergency Stop Buttons: Emergency stop buttons shall be provided, designed so that the momentary pressure of either button shall cut off the power supply to the motor and brake to bring the moving walk or ramp to rest.

    a. One emergency stop button shall be located at both the drive end and return end. Location shall be in the upper quadrant, 45 degrees above horizontal, in order to provide easy access. The stop button shall be red in color.
    b. The button shall be housed under a clear, high impact resistant plastic cover, which shall be self-closing. Instructions for operating the stop button shall be imprinted on the cover in half-inch high letters. When the cover is lifted, an audible alarm shall sound until the cover is returned to its closed position.

2. Broken Treadway, and Broken Drive Chain, Devices: Broken chain safety devices shall be provided with a safety switch for each chain designed to cut off the current and bring the moving walk to rest should either chain break.
3. Pit Stop Switch: Each moving walk shall be provided with an additional safety device, in the pit that shall interrupt power within the moving walk or ramp and automatically apply the brake to bring the moving walk or ramp to a smooth stop.
4. Reversal Stop Devices: The reversing device shall be designed to stop the moving walk automatically, should the direction of travel be accidentally reversed while the moving walk or ramp is operating in an ascending direction.
5. Pallet Level Devices: Moving walks or ramps equipped with pallets with trail wheels shall be provided with pallet level devices shall be located at the each end of the moving walk or ramp. These devices shall detect downward displacement of 1/8” or greater at the trailing edge of the pallet at either side of the pallet. When activated, the device shall cause the moving walk or ramp to stop prior to the pallet entering the combplate. The device shall cause power to be removed from the driving machine motor and brake.
6. Handrail Inlet Safety Devices: A handrail inlet safety device shall be provided at the handrail inlet in the newel. The electrical switch of this device shall be designed to cut off the current and bring the moving walk to rest should either an object become caught between the handrail and the handrail guard or an object approaches the area between the handrail and handrail guard.
7. Comb Pallet Impact Devices: Per Reference Standard RS-18 two independent safety devices, one at the side of the comb plate and the other at the center of the front edge of the comb plate shall be provided at the drive end and return end comb plate which will cause the opening of the power circuit to the moving walk or ramp drive machine motor and brake if either:

    a. a horizontal force in the direction of travel is applied exceeding 112 lbf at either side or exceeding 225 lbf at the center of the front edge of the comb plate; or,
    b. b. a resultant vertical force in upward direction is applied exceeding 150 lbf at the center of the front of the combplate.

8. Comb-Pallet Stop Device: Per Reference Standard RS-18 on every new moving walk a comb-pallet stop device shall be provided at the entrance to and the exit from a moving walk. Any obstruction exerting a pressure of 60 pounds for pallets over 32 inches in width between the moving treadway and the comb pallet shall activate the comb pallet stop device to cause the opening of the power circuit to the moving walk or ramp driving machine motor and brake.

9. Handrail Speed Monitoring Devices: A handrail speed monitoring device shall be provided which will cause the immediate activation of the audible alarm required for the emergency stop buttons whenever the speed of either handrail deviates from the pallet speed by 15% or more. The device shall cause electric power to be removed from the driving machine motor and brake if the speed deviation of 15% or more is continuous for more than 2 seconds.
10. Missing Pallet Switch: This safety feature shall be provided to prevent the unit from running if a pallet is missing.
11. Combplate Lights: Provide recessed light fixtures with flush lenses mounted in interior balustrade panels at each side of combplates designed to illuminate treadway at combplate.
12. Pallet Demarcation Lights: Pallet demarcation lights shall be furnished at the entrance to and the exit from a moving walk. They shall consist of a light fixture installed just below the track system where the pallet leaves or enters the comb plate. This fixture shall be furnished with two independently operating green fluorescent lamps and shall be capable of lighting the entire width of the pallet. The light shall be visible between the pallets. The lamps shall be activated whenever the moving walk or ramp is in operation.
13. Safety Signs: Worded and pictorial signage meeting the requirements of the ASME Code shall be provided at both the drive end and return end landings.

P. Remote Monitoring: Provide an interactive monitoring and diagnostic system tied to each individual elevator, escalator, and moving walk ready for connection to the new building management system (BMS). The BMS shall be centrally located in the BMS Control Room.

1. Lift-Net: Integrated Display Systems, Inc.

Q. Energy-Saving Feature: Provide moving walk motors and controls designed for motors to run on partial windings (at reduced power) when not under full load.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Refer to Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL.

3.2 MOVING WALK SCHEDULE

A. Number Required:

B. Unit Numbers:

C. Location:

D. Vertical Rise/Slope:

E. Length:

F. Width: 56" (1420 m)

G. Speed: 100 feet/minute (.50 m/s).

H. Power Characteristics: 480 Volts, 3 Phase, 60 Hertz.

I. Maintenance Service: Provide 12-month maintenance for all moving walks with 24-hour callback service, as-built wiring diagrams, operating instructions, and parts ordering information, remote wiring to fire alarm panel.

J. Warranty: Provide 12 month warranty beginning at date of acceptance by LAWA.

3.3 DEMONSTRATION

A. Engage a factory-authorized service representative to train LAWA's maintenance personnel to operate, adjust, and maintain escalators.

B. Check operation of escalators with LAWA's personnel present and before date of Completion. Determine that operation systems and devices are functioning properly.

C. Check operation of escalators with LAWA personnel present not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

END OF SECTION 14 32 00

Los Angeles World Airports

EXAMPLE

EXHIBIT A

FIVE YEAR EXTENDED PREVENTATIVE AND ROUTINE MAINTENANCE SERVICE AGREEMENT (SERVICE AGREEMENT) SPECIFICATIONS

FOR

ELEVATORS, ESCALATORS, and MOVING WALKS

AT THE

LOS ANGELES INTERNATIONAL AIRPORT

IN

THE CITY OF LOS ANGELES, CALIFORNIA

Los Angeles World Airports

GENERAL CONDITIONS

GC-1. SCOPE OF WORK

1.01 The Contractor agrees to furnish all labor, materials and equipment in strict compliance with the Work requirements, conditions and specifications identified in the Contract Documents.

