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.

NOTE: All new elevators shall be machine less room type units unless specifically approved by LAWA.

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 including intrusion detection systems and ACAMS, and data transmission to the Facilities Management Control System (FMCS) will be incorporated into the passenger conveyances work. Coordinate with the CCTV, security system including intrusion detection systems and ACAMS, and data transmission to the Facilities Management Control System (FMCS) contractors to incorporate CCTV, security system including intrusion detection systems and ACAMS, and data transmission to the Facilities Management Control System (FMCS) and interface requirements during the course of the Work.

NOTE: During any retrofit or demolition, 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.

NOTE: Specifics in this section are not meant to supersede sections of the Guide Specification for other trades the more stringent requirement shall apply.

1.2 DEFINITIONS

A. Vertical Transportation (VT): shall be used to refer to elevator, escalator or moving walk units.

1.3 PERFORMANCE REQUIREMENTS

A. Refer to specific equipment specifications sections for VT performance requirements.

B. Related work 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.

NOTE: Glass hoistways shall be designed without fascia, and special coordination made with all applicable trade for the construction.

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 self-locking governor access door and access means.
   h. Fire sprinklers.

3. Elevator Electrical Service, Conductors and Devices:

   a. Lighting with guard 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 (Category 6 cable) to each individual elevator control panel in elevator controller space.
   e. 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.
   f. Temporary power and illumination to install, test, and adjust elevator equipment.
   g. Category 6 (distance≤300 feet) or Fibre Optic (distance >300 feet) Ethernet connection and junction box in each elevator machine room space.
   h. 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.
   i. Conduit/Cabling 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.
   j. 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.

k. 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.
l. Single-phase power feeders to main control console and firefighters' control panel.
m. Single-phase power feeder to elevator intercom amplifier in the elevator controller space.
n. Single-phase power feeders to controller(s) for CCTV with lockable "open" disconnecting means.
o. Illumination level in elevator lobbies of elevator threshold.
p. IT infrastructure installation must comply with LAWA's most current Information Technology Infrastructure Standards of Practice from the closest wellway of each elevator group or single escalator to the firefighters' control room and/or the control console, utilizing protocols that are Layer 3 compliant.

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.

NOTE: Design of cladding and finishes shall consider the area below the escalator to eliminate unusable areas and the interface with adjacent finishes by other trades.

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. Lighting 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. Supports, conduit and wall blockouts for remote controller installations.
d. Illumination at escalator landings and along the entire escalator run.
e. 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.
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 space.
h. Single phase copper power feeder to each lower end intermediate location, and upper end escalator pit for step/under handrail lighting with individual protected, lockable "open", disconnect switch located in machine room space.
i. IT infrastructure installation must meet or exceed LAWA’s most current Information Technology Infrastructure Standards of Practice, utilizing protocols that are Layer 3 compliant.

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. Lighting 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. Supports, conduit and wall blockouts for remote controller installations.
d. Illumination at landings and along the entire moving walk run.
e. 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.
f. Temporary power and illumination to install, test, and adjust moving walk equipment.
g. Category 6 (distance≤300 feet) or Fibre Optic (distance >300 feet) Ethernet connection and junction box in each moving walk machine room space.
h. IT infrastructure installation must meet or exceed LAWA's most current Information Technology Infrastructure Standards of Practice, utilizing protocols that are Layer 3 compliant.
i. Single phase copper power feeder to each lower end intermediate location, and upper end moving walk pit for step/under handrail lighting with individual protected, lockable "open", disconnect switch located in machine room space.

1.4 QUALITY ASSURANCES

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, escalators and moving walks that are similar to those indicated for this Project in material, design, and extent.

E. Source Limitations: Obtain escalators, elevators and moving walks specified for this Project through one source from a single manufacturer.

F. 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 (S_{DS}), 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.
10. APTA Guidelines for Heavy Duty Transit Type Escalators/Moving Walks

G. 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 Walks:

   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 unit machine space to all electrified escalator/moving walk 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. 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 two single-mode fibre traveling cables for CCTV equipment in the car. Provide two pair 14 gauge wires for CCTV power. In a separate traveling cable provide 4pair of spare conductors, 10%, minimum, for each type of conductor provided in the main traveling cable. 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. Prevent traveling cables from rubbing or chafing against hoistway or car items.
   c. Non-traveling cable hoistway wiring shall be run in tubing, conduit, or electrical wireways.
   d. 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.

H. 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. Refer also to Section 3.5 of this specification for additional requirements.

I. Manufacturer Labeling: Names, trademarks and other identifying symbols shall not be permitted on surfaces visible to the public.

J. Unit Identification: Provide permanent phenolic labeling with mechanical fasteners at each landing with the unit identifier as approved by LAWA.

K. Obtain and pay for permits, fees, licenses, and inspections necessary to complete the vertical transportation installations.

L. Temporary Use: Do not use vertical transportation components during construction period, unless permitted in writing by LAWA.

M. Factory Visit

1. The Installer shall provide for the costs of up to three of LAWA’s representatives to visit the factory where the VT units are being manufactured, per contract, per unit type.
2. Installer shall not ship the VT units without the approval of LAWA’s representative after the conclusion of the factory visit.

N. Mock Ups: Build mockups in the Installer’s factory identified for the factory visit required by these specifications. Obtain Architect’s approval of mockups before constructing for installation

1. Escalators: Provide full scale mockup of glass balustrades, handrails and handrail lighting. Mockup shall be a minimum eight feet long with fully functional lights.

2. Elevators: Build full scale cab mockups for each elevator type to verify selections made under sample and shop drawing submittals to demonstrate typical joints, surface finish, texture, tolerances, and standard workmanship. Build mockups to comply with the following requirements, using materials indicated for the completed work:

1.5 SUBMITTALS

A. Senate Bill 1886 Submittals: Provide copies of all Code Authority/Permit submittals to the Architect.

B. 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.

C. 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.

D. 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.

E. Submit copies of Installer qualifications.

F. 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, cable risers, single line diagrams 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.

G. Submit training outlines for each unit type. Include in the outline the topics to be reviewed and the approximate time required for each topic.

H. Materials, And Tools: General: Prior to acceptance for use of the elevator/escalator/moving walk installation, provide, for each unit, written information and diagnostic tools necessary for proper maintenance and adjustment of the equipment, as follows:

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. Provide three (two copies and one mylar reproducible) copies 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.
3. Provide three copies of all "final" construction and installation drawings.
4. 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.

5. 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.
6. 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, networking, monitoring, 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.
14) Adding the elevators, escalators and moving walkways into the Monitoring system.

I. 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.

1. 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.

NOTE: Where a projects will be turned over to LAWA in multiple phases the warranty shall start at the end of the final phase. The contractor shall be responsible for warranty and preventative maintenance as required by contract during this interim period.

J. Submit Manufacturer's Warranties procedures.

K. Preventive Maintenance Contract Documents required prior to acceptance for use:

1. Preventive Maintenance Contract: Furnish properly executed contract for continuing, preventive maintenance. Utilize contract form provided, by LAWA.

2. 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.

L. Test Reports: Submit test results to governing authorities and to LAWA. Include computer generated events and results.

M. Maintenance and Operating Instructions: Submit six (6) sets of maintenance manuals. Each manual shall include operation and maintenance instructions, parts lists 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:

1. Procedures for adjusting brake, handrail tension, handrail chain drive tension, step and pallet chain tension, track system, and mechanical components, including pictorials.
2. Instructions for removing floor plate, replacing comb segments, and removing and installing steps and pallets.

N. Maintenance Log: Upon completion of the installation submit and provide 1 copy of the following in each machine room:

1. 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.
2. 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.
3. Fire firefighters service test log for each elevator to comply with the requirements of the code.
4. Hydraulic elevator oil usage log, to record all hydraulic oil added to the system. Log to include reason for loss of hydraulic oil.
5. 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.

O. All ‘as-built’ record drawings, wiring diagrams, parts manuals, catalogs, instructions, keys, etc. shall be submitted before final payment.

P. 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.

1.6 JOB CONDITIONS

A. Temporary Use: Do not use vertical transportation components during construction period, without permission in writing from LAWA.

1.7 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.

1.8 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.

1.9 INSTALLATION CONTRACT ACCEPTANCE, WARRANTY, INTERIM SERVICE AGREEMENT AND SERVICE AGREEMENT

A. Elevator/Escalator/Moving Walk One (1) Year Maintenance Agreement: Provide full preventative maintenance service of the VT equipment for a period of 12-months from the date of acceptance by LAWA, to run concurrently with the Warranty. This service shall include a monthly examination of each elevator, of not less than 4 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.

   a. 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: One 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 during regular working hours.
   d. 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.
   e. Maintain a preventative maintenance checklist in the machine room to itemize individual component parts, as determined by the original equipment manufacturer and approved by LAWA, 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.