1.02 It is expressly understood and agreed that the Contractor shall perform all incidental work required to fulfill the requirements of the Contract Documents. All such incidental work shall not be considered Change or Extra Work for which additional compensation can be claimed by the Contractor.

GC-2. NOT USEDAUTHORIZED REPRESENTATIVE OF THE CITY The Engineer and/or Director of Maintenance, represents LAWA, the City, the Board and the Executive Director within the limits of the City Charter and the administrative requirements of both the City on all matters relating to this Service Agreement.

3.01 The Engineer and/or Director of Maintenance or designated representative has the final authority in all matters affecting the Work and the authority to enforce compliance with the Service Agreement. The Contractor shall promptly comply with the instructions of The Engineer and/or Director of Maintenance or its authorized representative.

GC-4. INSURANCE

4.01 Contractor shall procure at its expense, and keep in effect at all times during the term of this Service Agreement the following types and amounts of insurance:

COVERAGE TYPE	POLICY LIMITS
A. Worker's Compensation	Statutory
B. Automobile Liability including i. Any Auto ii. ii. Hired Autos iii. iii. Non-owned Autos)	$10 Million Combined Single Limit ("CSL")
C. Aviation/Airport Liability	$10 Million CSL
OR	
Commercial General Liability (including the following coverages: i. Premises and Operations ii. Contractual Liability (Blanket/Schedule) iii. Independent Contractors iv. Personal Injury v. Products/Completed Operations) vi. Explosion, Collapse & Underground vii. Broad Form Property Damage	$10 Million CSL
D. Professional Liability	$1 Million CSL
E. Employer's Liability	$1 Million CSL

4.02 The specified insurance (except for Workers' Compensation, Employers' Liability and Professional Liability) shall also, either by provisions in the policies, by City's own endorsement form or by other endorsement attached to such policies, include and insure City, its Department of Airport, the Board, and

all of its officers, employees and agents, their successors and assigns, as insureds, against the areas of risk described in Section 4.01 hereof as respects Contractor's acts or omissions arising out of the performance of this Agreement, Contractor's acts or omissions in its operations, use and occupancy of the premises hereunder or other related functions performed by or on behalf of Contractor at the Airport.

4.03 Waiver of Subrogation. For commercial general liability insurance, workers' compensation insurance, and employer's liability insurance, the insurer shall agree to waive all rights of subrogation against City for Losses arising from activities and operations of Contractor insured in the performance of Services under this Service Agreement.

4.04 Sub-Contractors. Contractor shall include all of its Sub-Contractors as insureds under its policies or shall furnish separate certificates and endorsements for each Sub-Contractor. All coverages for Sub-Contractors shall be subject to all of the requirements stated herein unless otherwise agreed to in writing by Executive Director and approved as to form by the City Attorney.

4.05 Each specified insurance policy (other than Workers' Compensation and Employers' Liability and Professional Liability) shall contain a Severability of Interest (Cross Liability) clause which states, "It is agreed that the insurance afforded by this policy shall apply separately to each insured against whom claim is made, or suit is brought, except with respect to the limits of the company's liability." Additionally, Contractor's Commercial General Liability policy ("Policy") shall provide Contractual Liability Coverage, and such insurance as is afforded by the Policy shall also apply to the tort liability of the City of Los Angeles assumed by the Contractor under this Service Agreement.

4.06 All such insurance shall be primary and noncontributing with any other insurance held by City's Department of Airports where liability arises out of, or results from, the acts or omissions of Contractor, its agents, employees, officers, invitees, assigns, or any person or entity acting for, or on behalf of, Contractor.

4.07 Such policies may provide for reasonable deductibles and/or retentions acceptable to the Executive Director, based upon the nature of Contractor's operations and the type of insurance involved.

4.08 City shall have no liability for any premiums charged for such coverage(s). The inclusion of City, its Department of Airports, its Board, and all of its officers, employees and agents, and their agents and assigns, as additional insureds, is not intended to, and shall not; make them, or any of them, a partner or joint venturer of Contractor in its operations at the Airport.

4.09 In the event Contractor fails to furnish City evidence of insurance, or to maintain the insurance as required under this Section, City, upon ten (10) days' prior written notice to Contractor of its intention to do so, shall have the right to secure the required insurance at the cost and expense of Contractor, and Contractor agrees to promptly reimburse City for the cost thereof, plus fifteen percent (15%) for administrative overhead.

4.10 At least thirty (30) days prior to the expiration date of any of the above policies, documentation showing that the insurance coverage has been renewed or extended shall be filed with the City. If any such coverage is cancelled or reduced, Contractor shall, within ten (10) days of such cancellation or reduction of coverage, file with City evidence that the required insurance has been reinstated, or is being provided through another insurance company or companies.

4.11 Contractor shall provide proof of all specified insurance and related requirements to City either by production of the actual insurance policy(ies), by use of City's own endorsement form(s), by broker's letter acceptable to Executive Director in both form and content in the case of foreign insurance syndicates, or by other written evidence of insurance acceptable to Executive Director. The documents evidencing all

specified coverages shall be filed with City prior to the Contractor performing the services hereunder. Such documents shall contain the applicable policy number(s), the inclusive dates of policy coverage(s), the insurance carrier's name(s), and they shall bear an original or electronic signature of an authorized representative of said carrier(s). Such insurance shall not be subject to cancellation, reduction in coverage or non-renewal, except after the carrier(s) and the Contractor provide written notice (by Certified Mail) to the City Attorney of the City of Los Angeles at least thirty (30) days prior to the effective date thereof.

4.12 City and Contractor agree that the insurance policy limits specified in this Section shall be reviewed for adequacy annually throughout the term of this Service Agreement by the Executive Director, who may thereafter require Contractor to adjust the amount(s) of insurance coverage(s) to whatever amount(s) Executive Director deems to be adequate. City reserves the right to have submitted to it, upon request, all pertinent information about the agent(s) and carrier(s) providing such insurance.