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 manufacturer's renewal parts.

g. Examine, inspect, properly adjust, clean, lubricate, and if conditions warrant, repair or replace, all mechanical, structural and electrical elevator 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) 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.

h. 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) Escalator/Moving Walk tracks, chains, chain and step/pallet rollers, handrails, steps, pallets and safety devices.
5) Handrails, brush guards, guide rollers, and alignment devices.
6) Stop switches and related components.
7) Conductor cables and wiring.
8) Truss, steps, step treads, pallets, wheels, rollers, axle bushings, comb plates and tracks.
9) All sprockets, chains and bearings.
10) Demarcation lighting.
11) Safety switches.
12) Step Demarcation
13) 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

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, and 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. 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.

l. 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, and 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.

m. 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.

n. 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.

o. 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, expenses, and supplies which occur as a result of the stated repair.

p. 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.

1.10 EXTENDED PREVENTATIVE AND ROUTINE MAINTENANCE SERVICE AGREEMENT

A. Coordinate Elevator/Escalator/Moving Walk Extended Five (5) Year 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. Comply with requirements of Attachment A

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:
   1. Monitoring System
   2. Power Saving Control for Escalators and Moving Walks
   3. Secondary Fire Recall / Remote Recall for Elevators

B. 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, by authorities having jurisdiction and as referenced below:

1. Elevators, Escalators and Moving Walks: Comply with ASME 17.2 “Inspectors Manual for Elevators, Escalators and Moving Walks” procedures:
    a. Full Load Run Test: Run each elevator continuously a minimum of four (4) hours without faults, with full specified rated load, during which time the car shall be stopped at each landings and the doors shall open and close. This test shall be witnessed by LAWA.
    b. Speed Test: Make tests before and after each full load tests. 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:

        1) Ascending and Descending Car Speed not more than 10 percent above or more than 10 percent below required speed.
        2) 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.
        3) 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

    c. Contractor shall perform the following tests, as required by the AHJ on each escalator / moving walk without load:

        1) Comb impact device shall be tested and calibrated with an appropriate scale at both ends of the unit 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.

    d. Contractor shall perform the following tests, witnessed by LAWA on each escalator / moving walk without load:

1) Forty-eight Hour Test: After the passing the acceptance tests required by the AHJ, each escalator/moving walk shall be operated continuously for 48 hours, reversing direction every 12 hours, with no faults. If any fault occurs that shuts the unit down, the fault shall be corrected; and a new test shall be started until such time as it can be completed with no faults.

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/moving walk 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/moving walk brake torque tag.
6. Affix metal 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 routine 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. Provide 8 hours of training per each shift (three) for each type of conveyance.

B. Make a final check of each of vertical transportation units 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

A. Per project design drawings and specifications.

END OF SECTION 14 20 00

SECTION 14 21 00 - HEAVY DUTY TRANSIT TYPE MACHINE ROOM-LESS ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes APTA 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 PERFORMANCE REQUIREMENTS

A. General: Refer to Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL.

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 Vertical Transportation, General - 14 20 00-1.4G.

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 SUBMITTALS

A. Refer to Section 14 20 00, 1.5.

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 in an electronic form in either AutoCAD2014 or BIM format.
10. Monitoring system riser diagram

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 in an electronic form in either AutoCAD2014 or BIM format.
14. Monitoring system manuals and As-built drawings

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.

1.6 JOB CONDITIONS

A. General: Refer to Section 14 20 00, Vertical Transportation, General.

1.7 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.

1.8 COORDINATION

A. General: Refer to Section 14 20 00, Vertical Transportation, General.

B. Coordinate installation of, VT equipment with integral anchors, and other items that are embedded in concrete or masonry for VT equipment. Furnish templates, sleeves, escalator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.

C. Coordinate sequence of VT installation with other work to avoid delaying the Work

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, starting at the Contract Completion Date, a 1-Year Preventative Maintenance ("PM") service for all units.
2. When units are accepted by the Project in phases the Contractor shall provide an Interim Preventative Maintenance ("IPM") service for all units, starting from the Beneficial Use Date and continuing to the Contract Completion Date.
3. 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, 1.5 L-M and Exhibit A, for all units installed in this Contract.
4. 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, IPM 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 per unit 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. During the warranty period, unlimited any time callbacks are included with a required an on-site arrival time of one (1) hour. 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, 1.5L-M and Exhibit A.

1.10 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, 1.5 L-M and Exhibit A shall govern the SA and the Extended SA.

1.11 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.

1.12 LAWA INSTRUCTION/DEMONSTRATION AND COORDINATION

A. The manufacturer shall provide eight (8) hours/shift 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 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: passenger units – as specified; service units - SS checker.

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	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	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 via Category 6 cabling
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 LAWA does not allow modems to be used.
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. Security Operation: Provide integration and communication with ACAMS controller(s) when in security mode of operation. For elevators that access secure floors, provide car and hall call constant pressure operation. After presenting badge to ACAMS reader, car or hall call buttons must be continuously pressed until the car arrives at the landing.

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 with integration and communication with 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 rails through car shell. Provide backing plates and captive nuts.
10. Provide ¼" thick x 8" flat stock, with #4 SS finish, center mounded at 10" above finished cab floor. Bolt bumper rails through car shell. Provide backing plates and captive nuts.
11. Bases: Provide a 4" high base. Finish as shown in Architect's drawings.
12. 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.

13. 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. Monitoring System

1. General: Provide an interactive system to monitor and manage the VT equipment ("units"), hereinafter called "system". IT infrastructure installation must comply with LAWA’s most current Information Technology Infrastructure Standards of Practice, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation. System shall be compatible with other building monitoring systems. Systems shall be capable of accommodating multiple elevator control systems from various manufacturers. Real-time data collection, data storage and 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, Lift-Net, etc.
    c. Expansion capability to add unlimited number of monitoring terminals on the network.

d. Monitoring terminals and controllers must be installed using redundant network architecture and high availability.

e. Complete backup and restore of data must be available according to LAWA's Information Management Technology Group's standard, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation..

f. Display multiple banks, including multiple buildings, on a single monitoring terminal screen.

2. Monitoring Display: The system shall be capable of simultaneous monitoring at least five hundred units on a single monitoring station utilizing a graphical representation of a plan view of the facility. Each unit 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 will 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 unit 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. The system will be capable of interfacing with the California State's Earthquake Early Warning System.

f. The system shall be capable of interfacing with other building/campus monitoring and management systems via the LAWA network. Configuration of the

Monitoring system shall be coordinated with LAWA prior to deployment for VLAN assignment, IP address mapping, etc.

g. 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.

h. The system will automatically re-boot the program and continue to operate after a power loss or other system malfunction.

4. Monitoring Equipment: IT infrastructure installation must comply with LAWA's most current Information Technology Infrastructure Standards of Practice, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation. 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) Internal hard drive - adequate storage for three years data for entire system
      3) Modem - most current high-performance
      4) Display monitor (19" - 20" LCD flat panel)
      5) Printer - current HP Color Desk Jet Series
      6) Keyboard - MS Windows compatible
      7) Mouse - MS Windows compatible

   b. Machine Room Hardware (Retained Control):
      1) Compatible with all types and makes of controllers
      2) Modular design - capable of future expansion

   c. Monitoring Station Operating System Software
      1) MS Windows

5. Network requirements: IT infrastructure installation must comply with LAWA's most current Information Technology Infrastructure Standards of Practice, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation.
   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, RS232, Ethernet, Lift-Net, single-mode Fiber-Optic and mixed WAN TCPIP Network, utilizing protocols that are Layer 3 compliant.
   f. Network switches shall be Cisco managed switch models
   g. Any network device to be installed on the monitoring system shall have a unique MAC address.

6. Monitoring Requirements: The system shall display and record the following information for each monitored unit. Data may include many more points. Items listed below are minimum requirements.

   a. Elevators:

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.
17) Power on/off
18) Disconnected motor safety device
19) Top stop switch #T
20) Pit stop switch #B
21) Tandem operation
22) Cumulative run time
23) Pit high water level (Pit Float Switch)
24) Run Timer Fault – car was on a Floor to floor run. The car ran for a preset adjustable time (normally 25 seconds) without passing a floor.
25) Relevel Run Timer Fault. The car ran for a preset adjustable time without passing a floor. The car was not running between floors.
26) Run Sequence Fault A. The Drive On input was off while the car was running.
27) Run Sequence Fault B. The Safe input was on while the car was running.
28) Run Sequence Fault C. The Brake Micro Switch input was on while the car was running.
29) Run Sequence Fault D. The Emergency Brake Micro Switch input was on while the car was running.
30) Run Sequence Fault E. The Safe input was off while the car was stopped.
31) Run Sequence Fault F. The Drive On input was on while the car was stopped.
32) Run Sequence Fault G. The Em Brake Safe input was on while the Emergency Brake output was on.
33) Run Sequence Fault H. The Em Brake Safe input was on while the car was running.
34) Run Sequence Fault I. The Em Brake Safe input was off while the Emergency Brake output was off.

35) Leveling Fault. Initiated when the car has been leveling for more than 15 seconds, or if the car is oscillating at the floor, bouncing from up level to down level to up level, etc. The car is not shut down, but will not be able to relevel until the car has run to another landing.
36) Emergency Power was initiated
37) Door Open Fault A. The Doors failed to open, and the Door Close Limit Switch was broken (doors were fully closed).
38) Door Open Fault B. The Doors failed to open fully, and the Door Close Limit Sw was closed (doors partially opened).
39) Door Close Fault A. The doors failed to close properly. The Door Open Limit Sw was open (the doors were fully open).
40) Door Close Fault B. The doors failed to close properly. The Door Open Limit and Door Close Limit were both closed (the doors were partially open).
41) Door Close Fault C. The doors failed to close properly. The Door Open Limit was closed and the Door Close Limit was open, but the Car Door Contact was open.
42) Door Close Fault D. The doors failed to close properly. The Door Open Limit was closed and the Door Close Limit was open, and the Car Door Contact was closed, but the Hall Door Contact was open.
43) Door Close Fault E. The doors closed properly (DOL on, DCL off, Car and Hall Contacts closed), but the car did not run. The doors cycled to allow the car to try again.
44) Stop between Floors A – Safety String open. The car stopped outside the Door Zone, and the Stop Switch Input was off (a device in the Safety String was open).
45) Stop between Floors B – Door Close Limit Sw open. The car stopped outside the Door Zone, and the Door Close Limit was open (the car door was open).
46) Stop between Floors C – Car Door open. The car stopped outside the Door Zone, and the Car Door Contact was open (the car door was open).
47) Stop between Floors D – Hall Door open. The car stopped outside the Door Zone, and the Hall Door Contact was open (the hall door was open).
48) Stop between Floors E – Door String closed. The car stopped outside the Door Zone, and the Safety String and Door String were closed.
49) Door Zone Fault. The car stopped outside the Door Zone.
50) Car Stuck Fault. The car was held at a floor for more than 30 seconds, with calls registered. This fault does not shut the car down, but will prevent calls from initiating a re-open.
51) High Speed Counter Fault. The car exceeded 110% of contract speed.
52) High Speed Counter Fault A. The car exceeded 150fpm on Inspection.
53) High Speed Counter Fault B. The car exceeded 50fpm with the doors open.
54) High Speed Counter Fault C. The car was running the wrong direction.
55) High Speed Counter Fault D. The Tachometer signal was too low for the car speed.
56) Emergency Terminal Slowdown Detection Overspeed Switch Fault. The ETSD Sws did not operate properly.
57) Emergency Terminal Slowdown Detection Overspeed Fault. An overspeed was detected at a terminal landing.

58) Door Check Fault A. Car Door Contact was closed when the Door Open Limit was broken.
59) Door Check Fault B. Hall Door Contact was closed when the Door Open Limit was broken.
60) Door Check Fault C. Car and Hall Door Contacts were closed when the Door Open Limit was broken.
61) Rope Brake Fault. The car moved out of the Door Zone with the doors open. This fault trips the Rope Brake.
62) Drive Ready Fault. The Drive Ready Input went off.
63) Communication with the other controller(s) failed.
64) The Drive On Input went off while the car was running.
65) Up and Down Level Sws were both on at the same time.
66) Earthquake Operation was initiated.
67) The HSC OK signal to the CPU went off (if used). Cycle power, or replace the HSC card.
68) Fire Service was initiated from a Fire Sensor or the Fire Sw.
69) Machine Room Fire Sensor tripped.
70) Runaway Fault. Car exceeded 50fpm when it should not be running. This fault trips the Rope Brake.
71) FS Fault. The car tried to run Fast Speed, but did not pass a floor. After 20 attempts, the car will shut down. This can be caused by the FS relays failing to cut out Leveling, or by the car tripping the Door Contacts as the car starts.
72) Rope Brake Check Fault. The Rope Brake contacts failed their self-check, which is performed after every run.
73) Door Zone input stuck on.
74) Redundancy Fault 1A – Rope Brake. The Rope Brake Input was on while the Rope Brake Outputs were off.
75) Redundancy Fault 1B – Rope Brake Check. The Rope Brake Check Input was on while the Rope Brake Check Output was off.
76) Redundancy Fault 1C – Stop Sw Bypass. The Stop Sw Bypass Input was on while the Stop Sw Bypass Output or the terminal 3 Monitor Input was off.
77) Redundancy Fault 1D – Brake Micro Sw. The Brake Micro Switch Input was off after the car stopped.
78) Redundancy Fault 1E – Emergency Brake Micro Sw. The Emergency Brake Micro Switch Input was off after the Emergency Brake outputs dropped.
79) Redundancy Fault 1F – Emergency Brake Micro Sw. The Emergency Brake Micro Switch Input was on after the Emergency Brake outputs energized.
80) Redundancy Fault 2A. The Leveling Bypass Input was on while both Leveling Inputs were off.
81) Redundancy Fault 2B. The Leveling Bypass Input was on while both Leveling Inputs were on.
82) Redundancy Fault 2C. The Leveling Bypass Input was on while the Door Zone Input was off.
83) Redundancy Fault 2D. The Leveling Bypass Input was on while the terminal 3 Monitoring Input was off.
84) Redundancy Fault 2E. The first UD Monitoring Input was on while the car was not running or the terminal 3 Monitoring Input was off.
85) Redundancy Fault 2F. The second UD Monitoring Input was on while the car was not running or the terminal 3 Monitoring Input was off.

86) Redundancy Fault 3A. The DF Monitoring Input was off while the DF output was on.
87) Redundancy Fault 3B. The DF Monitoring Input was on while the DF output was off or the terminal 5 Monitoring input was off.
88) Redundancy Fault 3C – Door Contacts jumped. The Door Contacts Input was on while terminal 3 Monitoring Input was off.
89) Redundancy Fault 3D – Stop Switch jumped. The Stop Sw Monitoring Input was on while the terminal 3 Monitoring Input was off.
90) Redundancy Fault 3E – Car Door jumped. The Car Door Input was on while the terminal 4 Monitoring Input was off.
91) Redundancy Fault 3F – Door Contacts jumped. The Door Contacts Input was on while terminal 4 Monitoring Input was off.
92) Redundancy Fault 3G – EST jumped. The terminal 4 Monitoring Input was on while the terminal 4 Monitoring Input was off Stop Switch Input was off.
93) Redundancy Fault 4A. The Inspection Bypass for the Car Door was on while the terminal 4 Monitoring Input was off or the car was not on Inspection.
94) Redundancy Fault 4B. The Inspection Bypass for the Hall Door was on while the terminal 4 Monitoring Input was off or the car was not on Inspection.
95) Redundancy Fault 4C. The Inspection Access Bypass for the Car Door was on while the terminal 4 Monitoring Input was off or the car was not on Inspection.
96) Redundancy Fault 4D. The Inspection Access Bypass for the Bottom Hall Door was on while the terminal 4 Monitoring Input was off or the car was not on Inspection.
97) Redundancy Fault 4E. The Inspection Access Bypass for the Top Hall Door was on while the terminal 4 Monitoring Input was off or the car was not on Inspection.
98) Redundancy Fault 4F. A Manual Rescue Run Input was on while the car was not on Manual Rescue.
99) Car Lost Position. The car will run to the floor below it, until it resets floor position.
100) Brake Fault. The Brake Micros Sw indicated the Brake failed to drop. This fault trips the Rope Brake.
101) Belt Fault. The Belt Alarm Input stayed off for over 1 second.
102) Belt Fault. The Belt Alarm Input stayed on for over 1 second.
103) Belt Fault. The Belt Alert Input stayed on for over 1 second.
104) Manual Rescue. Manual Rescue was initiated.
105) The Governor tripped.
106) The car stopped on the normal terminal stopping switches in the up direction.
107) The car stopped on the normal terminal stopping switches in the down direction.
108) Normal Mode
109) Inspection Mode
110) Independent Mode
111) Seismic Mode
112) ACAMS Mode
113) Fire 1 Mode

114) Fire 2 Mode
115) Manual Rescue Mode
116) Shutdown Mode
117) Communications Failure Mode
118) Error Mode

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. Average wait-time for each hall call, in each direction of travel.
   b. Number of hall calls registered per event or time period selected.
   c. Emergency faults and events for the selected time period.
   d. Number of hall calls answered per elevator.
   e. Door dwell times.
   f. Calculated car times including: door open times, door close time, floor-to-floor time
   g. Faults per day/week/month (fault distribution on a per unit basis)
   h. Run time Vs. Down time

8. Interface to Third Party Building Management Systems: The VT monitoring system shall be capable of interfacing and exchanging data with a variety of third party building management systems including the Central Utility Plant's (CUP) Facilities Management Controls System (FMCS) and other local building systems such as Siemans, Landis & Staefa, Johnson Controls, Wonderware, SCADA, and others. Information shall be exchanged by Modbus protocol, open protocol or other suitable methods as required. Integration to FMCS shall:
   a. Provide one summary alarm point to the FMCS for each unit being monitored. Coordinate with LAWA to identify which functions monitored by the system for each unit will activate the summary alarm message
   b. Coordinate message format with LAWA and the FMCS contractor. The message shall include the unit number and location at a minimum.
   c. Communications from the unit MDS server/workstation to the FMCS server/workstation shall be over the LAWA IT Infrastructure IP network.
   d. Coordinate message protocols with the FMCS contractor. Provide software non-proprietary programming to communicate messages to the FMCS.