GC-5. CITY HELD HARMLESS

5.01 To the fullest extent permitted by law, Contractor shall defend, indemnify and hold harmless City and any and all of City's Boards, officers, agents, employees, assigns and successors in interest from and against any and all suits, claims, causes of action, liability, losses, damages, demands or expenses (including, but not limited to, attorney's fees and costs of litigation), claimed by anyone (including Contractor and/or Contractor's agents or employees) by reason of injury to, or death of, any person(s) (including Contractor and/or Contractor's agents or employees), or for damage to, or destruction of, any property (including property of Contractor and/or Contractor's agents or employees) or for any and all other losses alleged to arise out of, pertain to, or relate to the Contractor's and/or Sub-Contractor's performance of the Service Agreement, whether or not contributed to by any act or omission of City, or of any of City's Boards, officers, agents or employees; Provided, however, that where such suits, claims, causes of action, liability, losses, damages, demands or expenses arise from or relate to Contractor's performance of a "Construction Contract" as defined by California Civil Code section 2783, this paragraph shall not be construed to require Contractor to indemnify or hold City harmless to the extent such suits, causes of action, claims, losses, demands and expenses are caused by the City's sole negligence, willful misconduct or active negligence.

5.02 In addition, Contractor agrees to protect, defend, indemnify, keep and hold harmless City, including its Boards, Departments and City's officers, agents, servants and employees, from and against any and all claims, damages, liabilities, losses and expenses arising out of any threatened, alleged or actual claim that the end product provided to LAWA by Contractor violates any patent, copyright, trade secret, proprietary right, intellectual property right, moral right, privacy, or similar right, or any other rights of any third party anywhere in the world. Contractor agrees to, and shall, pay all damages, settlements, expenses and costs, including costs of investigation, court costs and attorney's fees, and all other costs and damages sustained or incurred by City arising out of, or relating to, the matters set forth above in this paragraph of the City's "Hold Harmless" agreement.

5.03 In Contractor's defense of the City under this Section, negotiation, compromise, and settlement of any action, the City shall retain discretion in and control of the litigation, negotiation, compromise, settlement, and appeals there from, as required by the Los Angeles City Charter, particularly Article II, Sections 271, 272 and 273 thereof.

5.04 Survival of Indemnities. The provisions of this GC-5 shall survive the termination of this Agreement.

GC-6. STANDARD OF CARE

6.01 Contractor's professional services rendered in the performance of this Service Agreement shall conform to the highest professional standards for said designated professional fields in the State of California.

GC-7. NOT USED

GC-8. CONTRACT BONDS

8.01 All provisions of Vertical Transportation General Provisions, Section 14 20 00 shall apply.

8.02 The Faithful Performance Bond and the Payment Bond shall each be for one hundred percent (100%) of the Service Agreement price. The Contractor shall submit both the Faithful Performance Bond and Payment Bond no less than thirty days prior to the expiration of the Warranty Period, with receipt and approval by LAWA and the City Attorney a condition of Final Acceptance of the Procurement and Installation Contract. Both bonds shall be maintained by the Contractor in full force and effect until the Service Agreement term is complete, and until all claims for materials and labor are paid, and shall otherwise comply with Section 3248 of the Civil Code.

8.03 Should any bond become insufficient, the Contractor shall renew the bond within 10 days after receiving notice from The Engineer and/or Director of Maintenance.

8.04 The mutually agreed optional second 5-year Extended Preventative and Routine Maintenance (EPRM) Service Agreement period shall maintain all bond requirements set forth herein.

GC-9. NOT USED

GC-10. ASSIGNMENT OR TRANSFER PROHIBITED

10.01 Contractor shall not, in any manner, directly or indirectly, by operation of law or otherwise, hypothecate, assign, transfer or encumber this Service Agreement, or any portion thereof or any interest therein, in whole or in part, without the prior written consent of the Executive Director. The names of Subcontractors or others whom Contractor intends to employ to perform services as part of the Work shall be submitted to Executive Director for prior approval.

10.02 For purposes of this Service Agreement, the terms “transfer” and “assign” shall include, but not be limited to, the following: (i) if Contractor is a partnership or limited liability company, the transfer of fifty percent (50%) or more of the partnership interest or membership or the dissolution of the Contractor; and, (ii) if Contractor is a corporation, any cumulative or aggregate sale, transfer, assignment, or hypothecation of fifty percent (50%) or more of the voting shares of Contractor.

GC-11. NOT USED

GC-12. NOT USED

GC-13. NOT USED

GC-14. NOT USED

GC-15. NOT USED

GC-16. NOT USED

GC-17. NOT USED

GC-18. NOT USED

GC-19. WAIVER

19.01 The waiver by City of any breach of any term, covenant, or condition herein contained shall not be deemed to be a waiver of any other term, covenant, or condition, or of any subsequent breach of the same term, covenant, or condition.

GC-20. NOT USED

GC-21. NOT USED

GC-22. TERMINATION

22.01 If, at any time, City, for any reason, decides to terminate the Service Agreement, or any part thereof, City may: 1) require Contractor to terminate the performance of all, or a portion, of its services; and/or 2) terminate this Service Agreement, or any part thereof, upon giving Contractor a thirty (30) day written notice prior to the effective date of such termination, which date shall be specified in such notice.

22.02 In the event this Service Agreement, or any portion hereof, is terminated by the City, City shall pay Contractor as set forth in Section GC-22.03 the amount due to the Contractor for Basic Services as set forth in the Service Agreement.

22.03 City shall not be liable for the cost of work performed or expenses incurred subsequent to the date specified by City in the thirty (30) day written notice to terminate, and in no event shall any payments to be paid by City to Contractor, exceed the amount(s) specified, without the prior approval of the City, and unless this Service Agreement is first amended in writing. Any such payments shall be made by City within a reasonable time following receipt of Contractor's invoice(s) therefor.

22.04 City may, at any time, upon written order to Contractor, require Contractor to stop all, or any part, of the services called for by this Service Agreement for a period of thirty (30) days. Said thirty (30) day period shall commence on the day the written order is delivered to Contractor, and shall extend for any further period to which the parties may agree. Any such order shall be specifically identified as a "Stop Work Order" issued pursuant to this clause. Upon receipt of such an Order, Contractor shall forthwith comply with its terms. Within a period of thirty (30) days after a Stop Work Order is delivered to Contractor, or within any extension of that period to which the parties have agreed, City shall either:

a. Cancel the Stop Work Order; or

b. Terminate the services as provided in the Service Agreement. If a Stop Work Order issued under this Section is canceled or expires, or the period of any extension thereof is canceled or expires, Contractor shall resume work. An equitable adjustment will thereafter be made in Contractor's time of performance, Contractor’s compensation, or both, consistent with the provisions of this Service Agreement, if:

   1. The Stop Work Order results in an increase in the time required for, or in Contractor's cost properly allocable to, the performance of services pursuant to this Service Agreement; and
   2. Contractor asserts a claim for such adjustment within thirty (30) days after the end of the period of work stoppage; provided, however, that City may investigate any facts relating to such claim.