9. Notification Feature: The monitoring system shall be capable of notifying a service technician or other personnel based on pre-defined parameters of elevator faults or conditions. The notification 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 mobile devices 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 or internet 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.

B. 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 or internet..

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 conduits 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 ETT, 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 four pairs of CAT 6A and single mode fibre optic cables for communication, CCTV and security.
4. Provide separate traveling cables for car lighting and fan control circuits.
5. Provide traveling cable for telephone in the elevator car. Cable shall extend from junction box in hoistway to telephone box in car.
6. Provide traveling cable for car work lights.
7. In a separate traveling cable, provide 10 percent spares, but not less than 4 spare pairs of each conductor type.
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: Coordinate with the Owner a minimum of five (5) working days prior to each scheduled test.

3. Full Load Run Test: Run elevator continuously without fault a minimum of four (4) hours with full specified rated load, during which time car shall be stopped at each landing and doors shall be opened and closed.

4. Speed Test: Make tests before and after full load tests. 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 elevators does not conform to the requirements of the contract specifications or the Safety Code, no approval or acceptance of elevators 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 elevators will be re-inspected. Rejected elevators 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 elevators. Provide a minimum of 8 hours of training for 3 shifts.

B. Check operation of elevators with LAWA's personnel present and before date of Completion. Determine that operation systems and devices are functioning properly.

C. Check operation of elevators 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. Provide APTA compliant heavy duty, high-traffic, transit type interior escalators.

B. Building Management Systems (BMS) components will be incorporated into the escalator work. Coordinate with the BMS component contractors to incorporate BMS components during the course of the work.

C. Single Subcontract Responsibilities: Refer to Section 14 20 00 Vertical Transportation, General for the requirements of single subcontract responsibilities for 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. 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, through comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Operational Requirements: The escalator systems shall:

1. Escalators shall be of the heavy-duty transit type for use in transit systems, and meet the APTA requirements.
2. Be capable of operating under full load conditions, at full contract speed, in either direction, and designed to operate quietly and smoothly without bounce.
3. Have a rated nominal speed of 100 ft. /min. (.50 m/s) or metric equivalent. The no-load to full load speed shall not vary by more than 4% of the contract speed.
4. Hours of operation shall be considered as twenty-four (24) hours per day, seven (7) days per week, and 365 days a year.

5. Direction of travel shall be considered as either direction; and unit travel directions shall be reversible.
6. Handrail speed shall be consistent with step speed.
7. Sound Level: Escalators shall be designed to operate at or below a sixty-five (65) decibels sound level, measured five (5) feet above the escalator at any location, with the escalator operating normally, either free-running or under load. An ambient level not to exceed forty-nine (49) decibels shall be maintained prior to units being turned on.
8. Vibration: Escalator shall be tested for vibration levels. A maximum velocity reading of four-tenths (.4) of an inch per second shall not be exceeded. Readings shall be taken throughout the exposed travel of steps.
9. Bearings shall be rated for an AFBMA L10 life, under fluctuating rearing load. All bearings shall have basic dynamic load ratings.

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. Environmental Requirements: Escalators 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.

H. Regulatory Requirements: Comply with ASME A17.1, CCR Title 8, and escalator design requirements for earthquake loads in ASCE 7.

I. In case of a conflict between codes, regulations or standards incorporated into this section, the most stringent requirement shall take precedent.

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. Contractor’s Statement: Refer to Section 14 20 00, Vertical Transportation, General.

D. Professional Engineer Qualifications: Professional Engineer Qualifications: Refer to Section 14 20 00, Vertical Transportation, General.

E. Source Limitations: Obtain escalators and elevators/moving walks specified in other sections through one source from a single manufacturer.

F. Standards: The following standards shall govern the escalator 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 escalator 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.
    b. City of Los Angeles Elevator Code.
6. APTA Guidelines for Heavy Duty Transit type Escalators.

G. Electrical Devices and Equipment: Refer to Section 14 20 00, Vertical Transportation, General.

H. 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. Design Information: Indicate equipment lists, reactions and design information on layouts.

D. Product Data: Include capacities, sizes, performances, safety features, finishes, and similar information.

E. 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.

F. Shop Drawings: provide fully dimensioned layout in plan, elevation, and section views, 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. Indicate the interface of the escalator work with adjacent work, including but not limited to, the following:
    a. Finished flooring surrounding landing plates.
    b. Adjacent finishes.
2. Monitoring system riser diagram
3. 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.

G. Glass Treatment Certificates: Submit glass treatment certificates signed by manufacturer of the heat soaked glass products certifying that products furnished comply with requirements.

H. Product Data: Submit manufacturers design data, material specifications, installation instructions, and other data pertinent to the components used in the escalator 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 escalators. 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.

I. Samples: For exposed finishes, 3-inch- square Samples of sheet materials, and 4-inch lengths of running trim members.

J. Fixtures: Cuts, samples or shop drawings.

K. Mockup: Provide full scale mockup of glass balustrades, handrails and handrail lighting. Mockup shall be a minimum eight feet long with fully functional lights.

L. 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.

M. Qualification Data: For Installer.

N. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted escalator use.

O. Rigging: Installer shall submit a rigging plan for approval. Any use of existing building structures shall be reviewed and approved by a structural engineer.

P. 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.
14. Monitoring system manuals and As-built drawings

Q. 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.

R. 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.

S. 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
20 Comb Plate Segments – each Left and Right
30 Comb Plate Segments – Center
20 Step Rollers and Flanges
7 Step Axel Sets
1 Matched Pair Step Chains (Longest Unit)
2 Sets Gear Box and Axel – Gaskets, Shims and Seals
1 Automatic Lubrication Reservoir
2 Sets Skirt and Emergency Switches
2 Sets Start Contacts, each size
3 Stop Switches
10 10' Sections skirt deflection brushe Assemblies
4 Stop Switch Covers with hardware
2 Key Switches – each kind
1 Motor Starters, each size
1 Reverse Phase Relays
2 Left Handrail Electric Interlocks, each size
2 Right Handrail Electric Interlocks, each size
1 Circuit Breakers, each size
1 Spool of continuous handrail – length to replance both sides of longest unit
1 Transformers
2 Step Chain Oilers
2 Handrail Inlet Brushes per side (or equal)
4 Handrail Tension Roller Assemblies

1.6 JOB CONDITIONS

A. General: Refer to Section 14 20 00, Vertical Transportation, General.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General: Refer to Section 14 20 00, Vertical Transportation, General.

1.8 COORDINATION

A. General: Refer to Section 14 20 00, Vertical Transportation, General.

B. Coordinate installation of, VT equipment with integral anchors, and other items that are embedded in concrete or masonry for VT equipment. Furnish templates, sleeves, escalator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.

C. Coordinate sequence of VT installation with other work to avoid delaying the Work.

D. 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.

E. Coordinate and provide hoisting related to VT installation.

F. Coordinate installation of truss cladding and all other work related to the VT installations.

G. 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, starting at the Contract Completion Date, a 1-Year Preventative Maintenance ("PM") service for all units.

2. When units are accepted by the Project in phases the Contractor shall provide an Interim Preventative Maintenance ("IPM") service for all units, starting from the Beneficial Use Date and continuing to the Contract Completion Date.

3. 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 1.5 L-M, and Exhibit A, for all units installed in this Contract.

4. 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, IPM 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 VT units in completely operable, like new condition.

b. Provide preventative maintenance on escalators for a minimum of four (4) hours each month per unit (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 an on-site arrival time of 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. During the warranty period, unlimited any time callbacks are included with a required an on-site arrival time of one (1) hour. . 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, 1.5 L-M, Vertical Transportation, General.",and Exhibit A.

1.10 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. Comply with requirements in Section 14 20 00, 1.5 L-M ;"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, 1.4 A; "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 316.

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 escalator 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 escalator systems shall be as selected by the escalator manufacturer. Perimeter sealants, joint fillers and primers are specified under Section 07920, JOINT SEALANTS.

H. Paint and Corrosion Protection: Each escalator 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 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. Machine 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) 40-inch wide exposed step with a load of 320 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 LAWA and the AHJ.

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; monitoring of drive motor temperature.

2) The fault indication shall remain visible until reset by an authorized person.

3) Data shall be transmitted to a remote monitoring location.

4) Provide a digital readout at the key start area

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 remotely.

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 via Category 6 cabling.