   If a Stop Work Order is not canceled, and the services covered by such order are terminated for the convenience of City, the reasonable costs resulting from said Stop Work Order shall be allowed.

22.05 It is understood and agreed that should City decide that any portion of Service Agreement, and/or Contractor's services, shall be suspended or terminated, this Service Agreement shall continue to apply to that portion or those portions not suspended or terminated, and that such suspension or termination of a portion of Service Agreement or services shall in no way make void or invalid this Service Agreement.

22.06 At the termination of this Service Agreement, the Contractor shall deliver to LAWA all records and documentation, including, but not limited to manuals, operations manuals, service records, drawings, computer programs (including applicable software source codes), procedures, and records which the Contractor has used to maintain the equipment. All such records and documents shall remain the sole property of LAWA. The system shall be returned to LAWA in the same or better condition as it was delivered to the Contractor with the exception of reasonable wear and tear.

GC-23. PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS

23.01 The Contractor shall conduct the operations in a manner that avoids injury or damage to adjacent property and improvements. If damaged or removed due to the Contractor's operations, they shall be restored or replaced in as nearly the original condition and location as is reasonably possible. When ordered by LAWA, the Contractor shall provide and install suitable safeguards to protect any object from injury or damage.

GC-24. PUBLIC CONVENIENCE AND SAFETY

24.01 All provisions of the Contract Documents shall apply.

24.02 The Contractor shall be liable for any damage caused to such premises. The Contractor shall restore areas used for operations or for storage, and all areas adjacent to the construction to their original condition.

GC-25. RESPONSIBILITIES OF THE CONTRACTOR

25.01 All provisions of the General Provisions shall apply.

25.02 The Contractor's employees shall be restricted to immediate work areas at the Site, and shall not go beyond work limits or access routes, except as otherwise approved by LAWA.

25.03 All employees must have a LAWA security badge with a Customs Seal and insurance as required for unescorted access to the Airport’s Security Identification Display Area (SIDA).

25.04 The Contractor shall be responsible for providing and maintaining all tools and all necessary vehicles, including, but not limited to scissor lifts, fork-lift trucks, golf carts, etc. that will be used under this Service Agreement. There will be no additional costs to LAWA for these items, and shall be included as part of Contractor’s rates.

25.05 Before starting work, the Contractor shall designate in writing a representative who shall have complete authority to act on the Contractor's behalf.

25.06 LAWA reserves the right to:

a. Disapprove any candidate named as the Contractor's representative or alternate who fails to meet the provisions set forth herein.

b. Remove, without any right to work on the work site, either the Contractor's representative or alternate, who in the sole opinion of LAWA has demonstrated incompetence, lack of ability, or

other unsuitability to perform supervision of the Work; and that individual shall not, without permission of LAWA, be re-employed on this Service Agreement.

25.07 If the Contractor's representative or alternate leaves the employment of the Contractor, the Contractor will be required to replace the individual(s) within fifteen (15) days.

25.08 The Contractor shall be responsible for obtaining, at its own expense, all necessary licenses and permits. The Contractor shall be responsible for all damages to persons or property that occur as a result of the Contractor's negligence and shall take proper safety and health precautions to protect the work, workers, the public and the property of others.

GC-26. RESPONSIBILITIES OF LAWA

26.01 LAWA will designate its representative whom the Contractor shall coordinate all operational requirements and activities, concerning, but not limited to rules and regulations, safety, enforcements, notifications to stakeholders and airlines.

26.02 LAWA shall pay the reasonable cost of utilities (electric, gas, etc.) used in the course of performing the Service Agreement activities. LAWA will be the exclusive judge of the reasonableness of claimed utility charges.

26.03 LAWA shall reimburse the Contractor for approved work performed on the units that is required due to damage caused to the units by others. The Contractor will be reimbursed in accordance with the agreed upon rate for such work.

GC-27. INTERFACE

27.01 The Contractor shall conduct all operations in a manner that will cause no interference with airplane traffic, passenger flow or normal operation of the Airport. In all operations, the Contractor shall be governed by the regulations and rules of LAWA and shall cooperate fully with LAWA.

27.02 Contractor shall also comply with all applicable laws and regulations and shall hold all necessary consultations and conferences with personnel of any and all City, County, State, or Federal agencies, including, but not limited to the City of Los Angeles, FAA, DHS, TSA, USCBP, LAXTEC, which may have jurisdiction.

GC-28. SAFETY

28.01 During the term of this Service Agreement, The Contractor shall provide all materials, resources, training and any and all services required to ensure that the systems can be safely operated and maintained in conformance with LAWA and the approved documents developed by the elevator/escalator OEM in conformance with industry standards.

28.02 Contractor shall at all times conduct all operations under the Service Agreement in a manner to avoid the risk of bodily harm to persons or risk of damage to any property. Contractor shall promptly take all precautions which are necessary and adequate against any conditions which involve a risk of bodily harm to persons or a risk of damage to any property. Contractor shall continuously inspect all Work, materials and equipment to discover and determine any such conditions and shall be solely responsible for discovery, determination and correction of any such conditions.

28.03 Contractor shall submit their written Safety Program, with detail commensurate with the Work to be performed, for LAWA's review within 30 days of expiration of the 1-year warranty period. Such review and approval shall not relieve Contractor of its responsibility for safety, nor shall such review be construed

as limiting in any manner Contractor's obligation to undertake any action which may be necessary or required to establish and maintain safe working conditions at the facility.

28.04 Contactor shall maintain accurate accident and injury reports and shall furnish LAWA a monthly summary of injuries and man hours lost due to injuries as well as a statement of total man hours worked.