   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. LAWA does not allow 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 data transmission through RJ 45 Ethernet connection and install all devices necessary to monitor items outlined in Section 2.3K. Conveyance Monitoring System Contractor shall be responsible to connect monitoring system interface to machine controller and LAN.

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 non-proprietary programming tools. The system shall be capable of driving remote color monitors that continually scan and display the status of each VT unit. 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 controller nor be developed utilizing a proprietary programming language. Refer to section 2.3K of this specification for additional requirements.

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 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. Provide a minimum of one handset per unit.

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.

C. 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.

   c. The acceleration and deceleration rates of the unit shall not exceed 1.0ft/sec2 (0.3m/s2).

   d. The rated speed shall not be exceeded.

   e. The minimum speed of unit shall not be less than 10ft/min (0.5m/s).

   f. The speed of the unit shall not automatically vary during inspection operation mode.

   g. The passenger detection means shall be provided at both landings of the unit such that :

      1) Detection of any approaching passenger shall cause the unit to accelerate to, or maintain the, full rated speed in compliance with paragraphs c-f above.

      2) Detection of any approaching passenger shall occur sufficiently in advance of boarding to allow the unit to attain full attain full operation speed before a passenger walking at a typical speed of 270 fpm (1.35m/s) reaches the comb plate.

      3) Passenger detection means shall remain active at the egress landing to detect any passenger approaching against the direction of unit travel and shall cause the unit to accelerate to full rated speed and sound an alarm bell at the approaching landing before the passenger reaches the comb plate.

4) Redundant sensors below each handrail return are provided.

5) Means shall be provided to detect failure of the passenger detection means and shall cause the unit to operate at full rated speed only.

3. Equipment Manufacturer Acceptance

   a. The supplier shall show broad industry acceptance of the motor control device by documenting that all major VT service providers, including Otis Elevator, KONE Inc. Schindler, ThyssenKrupp, and Mitsubishi Electric, have experience installing such device on an escalator.

4. Functions: The motor controlling device must include the following functions:

   a. Overload Current Protection

   b. Over Voltage Protection

   c. Under voltage Protection

   d. Over Current

   e. Under Current

   f. Phase Loss

   g. Reverse Direction

   h. S.C.R. Failure

   i. Fault logging capability

   j. 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 voltage 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.

D. 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.

E. 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.

F. 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 Plexiglas intersection guards at floor penetrations as required per Code.

NOTE: In areas where luggage carts are used, glass balustrades are not permitted.

G. Landings
1. Flat Steps: Provide upper and lower landings with a minimum three flat steps on vertical travel distances of 32’-10” feet or less. For travel distance above 32’-10” feet, provide four 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.

H. 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.

I. 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.

J. 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.

K. Monitoring System

1. General: Provide an interactive system to monitor and manage the VT equipment ("units"), hereinafter called "system". IT infrastructure installation must comply with LAWA's most current Information Technology Infrastructure Standards of Practice, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation. System shall be compatible with other building monitoring systems. Systems shall be capable of accommodating multiple escalator control systems from various manufacturers. Real-time data collection, data storage and 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, Lift-Net, etc.

c. Expansion capability to add unlimited number of monitoring terminals on the network.

d. Monitoring terminals and controllers must be installed using redundant network architecture and high availability.

e. Complete backup and restore of data must be available according to LAWA's Information Management Technology Group's standard, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation..

f. Display multiple banks, including multiple buildings, on a single monitoring terminal screen.

2. Monitoring Display: The system shall be capable of simultaneous monitoring at least five hundred units on a single monitoring station utilizing a graphical representation of a plan view of the facility. Each unit 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 step, 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 will 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 unit 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. The system will be capable of interfacing with the California State's Earthquake Early Warning System.

f. The system shall be capable of interfacing with other building/campus monitoring and management systems via the LAWA network. Configuration of the Monitoring system shall be coordinated with LAWA prior to deployment for VLAN assignment, IP address mapping, etc..

g. 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.

h. The system will automatically re-boot the program and continue to operate after a power loss or other system malfunction.

4. Monitoring Equipment: IT infrastructure installation must comply with LAWA's most current Information Technology Infrastructure Standards of Practice, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation. 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) Internal hard drive - adequate storage for three years data for entire system
      3) Modem - most current high-performance
      4) Display monitor (19" - 20" LCD flat panel) Printer - current HP Color Desk Jet Series
      5) Keyboard - MS Windows compatible
      6) Mouse - MS Windows compatible

   b. Machine Room Hardware (Retained Control):
      1) Compatible with all types and makes of controllers
      2) Modular design - capable of future expansion

   c. Monitoring Station Operating System Software
      1) MS Windows

5. Network requirements: IT infrastructure installation must comply with LAWA's most current Information Technology Infrastructure Standards of Practice, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation.

   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, RS232, Ethernet, Lift-Net, single-mode Fiber-Optic and mixed WAN TCPIP Network, utilizing protocols that are Layer 3 compliant.

   f. Network switches shall be Cisco managed switch models

g. Any network device to be installed on the monitoring system shall have a unique MAC address.

6. Monitoring Requirements: The system shall display and record the following information for each monitored unit. Data 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 step chain device #L
7) Broken step chain device #R
8) Comb-step impact device, horizontal switch #TL, TR
9) Comb-step impact device, horizontal switch #BL, BR
10) Comb-step impact device, vertical switch #TL, TR
11) Comb-step 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) Step level device #T
19) Step level device #B
20) Broken step device #1
21) Broken step device #2
22) Broken step device #3
23) Broken step 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) Step 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
40) MISSING STEP SENSOR UL
41) MISSING STEP SENSOR LL
42) FLOOR PLATE CONTACT UL

43) FLOOR PLATE CONTACT LL
44) BRAKE LINING WEAR CONTACT
45) MOTOR OVER TEMPERATURE
46) CONTROL CONTACT FOR LIFTED BRAKE
47) CONTROL CONTACT FOR FALL BRAKE
48) 3-PHASE LINE MONITOR
49) MOTOR SPEED SENSOR FAILURE
50) UP&DWN RUN INPUT AT SAME TIME
51) NO UP&DWN RUN INPUT WHILE RUNNING
52) EMERGENCY BRAKE SWITCH
53) KSU, KSD GREATER THAN 10SEC WHILE RUNNING
54) HANDRAIL SPEED RIGHT LOCKED
55) HANDRAIL SPEED LEFT LOCKED
56) FUSE BLOWN ON SAFETY CHAIN
57) BROKEN MAIN DRIVE CHAIN SAFETY
58) STEP CHAIN WHEEL UPPER RIGHT
59) STEP CHAIN WHEEL UPPER LEFT
60) HAND WHEEL FAULT
61) EGRESS RESTRICTION DEVICE
62) CONTROL CONTACT FOR LIFTED BRAKE
63) CONTROL CONTACT FOR FALL BRAKE
64) NO UP AFTER 3SEC KSU FAULT
65) NO DOWN AFTER 3SEC KSU FAULT
66) VF DRIVE FAILURE FAULT
67) NON REVERSAL DEVICE FAULT
68) VF DRIVE NO START RELAY FAULT
69) FLOOD DETECTION DEVICE
70) STEP UP THRUST LEFT LOWER LANDING
71) STEP UP THRUST RIGHT LOWER LANDING
72) DRIVE TEMPERATURE ALARM
73) REDUNDANT 1: UP CONTRACT STUCK CLOSED
74) REDUNDANT 2: DOWN CONTACT STUCK CLOSED
75) REDUNDANT 3: KSU - KSU REDUNDANT FAILED
76) REDUNDANT 4: KSD - KSD REDUNDANT FAILED
77) MISSING STEP SENSOR STUCK ON UL
78) MISSING STEP SENSOR STUCK ON LL
79) EMERGENCY STOP BY FIRE DETECTION
80) EMERGENCY STOP BY EARTHQUAKE SENSOR
81) STUCK SENSOR LEFT
82) STUCK SENSOR RIGHT
83) UPPER SENSOR(S) FAIL
84) LOWER SENSOR(S) FAIL
85) Stopped Mode
86) Inspection Mode
87) Economy Up
88) Economy Down
89) Shutdown Mode
90) Communication Fail Mode
91) Error Mode

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 VT monitoring system shall be capable of interfacing and exchanging data with a variety of third party building management systems including the Central Utility Plant's (CUP) Facilities Management Controls System (FMCS) and other local building systems such as Siemans, Landis & Staefa, Johnson Controls, Wonderware, SCADA, and others. Information shall be exchanged by Modbus protocol, open protocol or other suitable methods as required. Integration to FMCS shall:

    a. Provide one summary alarm point to the FMCS 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 FMCS 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 FMCS server/workstation shall be over the LAWA IT Infrastructure IP network.

    d. Coordinate message protocols with the FMCS contractor. Provide software non-proprietary programming to communicate messages to the FMCS.

9. Notification Feature: The monitoring system shall be capable of notifying a service technician or other personnel based on pre-defined parameters of escalator faults or conditions. The notification 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 mobile devices 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 or internet 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 or internet.

L. 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 SITE INSPECTION

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 PREPARATION

A. General: Refer to Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL.

3.3 INSTALLATION

A. General: Refer to Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL.

B. Comply with manufacturer's written instructions.

C. 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.

D. 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.

E. 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.

3.4 FIELD QUALITY VERIFICATION

A. Comply with requirements in Division 14 Section "Vertical Transportation, General."

3.5 DEMONSTRATION

A. Comply with requirements in Division 14 Section "Vertical Transportation, General."

B. Engage a factory-authorized service representative to train LAWA's maintenance personnel to operate, adjust, and maintain escalators.

C. Check operation of escalators with LAWA's personnel present and before date of Completion. Determine that operation systems and devices are functioning properly.

D. 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 31 00

SECTION 14 32 00 - MOVING WALKS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes APTA compliant heavy duty, high-traffic, transit type interior moving walks.

B. Building Management Systems (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.

C. Single Subcontract Responsibilities: Refer to Section 14 20 00 Vertical Transportation, General for the requirements of single subcontract responsibilities for moving walks.

D. Unless specifically approved in writing by LAWA, moving walks shall be truss type, with a maximum travel distance of 250'.

1.2 DEFINITIONS

A. Definitions in the latest version of ASME A17.1 apply to work of this Section.

B. High-Traffic Moving Walks: Moving Walks designed specifically for use where high-traffic volumes produce dense occupancy resulting in structural, machinery, and brake loads much higher than normal

C. 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.

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 moving walks including attachment to structure, through comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Operational Requirements: The moving walk systems shall:
   1. Shall be of the heavy-duty transit type for use in transit systems, and meet the APTA requirements.
   2. Be capable of operating under full load conditions, at full contract speed, in either direction, and designed to operate quietly and smoothly without bounce.

3. Have a rated speed of 100 ft./min. (0.50 m/s) or the metric equivalent. The no-load to full load speed shall not vary more than 4% from the contract speed.
4. Hours of operation shall be considered as twenty-four (24) hours per day, seven (7) days per week, and 365 days a year.
5. Direction of travel shall be considered as either direction; and unit travel directions shall be reversible.
6. Handrail speed shall be consistent with pallet speed.
7. Sound Level: moving walks shall be designed to operate at or below a sixty-five (65) decibels sound level, measured five (5) feet above the moving walks at any location, with the moving walks operating normally, either free-running or under load. An ambient level not to exceed forty-nine (49) decibels shall be maintained prior to units being turned on.
8. Vibration: moving walks shall be tested for vibration levels. A maximum velocity reading of four-tenths (.4) of an inch per second shall not be exceeded. Readings shall be taken throughout the exposed travel of steps.
9. Bearings shall be rated for an AFBMA L10 life, under fluctuating rearing load. All bearings shall have basic dynamic load ratings.

C. Braking Performance: Provide brakes that stop moving walks 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 moving walks: For the purpose of structural design, driving machine and power transmission calculations, and brake calculations, design high-traffic moving walks for loads not less than 2 times the design loads required by ASME A17.1.

F. Structural Performance of Balustrades: Per ASME A17.1-2004. Provide balustrades designed to resist the simultaneous application of a static lateral force of 40 lb. /ft. and a vertical load of 50 lbf/ft, both applied at the top of the handrail stand.

G. 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.

H. Regulatory Requirements: Comply with ASME A17.1, CCR Title 8, and moving walk design requirements for earthquake loads in ASCE 7.

I. In case of a conflict between codes, regulations or standards incorporated into this section, the most stringent requirement shall take precedent.

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. Contractor’s Statement: Refer to Section 14 20 00, Vertical Transportation, General.

D. Professional Engineer Qualifications: Professional Engineer Qualifications: Refer to Section 14 20 00, Vertical Transportation, General.

E. Source Limitations: Obtain moving walks and elevators/escalators specified in other sections through one source from a single manufacturer.

F. 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.
6. APTA Guidelines for Heavy Duty Transit type Moving Walks.

G. Electrical Devices and Equipment: Refer to Section 14 20 00, Vertical Transportation, General.

H. 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 moving walks in an interior airport environment is not necessary.

1.5 SUBMITTALS

A. General: Refer also 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. Design Information: Indicate equipment lists, reactions and design information on layouts.

D. Product Data: Include capacities, sizes, performances, safety features, finishes, and similar information.

E. 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.

F. 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 views at a scale of ¼" = 1'-0" and necessary details. 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.
   b. Adjacent finishes.

2. Monitoring system riser diagram

3. 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.

4. Pallet linkage details for material, configuration, arrangement, and lubrication requirements.

5. Drive motor, controller, safety devices, and switches including brakes.

6. 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.

7. 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.

G. Glass Treatment Certificates: Submit glass treatment certificates signed by manufacturer of the heat soaked glass products certifying that products furnished comply with requirements.

H. 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.

I. 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.

J. Certificates and Permits: Refer to Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL.

K. Rigging: Installer shall submit a rigging plan for approval. Any use of existing building structures shall be reviewed and approved by a structural engineer.

L. 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.

14. Monitoring system manuals and As-built drawings

M. 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.

N. 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.

O. 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 32 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
20 Comb Plate Segments – each left/right 30 Comb Plate Segments - center	1 Motor Starters, each size
20 Pallets Rollers and Flanges	2 Left Handrail Electric Interlocks, each size
7 Pallets Axel Sets	2 Right Handrail Electric Interlocks, each size

- 1 Matched Pair Pallets Chains (Longest Unit)
- 2 Sets Gear Box and Axel –Gaskets, Shims and Seals – each type
- 1 Automatic Lubrication Reservoir
- 2 Sets Skirt and Emergency Switches
- 2 Sets Start Contacts, each size
- 3 Stop Switches
- 1 Spoll of continuous handrail –length to replace both sides of the longest unit
- 1 Circuit Breakers, each size
- 1 Reverse Phase Relays
- 1 Transformers
- 2 Pallets Chain Oilers
- 2 Handrail Inlet Brushes per side (or equal)
- 4 Handrail Tension Roller Assemblies

1.6 JOB CONDITIONS

A. General: Refer to Section 14 20 00, Vertical Transportation, General.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. General: Refer to Section 14 20 00, Vertical Transportation, General.

1.8 COORDINATION

A. General: Refer to Section 14 20 00, Vertical Transportation, General.

B. Coordinate installation of, VT equipment with integral anchors, and other items that are embedded in concrete or masonry for VT equipment. Furnish templates, sleeves, moving walk equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.

C. Coordinate sequence of VT installation with other work to avoid delaying the Work.

D. Coordinate locations and dimensions of other work relating to moving walks including sumps and floor drains in pits, electrical service, and electrical outlets, lights, and switches in pits.

E. Coordinate and provide hoisting related to VT installation.

F. Coordinate installation of truss cladding and all other work related to the VT installations.

G. 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, starting at the Contract Completion Date, a 1-Year Preventative Maintenance ("PM") service for all units.

2. When units are accepted by the Project in phases the Contractor shall provide an Interim Preventative Maintenance ("IPM") service for all units, starting from the Beneficial Use Date and continuing to the Contract Completion Date.

3. 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, 1.5L-M and Exhibit A, for all units installed in this Contract.

4. 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, IPM 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 VT units in completely operable, like new condition.

b. Provide preventative maintenance on moving walks for a minimum of four (4) hours each month per unit (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 moving walk indicating when services are provided.

d. Perform work without removing moving walks 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 an on-site arrival time of 30 minutes to emergency request by telephone or otherwise from LAWA or designated representative if an moving walk is inoperable or in case of injury, entrapment, or potential injury to persons.

f. During the warranty period, unlimited any time callbacks are included with a required an on-site arrival time of one (1) hour. 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, 1.5 L-M, Vertical Transportation, General," and Exhibit A.

1.10 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. Comply with requirements in Section 14 20 00, 1.5 L-M,"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:

1. Sheet, Plate and Strip: ASTM A 666 or ASTM A240, Type 316
2. Shapes and Bars: ASTM A276, Type 316.
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 high-traffic transit type moving walk 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 moving walk.. 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. 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.

NOTE: In areas, such as, but not limited to Ticketing, glass balustrades are susceptible to breakage from luggage carts and therefore are not permitted.

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 tread-way chain drive mechanism to obtain the same ratio of speed and direction of travel as the moving pallets on the tread-way.

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.

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, and 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 in pit where possible, install remotely if available space is not sufficient in upper and lower pit.

    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. LAWA does not allow 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 data transmission through RJ 45 Ethernet connection and install all devices necessary to monitor items outlined in Section 2.3K. Conveyance Monitoring System Contractor shall be responsible to connect monitoring system interface to machine controller and LAN.

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 non-proprietary programming tools. The system shall be capable of driving remote color monitors that continually scan and display the status of each VT unit. 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 controller nor be developed utilizing a proprietary programming language. Refer to section 2.3K of this specification for additional requirements.