28.05 Material usage by the Contractor shall be accomplished with strict adherence to California Division of Industrial Safety requirements and all manufacturer warnings and application instructions listed on the material Safety Data Sheet and on the product container label.

28.06 The Contractor shall notify LAWA if a specified product cannot be used under safe conditions.

28.07 Worker Protection: In all cases involving exposure of personnel to toxic/hazardous materials and/or elements, the City of Los Angeles Personnel, Occupational Safety Office, shall have field review authority over the Contractor's operations.

GC-29. ADVERTISING

29.01 No use of information related to the Work is permitted without the written approval of LAWA.

29.02 All signage, logos, placards, displays, etc. are subject to written approval by LAWA.

GC-30. AUDITS AND RECORDS

30.01 LAWA shall have access to all records and documents of the Contractor directly relating to labor and materials used for the performance of the work in this Service Agreement.

GC-31. PAYMENT

31.01 It is agreed that, regardless of any other provision of this Service Agreement, unless amended, the total amount to be paid to Contractor by City shall not exceed the amount indicated in the Contractor's proposal.

31.02 Each month, during the term of this Service Agreement, Contractor shall submit a Request For Payment for 1/60 of the amount specified in 31.01.

31.03 Each Request For Payment shall contain documentation acceptable to LAWA that include applicable employee and subcontractor time sheets, identification of the scope of work completed, billing by job classifications and the applicable approved billing rates. Each Request For Payment shall also contain a cumulative total of all monthly billings, and balances. Subject to the provisions of this Service Agreement, LAWA shall pay Contractor based on Contractor's monthly payment requests. Payment will be withheld for any Work not completed in the billing period.

GC-32. NOT USED

GC-33. CONTRACTOR STAFFING

33.01 If LAWA at its sole discretion is dissatisfied with the performance of any of Contractor's personnel, including personnel of Contractor's sub-Contractors, assigned to the Work, and so notifies Contractor, in writing, Contractor shall replace the person(s) to whom objection has been made within five (5) working days of the written notice. City, in exercising its rights may also, in its sole discretion direct Contractor to terminate one or more its sub-consulting agreements.

Los Angeles World Airports

SPECIAL CONDITIONS

SC-1. INTRODUCTION

1.01 The general scope of work is to provide complete Extended Preventative and Routine Maintenance (EPRM), services for the elevators, escalators and moving walks (equipment) installed as part of this Procurement and Installation Contract at LAX. Services include repairs, adjusting, cleaning and lubrication of equipment.

1.02 Any other incidental services that the Contractor determines to be required to assume complete responsibility for EPRM of the new equipment that are not described herein shall be included as part of the Service Agreement costs.

1.03 The Contractor shall have contractual agreements with each of its sub-contractors whose services the Contractor may secure to perform work under this Service Agreement and is in compliance with all of the terms of this Service Agreement. In the event that the Contractor subcontracts certain portions of the work, the term "employee" as used herein shall be deemed to include such subcontractors and their employees.

SC-2. SITE SPECIFIC WORK PROCEDURES AND PROGRAMS

2.01 The Contractor is solely responsible for obtaining any procedures from LAWA prior to commencement of Work and hereby releases LAWA from any and all claims based upon its failure to either become familiar with the governing procedures and programs or its failure to comply with them.

2.02 Contractor is responsible for obtaining copies of any and all approved O&M manuals, drawings, updates, and other documents required to perform all services to the referenced systems called for in this Service Agreement.

2.03 Contractor shall have hardcopy prints of all manuals, drawings, etc. at all times, and update as needed to reflect operation of new or modified systems.

2.04 Any document referenced in this Service Agreement shall become part of the Service Agreement documents.

SC-3. SUBMITTALS

3.01 Contractor shall submit the following documentation at the time specified during the term of the Service Agreement and in accordance with the following submittal deadlines. Prepare all documents in the English language.

a. Contractor's Safety Plan and Drug Policy – Prior to start of any work.

b. Problem Reports - On a monthly basis

c. Maintenance Reports - On a monthly basis

d. Invoices – No later than 10 days from the first day of each following calendar month

SC-4. TERM OF SERVICE AGREEMENT

4.01 The term of this Service Agreement shall be for the five year period commencing immediately upon expiration of the 1-year Warranty for each unit.

SC-5. WORKING HOURS

5.01 Unless restricted elsewhere in the Service Agreement Documents, or directed by LAWA in writing, the normal working hours for services performed while the units remain in service are 8 a.m. to 4:30 p.m., 7 days a week for the term of the Service Agreement.

5.02 Normal working hours for services requiring the units to be taken out of service are 10:30 p.m. to 6:30 a.m., 7 days a week for the term of the Service Agreement. All units shall be returned to service and opened to the public by 6:30 a.m. following the maintenance or repair services. It is anticipated that 85% of the mandated PM hours will fall during this time period.

SC-6. SERVICE CALLS

6.01 The Contractor shall have staff to respond to and provide emergency services twenty-four (24) hours a day, seven (7) days a week. The Contractor shall respond within 30 minutes when the emergency call includes equipment failure, personal injury, entrapment, or potential for personal injury.

6.02 The Contractor shall also maintain an Emergency Service Call Log containing the following:

- Name and telephone number of caller.
- Description of problem and location within the Terminal where problem exists.
- Time and date call was received.
- Description of action taken to resolve the problem and time and date action was taken.

SC-7. WORK RESPONSE TIME

7.01 Response time for work requirements is dependent upon work priority and shall be in accordance with the standards noted below. Any non-compliance with the specified standards and requirements may result in the Contractor being issued a written notification by LAWA.

7.02 Emergency Work: The Contractor shall have available personnel to take action at the emergency location within thirty (30) minutes following notification by LAWA or other designated official.

a. Emergency Work is defined as any mechanical, electrical or controls issue that cannot be resolved within ten (10) minutes or any mechanical problem in which the vertical transportation device is not usable by LAWA. It also includes breakdown, stoppage or loss of critical system or equipment which, if not repaired, could endanger life, safety or health of personnel or might result in the damage to LAWA property, or any condition that they may exist which LAWA determines requires immediate response.