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 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 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.
    c. The acceleration and deceleration rates of the unit shall not exceed 1.0ft/sec2 (0.3m/s2).
    d. The rated speed shall not be exceeded.
    e. The minimum speed of unit shall not be less than 10ft/min (0.5m/s).
    f. The speed of the unit shall not automatically vary during inspection operation mode.
    g. The passenger detection means shall be provided at both landings of the unit such that :
        1) Detection of any approaching passenger shall cause the unit to accelerate to, or maintain the, full rated speed in compliance with paragraphs c-f above.
        2) Detection of any approaching passenger shall occur sufficiently in advance of boarding to allow the unit to attain full attain full operation speed before a passenger walking at a typical speed of 270 fpm (1.35m/s) reaches the comb plate.
        3) Passenger detection means shall remain active at the egress landing to detect any passenger approaching against the direction of unit travel and shall

cause the unit to accelerate to full rated speed and sound an alarm bell at the approaching landing before the passenger reaches the comb plate.

4) Redundant sensors below each handrail return are provided.

5) Means shall be provided to detect failure of the passenger detection means and shall cause the unit to operate at full rated speed only.

3. Equipment Manufacturer Acceptance

   a. The supplier shall show broad industry acceptance of the motor control device by documenting that all major VT service providers, including Otis Elevator, KONE Inc. Schindler, ThyssenKrupp, and Mitsubishi Electric, have experience installing such device on an moving walk.

4. Functions: The motor controlling device must include the following functions:

   a. Overload Current Protection

   b. Over Voltage Protection

   c. Under voltage Protection

   d. Over Current

   e. Under Current

   f. Phase Loss

   g. Reverse Direction

   h. S.C.R. Failure

   i. Fault logging capability

   j. 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 voltage 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. Monitoring System

1. General: Provide an interactive system to monitor and manage the VT equipment ("units"), hereinafter called "system". IT infrastructure installation must comply with LAWA’s most current Information Technology Infrastructure Standards of Practice, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation. System shall be compatible with other building monitoring systems. Systems shall be capable of accommodating multiple moving walk control systems from various manufacturers. Real-time data collection, data storage and 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, Lift-Net, etc.

c. Expansion capability to add unlimited number of monitoring terminals on the network.

d. Monitoring terminals and controllers must be installed using redundant network architecture and high availability.

e. Complete backup and restore of data must be available according to LAWA's Information Management Technology Group's standard, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation..

f. Display multiple banks, including multiple buildings, on a single monitoring terminal screen.

2. Monitoring Display: The system shall be capable of simultaneous monitoring at least five hundred units on a single monitoring station utilizing a graphical representation of a plan view of the facility. Each unit 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 will 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 unit 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. The system will be capable of interfacing with the California State's Earthquake Early Warning System.

f. The system shall be capable of interfacing with other building/campus monitoring and management systems via the LAWA network. Configuration of the Monitoring system shall be coordinated with LAWA prior to deployment for VLAN assignment, IP address mapping, etc...

g. 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.

h. The system will automatically re-boot the program and continue to operate after a power loss or other system malfunction.

4. Monitoring Equipment: IT infrastructure installation must comply with LAWA's most current Information Technology Infrastructure Standards of Practice, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation. 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) Internal hard drive - adequate storage for three years data for entire system
      3) Modem - most current high-performance
      4) Display monitor (19" - 20" LCD flat panel)
      5) Printer - current HP Color Desk Jet Series
      6) Keyboard - MS Windows compatible
      7) Mouse - MS Windows compatible

   b. Machine Room Hardware (Retained Control):
      1) Compatible with all types and makes of controllers
      2) Modular design - capable of future expansion

   c. Monitoring Station Operating System Software
      1) MS Windows

5. Network requirements: IT infrastructure installation must comply with LAWA's most current Information Technology Infrastructure Standards of Practice, to be confirmed, in writing, by all parties, from the assigned LAWA IT Project Manager three months prior to installation.
   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, RS232, Ethernet, Lift-Net, single-mode Fiber-Optic and mixed WAN TCPIP Network, utilizing protocols that are Layer 3 compliant.
f. Network switches shall be Cisco managed switch models
g. Any network device to be installed on the monitoring system shall have a unique MAC address.

6. Monitoring Requirements: The system shall display and record the following information for each monitored unit. Data may include many more points. Items listed below are minimum requirements.

a. Moving Walks:
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
40) MISSING STEP SENSOR UL
41) MISSING STEP SENSOR LL
42) FLOOR PLATE CONTACT UL
43) FLOOR PLATE CONTACT LL
44) BRAKE LINING WEAR CONTACT
45) MOTOR OVER TEMPERATURE
46) CONTROL CONTACT FOR LIFTED BRAKE
47) CONTROL CONTACT FOR FALL BRAKE
48) 3-PHASE LINE MONITOR
49) MOTOR SPEED SENSOR FAILURE
50) UP&DWN RUN INPUT AT SAME TIME
51) NO UP&DWN RUN INPUT WHILE RUNNING
52) EMERGENCY BRAKE SWITCH
53) KSU, KSD GREATER THAN 10SEC WHILE RUNNING
54) HANDRAIL SPEED RIGHT LOCKED
55) HANDRAIL SPEED LEFT LOCKED
56) FUSE BLOWN ON SAFETY CHAIN
57) BROKEN MAIN DRIVE CHAIN SAFETY
58) STEP CHAIN WHEEL UPPER RIGHT
59) STEP CHAIN WHEEL UPPER LEFT
60) HAND WHEEL FAULT
61) EGRESS RESTRICTION DEVICE
62) CONTROL CONTACT FOR LIFTED BRAKE
63) CONTROL CONTACT FOR FALL BRAKE
64) NO UP AFTER 3SEC KSU FAULT
65) NO DOWN AFTER 3SEC KSU FAULT
66) VF DRIVE FAILURE FAULT
67) NON REVERSAL DEVICE FAULT
68) VF DRIVE NO START RELAY FAULT
69) FLOOD DETECTION DEVICE
70) STEP UP THRUST LEFT LOWER LANDING
71) STEP UP THRUST RIGHT LOWER LANDING
72) DRIVE TEMPERATURE ALARM
73) REDUNDANT 1: UP CONTRACT STUCK CLOSED
74) REDUNDANT 2: DOWN CONTACT STUCK CLOSED
75) REDUNDANT 3: KSU - KSU REDUNDANT FAILED
76) REDUNDANT 4: KSD - KSD REDUNDANT FAILED
77) MISSING STEP SENSOR STUCK ON UL
78) MISSING STEP SENSOR STUCK ON LL
79) EMERGENCY STOP BY FIRE DETECTION
80) EMERGENCY STOP BY EARTHQUAKE SENSOR
81) STUCK SENSOR LEFT
82) STUCK SENSOR RIGHT
83) UPPER SENSOR(S) FAIL
84) LOWER SENSOR(S) FAIL
85) Stopped Mode
86) Inspection Mode
87) Economy Up
88) Economy Down

89) Shutdown Mode
90) Communication Fail Mode

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 VT monitoring system shall be capable of interfacing and exchanging data with a variety of third party building management systems including the Central Utility Plant's (CUP) Facilities Management Controls System (FMCS) and other local building systems such as Siemans, Landis & Staefa, Johnson Controls, Wonderware, SCADA, and others. Information shall be exchanged by Modbus protocol, open protocol or other suitable methods as required. Integration to FMCS shall:

   a. Provide one summary alarm point to the FMCS for each unit being monitored. Coordinate with LAWA to identify which functions monitored by the system for each unit will activate the summary alarm message

   b. Coordinate message format with LAWA and the FMCS contractor. The message shall include the unit number and location at a minimum.

   c. Communications from the unit MDS server/workstation to the FMCS server/workstation shall be over the LAWA IT Infrastructure IP network.

   d. Coordinate message protocols with the FMCS contractor. Provide software non-proprietary programming to communicate messages to the FMCS.

9. Notification Feature: The monitoring system shall be capable of notifying a service technician or other personnel based on pre-defined parameters of moving walk faults or conditions. The notification 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 mobile devices 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 or internet 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 or internet.

Q. 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 SITE INSPECTION

A. Examine moving walk 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 moving walks 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 PREPARATION

A. General: Refer to Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL.

3.3 INSTALLATION

A. General: Refer to Section 14 20 00, VERTICAL TRANSPORTATION, GENERAL.

B. Comply with manufacturer's written instructions.

C. Set moving walks 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.

D. 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.

E. 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.

3.4 FIELD QUALITY VERIFICATION

A. Comply with requirements in Division 14 Section "Vertical Transportation, General."

3.5 DEMONSTRATION

A. Comply with requirements in Division 14 Section "Vertical Transportation, General."

B. Engage a factory-authorized service representative to train LAWA's maintenance personnel to operate, adjust, and maintain moving walks.

C. Check operation of moving walks with LAWA's personnel present and before date of Completion. Determine that operation systems and devices are functioning properly.