SC-8. NOT USED

SC-9. OPERATION OF VEHICLES

9.01 Contractor's ability to park at Terminals is controlled by LAWA. LAWA shall permit the Contractor and its personnel, during the effective period of Service Agreement to purchase parking pass cards to park motor vehicles used by it exclusively in its operations hereunder in the designated parking lots. The Contractor shall comply with such existing rules, regulations and procedures as are now in force and such reasonable future rules, regulations and procedures as may hereafter be adopted by the LAWA for the safety and convenience of persons who park automotive vehicles in any parking area at the airport or for the safety and proper identification of such vehicles, and the Contractor shall also comply with any and all directions pertaining to such parking which may be given from time to time and at any time by the Airport Manager. LAWA shall have no responsibility of any kind whatsoever, including, without limitation thereto, the loss, theft, destruction or damage to said vehicle or any contents therein, in connection with the permission granted to the Contractor to park its motor vehicles. No other rights or privileges in connection with parking of motor vehicles at the Airport are or shall be deemed to be granted to the Contractor under Service Agreement.

9.02 Each vehicle or unit of equipment that travels, operates or delivers materials in any restricted area of the Airport shall comply with the regulation set forth in Appendices B, C and D.

SC-10. UNIFORMS

10.01 The Contractor shall provide its personnel with all necessary distinctive uniforms and identification badges and woven identification insignia of a type and style which shall be subject to the prior and continuing approval of C&M. Contractor's employees shall wear these uniforms and identification badges or insignias at all times while performing the operations hereunder. The Contractors' employee shall be neat, clean, and professional in appearance.

SC-11. WORKMANSHIP AND MATERIALS

11.01 All repair and replacement materials, parts, and equipment furnished by the Contractor in the Work shall be new, high grade, of the same manufacture and type as material and items being replaced and free from defects. Materials and work quality not conforming to the requirements of the Specifications shall be considered defective and will be subject to rejection. Defective work or material, whether in place or not, shall be removed immediately from the site by the Contractor, at its expense, when so directed by LAWA.

11.02 If the Contractor fails to replace any defective or damaged work or material within 10 days after reasonable notice, LAWA may cause such work or materials to be replaced. The replacement expense shall be deducted from the amount to be paid to the Contractor.

SC-12. OWNER-FURNISHED MATERIALS AND EQUIPMENT

12.01 The Contractor shall maintain all required Spare Parts at all times with, at a minimum, quantities of spare parts equal to or greater than that which are present at the start of the Service Agreement, and as specified by the OEM O&M Manual, or as directed by LAWA. The cost of all Non-Warranty Spare Parts replacement shall be invoiced back to LAWA in accordance with General Provisions.

12.02 The Contractor shall be responsible to accurately record spare parts purchases and inventory at all times.

12.03 At time of acceptance of materials from LAWA, Contractor shall sign a receipt. Signing of such receipt without reservation therein shall preclude any subsequent claim by the Contractor that any such items were received from LAWA in a damaged condition and with shortages. If at any time after acceptance of any such item from LAWA any such item is damaged, lost, stolen or destroyed, such item shall be repaired or replaced at the expense of the Contractor.

12.04 Upon completion of the 5-year Service Agreement, Contractor shall, at its expense, return all surplus and unused materials and parts to LAWA.

SC-13. CONTRACTOR SUPPLIES

13.01 The Contractor shall furnish all incidental supplies, materials, tools, and equipment necessary for the performance of the work in the Service Agreement, unless otherwise specified. The costs for these incidentals shall be inclusive of this Service Agreement.

SC-14. FACILITIES USED BY THE CONTRACTOR

14.01 General

a. Limited facilities such as storage and workshop space may be furnished by LAWA. The Contractor shall be fully responsible and liable for the facilities made available to it, to include security, loss or damage thereto. This responsibility includes the observance of safety, security and sanitary directives. Facilities built or installed by Contractor must be removed at termination of the Service Agreement, unless the Contractor and LAWA agree to their presence. The Contractor may not use any LAWA facilities other than those specifically provided. In case of break-ins, the Contractor shall notify Airport Police immediately upon discovery and assist in determining loss. Notwithstanding this paragraph, in no instance is the Contractor made liable for loss or damage of LAWA furnished facilities when the loss or damage was not caused by Contractor's negligence.

b. Access to Premises: The Contractor shall not permit any unauthorized access to individuals to the work area, and shall enforce all applicable LAWA orders, rules, regulations, and instructions. These requirements shall also be applicable to all individuals with regard to access, removal, and/or possession of classified data, materials, supplies, equipment and all LAWA owned property at the locations designated in Service Agreement. Access to FIS areas is controlled by the Federal Agencies and subject to their rules and restrictions. Contractors' employees working in the FIS areas are subject to extensive background checks by these Agencies.

c. Equipment and materials located on the Airport, but not being used, shall be left at locations to be designated by LAWA. All other operations of the Contractor shall be confined to the areas authorized or approved by LAWA. Areas adjacent to the work will be made available for temporary use by the Contractor, without cost, whenever such use will not interfere with other purposes. The Contractor shall be liable for any damage caused to such premises. The Contractor shall restore areas used for operations or for storage, and all areas adjacent to the work, to their original conditions.

14.02 Cleaning of Site: The Contractor shall be responsible for keeping the work site clean and neat. As necessary, debris shall be removed to an approved disposal location. Areas used by the Contractor during its work shall be cleaned daily before leaving the job site. Items saturated with combustible fluids shall be stored in tightly sealed metal containers and removed from the Work location. Paints and thinners shall not be poured into Terminal drains, lines or sewers. Paint, dirt and other stains on surfaces of Terminals, which are caused by the Contractor's work, shall be carefully removed and the surfaces cleaned. All areas used by the Contractor shall be left in a clean and neat condition.

SC-15. NOT USED

SC-16. NOT USED

SC-17. NOT USED

SC-18. BASIC MAINTENANCE REQUIREMENTS

18.01 General

a. The Contractor shall facilitate proactive preventive maintenance, maximize equipment life and maximize beneficial usage of the vertical transportation equipment covered by this Agreement. Contractor expressly acknowledges that City is relying on CONTRACTOR'S professional expertise and knowledge of covered equipment in the performance of Services to achieve desired results.

b. The Contractor shall provide the EPRM of the vertical transportation systems installed in this Service Agreement in conformance with the LAWA approved O&M Manuals. Services shall strictly comply with all services necessary to maintain the equipment in proper working order for use at a major international airport, and in coordination with LAWA.

c. The Contractor shall be responsible to provide (employ) Senior / Supervising Maintenance Technicians that are licensed elevator mechanics. The Contractor must also possess a valid C-11 Contractor's License. The Contractor shall be responsible for all labor, personnel and employee costs.

d. The Contractor shall be capable of operation, maintenance, trouble-shooting, updating and repairing the equipment computer systems and software.

e. The Contractor shall be responsible for the procurement of all tools and equipment required to perform preventative maintenance and repair functions. Any tools that are required to perform specific maintenance tasks on OEM supplied equipment will be supplied by the OEM as part of the equipment supply and installation. The Contractor shall be responsible for all contracted goods and services.

f. The Contractor shall be responsible to coordinate and cooperate in all respects with LAWA, the user airline, and/or their representatives in the performance of the Contractor's work. EPRM and non-scheduled maintenance tasks shall be coordinated with and scheduled in concurrence with LAWA. The Contractor shall be required to submit a preventative maintenance schedule to LAWA for review.

g. The Contractor shall be responsible for ensuring that the Contractor's personnel follow Customs and Border Protection (CBP) rules and requirements when working in Customs areas.

h. The Contractor shall be responsible for all sundries and components, lubricants, supply and inventory costs.

i. The Contractor shall be responsible for all safety equipment costs.

j. The Contractor shall be responsible for all license fees and expenses.

k. The Contractor shall be responsible for all office supplies, equipment and expenses.

l. The Contractor shall be responsible for all computers, printing, photographs, records, documents and report expenses.

m. The Contractor shall be responsible for all telephone, radio and communication expenses.

n. The Contractor shall be responsible for all Contractor facility and utility expenses.

o. The Contractor shall be responsible for all vehicle expenses.

p. The Contractor shall be responsible for all travel time and travel related expenses.

q. The Contractor shall be responsible for all excise taxes and fuel surcharges.

r. The Contractor shall be responsible for any and all other payments, costs and expenses associated with the Contractor's complete fulfillment of the requirements and obligations as set forth in this Agreement.

18.02 Basic Maintenance Requirements

a. Service Agreement tasks include, but are not limited to:

1. Inspection of completed installation and Periodic testing, as defined by ASME A17.1 and at ASME A17.1-1996 intervals, to maintain each Moving Walk/Elevator/Escalator ("Unit(s)") in completely operable, like new condition.
2. Provide preventative maintenance on each elevator at least monthly for a minimum of four (4) hours. (Total On-Site Time). Provide monthly documentation of the same to LAWA.
3. Provide preventative maintenance on each escalator and moving walkway at least a minimum of four (4) hours each two weeks. (Total On-Site Time). Provide monthly documentation of the same to LAWA. An external review of comb plates and skirt/step clearances will be performed weekly.
4. Periodic lubrication of parts and equipment components as per OEM's recommendation. Charts are to be provided for each Unit indicating when services are provided.
5. Perform work without removing Units from service during peak traffic periods determined by LAWA as 7:00 a.m. to 10:30 p.m. daily.
6. Unlimited regular time callbacks are included with a required response time of one (1) hour. Regular time will be Monday through Friday, 8:00am to 4:30pm, exclusive of holidays. Overtime\Premium time call backs originating from an operational error related to the performance requirements of the equipment shall be borne by the Contractor.

7. Annual clean down of the Units, drip pans, pits, hoistways, pallets, hydraulic pumps and components, and all interior parts is required. Make necessary arrangements with LAWA in order to minimize any inconvenience.
8. Annual tests and confirmations that the Controllers and control systems are functioning properly for each Unit.
9. Reporting: Detailed monthly records of tasks performed including names of individuals performing the tasks, date and time performed, and other pertinent data. Contractor is required to conform to the requirements of LAWA's maintenance system.
10. Five-year, full load, full speed tests of buffers ,governors and safeties.
11. Five year pressure tests on hydraulic elevators.
12. Monthly Testing of Phase I and Phase II Firefighter's Service.

b. Routine Maintenance - Activities such as routine inspections and tests designed to identify any unusual or abnormal equipment condition.

c. Preventative Maintenance ("PM") - Activities required to keep the Units operating at the prescribed levels of safety, efficiency and reliability as defined in the O&M Manuals and installation specifications, which are performed on a regular basis at specified intervals. Preventative measures shall also include cleaning the surrounding area as required to keep Units free from any trash, dirt and/or debris.

d. Non-Scheduled Maintenance - Any corrective measure or repair necessitated by an inspection, a failure, or unusual circumstances adversely affecting the normal equipment operation. Non-scheduled maintenance may be required as a result of unsatisfactory conditions discovered during an inspection.

e. Ordinary Wear - Any corrective measure or repair that may be required because of ordinary wear.

f. Other Maintenance - Maintaining updated maintenance manuals, maintenance of testing equipment and tools, maintaining wiring diagrams, cleaning of equipment and equipment areas.

g. Hours Available for Maintenance Functions – shall be as stated in SC-5 and SC-18, or as approved by LAWA.

h. Repair and Replacement of Damaged Parts, Components or Materials

1. Contractor shall promptly repair and/or replace damaged parts, components or materials, regardless of the cause of such damage. Any and all replacement parts must be new and unused. LAWA will reimburse the Contractor for the cost of such repairs and replacements, in accordance with GP, where the need for the repairs did not result from:
   i. The routine operation and maintenance of the system.
   ii. The careless or negligent acts or omissions of the equipment OEM, Contractor's employees, suppliers, agents or subcontractors. There shall be no separate reimbursement for repairs or replacements for items covered by the warranties or guarantees provided by the OEM.
   iii. Normal wear and tear.
   iv. Contractors negligence.
2. LAWA requires the Contractor to provide sufficient resources to promptly repair the systems at all times.

3. Any additional costs not associated with this Service Agreement must be approved in advance by LAWA.

i. Replacement of Materials

1. If it is necessary for the Contractor to replace any materials, parts or components under this Service Agreement and LAWA is responsible for the cost, the Contractor shall first submit to LAWA, for approval, the name of the item, identifying number and quantity required, name of the proposed supplier and the proposed cost, and the amount that the Contractor intends to bill LAWA. LAWA's written approval is required before the purchase of any parts, components or material shall commence unless, if in the Contractor's opinion, it is needed to keep the Units in operation or is required to comply with any LAWA, city, or national safety requirements. Cost submittal shall be provided within 24 hours of equipment shutdown.

j. Testing Required By Applicable Codes and Agreement Documents:

1. The Contractor shall act as the City's agent for conducting or assisting in the conducting of all Authority Having Jurisdiction and Consultant tests and inspections required for vertical transportation equipment as part of this Agreement. Testing hours shall be at the sole cost and expense of Contractor.

i. Periodic tests:

(a) Contractor shall perform periodic tests as required by the ASME A17.1-2007 Safety Code for Elevators and Escalators at intervals dictated by ASME A17.1-1996, including compliance with the ASME A17.2.1 2007 Inspectors' Manual.
(b) Conduct monthly inspection and testing of the firefighters' service. Maintain test log in each machine/control room. Conduct semi-annual testing of emergency and standby power operation.
(c) When testing is required during working (See SC-18) hours, CONTRACTOR shall coordinate with the City and Code authorities as to minimize disruptions of service to the Airport. City retains the right to have testing performed during non-operating hours when possible.
(d) When required by Local Code Authority or LAWA's Representative, assist in Routine and Periodic inspections and audits of equipment at no additional cost to City.
(e) Provide Routine and Periodic inspections of escalators and moving walks per ASME A17.1, Sections 8.6.8 and 8.11.4. Frequencies shall be as described in ASME A17.1-1996.

2. Complete all repairs found to be necessary as a result of the above examinations, inspections and tests.
3. Inspection and Approvals: The Services shall be subject to inspection and approval by City or City's Representative and all applicable governmental authorities; provided, however, in no event shall any such inspection and/or approval by City or Representative of the City constitute an assumption of Contractor's duties and obligations or a waiver or release of liability or a release of any other obligations whatsoever of Contractor with respect to the Services performed by Contractor pursuant to this Agreement.

SC-19. REPORTS

19.01 Unless specified elsewhere in the Service Agreement, the following are minimum reports to be submitted to LAWA monthly:

1. Completed PM tasks
2. Preventative Maintenance Inspection Sheets and Maintenance Logs
3. Emergency Service Call Log
4. All records of maintenance, repair, testing, alteration, callback, etc., required by this Agreement, shall be kept in a computerized maintenance management system that can be accessed by City at any time during the Agreement. Hard copies of documents shall be made available within 48 hours of City's request.
5. Conduct monthly operational examinations and provide a written report thereof with a copy to the City.

SC-20. QUALITY CONTROL

20.01 The Contractor shall establish and maintain a complete QC program that is acceptable to LAWA and assures the requirements of Service Agreement are provided as specified. The QC Program shall be implemented on Service Agreement start date. A copy of the Contractor's QC Program shall be submitted to LAWA prior to start of work.

20.02 The Contractor's QC Program shall include the following:

a. An inspection system covering all the tasks and services to be provided by the Contractor. It shall specify areas to be inspected on a scheduled or unscheduled basis, the manner in which inspections are to be conducted and the individual who will do the inspection.

b. A method of identifying deficiencies in the quality of services performed before the level of service becomes unacceptable.

c. A file of all inspections or tests conducted by the Contractor, to include any corrective actions taken. This file shall be subject to LAWA review at all times during the performance of Service Agreement. The file shall be property of LAWA and shall be turned over to LAWA upon completion or termination of Service Agreement.

d. QC program shall be in compliance with Contractors, LAWA approved, Maintenance Control Program. The Code required Maintenance Control Program shall be posted in each machine/control room.

e. Codes and Ordinances:

1. All the work covered by these specifications is to be done in full accord with the state and local Codes, and ordinances as are in effect at the time of the execution of the contact and the ASME A17.1-2007 elevator safety orders. All of the elevator/escalator/moving walk related requirements of the local Building Department are to be fulfilled by the Contractor except for inspection fees.

2. The Contractor shall also provide maintenance and/or repairs to comply with any violation of the Governing Agencies and recommendations of casualty companies on due notice from the City, provided that such violations or recommendations did not exist prior to the date of the Agreement or after issuance by either party of any 30 or 90 day cancellation notice. Upon award of this Agreement any pre-existing condition falling within the scope of this Agreement will be covered. The requirement of any new attachments or parts on an elevator, escalator or moving walk, in addition to those on the now existing equipment, shall be the responsibility of the City.

f. Certificate of Inspection/Permit To Operate:

1. State or City inspection fees shall be paid by the City. Fees for re-inspection due to failure to eliminate deficiencies covered by this maintenance Agreement will be paid by the Contractor.

g. City's Right To Inspect and Require Work:

1. City reserves the right to make such inspections and tests whenever necessary to ascertain that the requirements of this AGREEMENT are being fulfilled. Deficiencies noted shall be promptly corrected at Contractor's expense. In no instance shall CITY be liable for the frequency or sufficiency of such inspections or tests.
2. If Contractor fails to perform the work required by the terms of this Agreement in a diligent and satisfactory manner, City may, after ten (10) days' written notice to Contractor, perform or cause to be performed all or any part of the work required hereunder. Contractor agrees that it will reimburse City for any expense incurred therefore, and CITY at its election may deduct the amount from any sum owing Contractor. The waiver by City of a breach of any provision of this Agreement by Contractor shall not operate or be construed as a waiver of any subsequent breach by Contractor. If the City so desires, a qualified Elevator Consultant reasonably acceptable to both parties may be retained by City to mediate any disputes.

h. Labor Laws:

1. The Contractor performing work under this Agreement shall comply with applicable provisions of all federal, state and local labor laws, and Union Labor Agreements.
2. Contractor hereby indemnifies and saves City and/or City's Representative from and against any and all costs, liabilities, and actions arising out of the violation or alleged violation of, or the non-compliance with or alleged non-compliance with, any Labor Laws and or Union Labor Agreements.