D. Check operation of moving walks 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

EXHIBIT A: FIVE YEAR EXTENDED PREVENTATIVE AND ROUTINE MAINTENANCE SERVICE AGREEMENT FOR MSC GENERAL AND SPECIAL CONDITIONS

FOR

ELEVATORS, ESCALATORS and MOVING WALKS

AT THE

LOS ANGELES INTERNATIONAL AIRPORT IN

THE CITY OF LOS ANGELES, CALIFORNIA

EXHIBIT A
TABLE OF CONTENTS

GENERAL CONDITIONS

SPECIAL CONDITIONS

GENERAL CONDITIONS

GC-1. SCOPE OF WORK

1.01. These General Conditions apply exclusively to the Five Year Service Agreement (and optional 5 year extension of that Service Agreement) which shall begin immediately upon expiration of the Warranty Period defined in Section 1.11 of the LAWA Guide Specifications, Divisions 14 2150, 14 3100 and 14 3200.

GC-2. NOT USED

GC-3. AUTHORIZED REPRESENTATIVE OF THE CITY

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 Contract. The Contractor shall promptly comply with the instructions of The Engineer and/or Director of Maintenance or its authorized representative.

GC-4. INSURANCE REQUIRMENETS

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	$10 Million Combined Single Limit ("CSL")
i. Any Auto	
ii. Hired Autos	
iii. Non-owned Autos)	
C. Aviation/Airport Liability	$10 Million CSL OR
Commercial General Liability	$10 Million CSL
(Including the following coverage's):	
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	
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 insured's, 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 insured's under its policies or shall furnish separate certificates and endorsements for each Sub-Contractor. All coverage's 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 insured's, 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 The Faithful Performance Bond and Payment Bond shall be for one hundred percent (100%) of the Contract Amount. The Contractor shall submit both the Faithful Performance Bond and Payment Bond on LAWA provided forms prior to performing any work under the contract. Both bonds shall be issued by a surety who Is listed in the latest version of U.S. Department of Treasury Circular 570, who is authorized to issue bonds In California, and whose bonding limitation shown in said circular is sufficient to provide bonds in the amount required by the Contract shall be deemed to be approved unless specifically rejected by the City. Contractor shall pay all bond premiums, costs and Incidentals.

8.02 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. Should any surety at any time be unsatisfactory to the City, notice to that effect will be given to the Contractor. No further payments shall be deemed due or will be made under the Contract until a new surety qualifies and is accepted by the City.

8.03 Should the five-year option be exercised, Contractor 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 Contract, or any part thereof, or Contractor's services, 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 Contract, 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 Contract, or any portion hereof, and/or Contractors services, or any portion thereof, is terminated by the City, the City shall pay the Contractor as set forth in Section GC-22.03 the amount due to the Contractor for Basic Services as set forth in the Contract.

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 Contract 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 Contract 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 Contract.

22.05 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 lime of performance, Contractor's compensation, or both, consistent with the provisions of this Contract, if:

a. 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 Contract; and
b. 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 Slop Work Order shall be allowed.

22.06. It is understood and agreed that should City decide that any portion of Contract, and/or Contractor's services, shall be suspended or terminated, this Contract shall continue to apply to that portion or those portions not suspended or terminated, and that such suspension or termination of a portion of Contract or services shall in no way make void or invalid this Contract.

22.07. At the termination of this Contract, the Contractor shall deliver to LAWA all records and documentation, including, but not limited to manuals, 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 properly 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 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.

25.02 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).

25.03 The Contractor shall be responsible for providing and maintaining all necessary vehicles, Including, but not limited to scissor lifts, fork-lift trucks, golf carts, etc. that will be used under this Contract. There will be no additional costs to LAWA for these items, and shall be included as part of Contractor's rates.

25.04 Before starting work, the Contractor shall designate in writing a representative who shall have complete authority to act for it.

25.05 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 the this Contract.

25.06 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.

25.07 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 excessive wear and tear or 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 The Contractor shall conduct the operations in a manner that avoids injury or damage to adjacent property and improvements. Buildings, project markers, signs, structures and other objects on or adjacent to the work site shall be protected from injury or damage. When ordered by LAWA, the Contractor shall provide and install all suitable safeguards to protect any object from injury or damage.

27.03 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, and TBITEC, which may have jurisdiction.

GC-28. SAFETY

28.01 During the term of this Contract, 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 Contract in a manner to avoid the risk of bodily harm to persons or risk of damage to any property. Contractor shall promptly lake 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. Reports will be provided within 24 hours of any injuries requiring ambulance or medical assistance.

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. is subject to written approval by LAWA.

GC-30. AUDITS AND RECORDS

31.01 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 Each month, during the term of this Contract, Contractor shall submit a Request For Payment for 1/60 of the actual not to exceed contract amount for the scheduled preventative and routine maintenance. Any additional unscheduled maintenance, repair and parts provided to LAWA shall be invoiced separately for each specific occurrence.

31.02 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 Contract, 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 of its sub-consulting agreements.

SPECIAL CONDITIONS

SC-1. INTRODUCTION

1.01. The general scope of work is to provide complete Extended Preventative and Routine Maintenance (EPRM) Services, as set forth in Exhibit A, for the elevators, escalators and moving walks installed as part of the Midfield Satellite Concourse Contract.

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 contract and in compliance with all of the terms of this contract. 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 Contract.

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 Contract shall become part of the Contract 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 work
b. Problem Reports - On a monthly basis
c. Maintenance Reports- On a monthly basis (refer to SC-19)
d. Invoices - No later than 10 days from the first day of each following calendar month
e. Passenger Injury Log - Contractor must maintain a PI log at each unit that
f. Must be kept up to date at all times.
g. Service Call Logs
h. Spare Parts Inventory Log- On a monthly basis
i. Contractors Quality Control Program - Prior to the start of work.

SC-4. TERM OF SERVICE AGREEMENT

4.01 The term of this Service Agreement (SA) shall be for the five (5) year period commencing immediately upon expiration of the one-year warranty of the last unit installed as part of the project. Preventative Maintenance as described in Section SC-18 of this document shall be provided as part of the one-year warranty for each unit.

4.02 Optional five (5) year Service Agreement Extension: LAWA will notify the Contractor no less than six (6) months prior to the conclusion of the five (5) year SA if it will extend the SA for a single additional five (5) year period at a cost no greater than 9% more than the amount of the previous year SA.

4.03 An appropriate allowance shall be included in the contract to cover the costs of any repair work requested by LAWA, not associated with scheduled preventive maintenance work. The allowance is for the length of the five (5) year contract. If this amount is not used by the end of the five (5) year service agreement, the un-used amount shall be deducted from the contract amount. Work under the allowance shall be invoiced separately from the maintenance contract billing, and any amounts invoiced will be supported with labor and material documentation. The amount used and the remaining amount will be detailed on the invoice.

SC-5. WORKING HOURS

5.01. Contractor shall provide mechanics to work Monday-Friday 11:00PM to 7:00AM, as necessary to meet the service requirements. The labor schedule shall be approved by LAWA on a project-by-project basis.

SC-6. SERVICE CALLS

6.01 The LAWA Elevator Shop will be the primary responder to entrapments. LAWA acknowledges and agrees that only licensed elevator personnel should perform work on the equipment. The LAWA Elevator shop will be the primary responder to equipment failures, entrapments, personal injuries or any other equipment related calls. The contractor may be called upon to execute repairs that need immediate attention. The contractor shall be required to respond within 24 hours of the initial call to initiate any requested repair. Once a repair has started, the contractor must continue on consecutive days with the appropriate staffing level applicable to the repair until the work has been completed.

For additional unscheduled maintenance, repair and parts: the contractor shall submit first year rates with the annual increase for the following:

Mechanic Hours			Helper Hours		
RT	OT	OT-Premium	RT	OT	OT-Premium
Foreman Hours			Team Hours		
RT	OT	OT-Premium	RT	OT	OT-Premium

6.02 The mark-up on all purchased parts shall be 15%.

6.03 All service call hours must be approved by the LAWA Elevator Shop Supervisor and will be paid based on the appropriate established rate. All work must be documented via certified time cards and presented with each monthly invoice. Only the actual hours worked will be paid. There is no provision to pay for travel time (portal to portal).

6.04 All work shall be inspected and approved by the LAWA Elevator Shop Supervisor. Any deficiencies shall be brought to the attention of the Contractor for correction. Deficiencies must be corrected within a time frame established by the Elevator Shop Supervisor. If LAWA requires any additional on-site staffing or standby, contractor will bill for the additional hours at the negotiated rates.

6.05 Notwithstanding anything in this section SC-6 or in any other documentation or agreement, LAWA agrees that in the event equipment that is the subject of this Agreement malfunctions or is otherwise In a dangerous condition, LAWA agrees to notify Contractor as soon as possible using the Contractor provided 24 hour notification system. Until the problem is corrected, LAWA agrees to remove the equipment from service and take all necessary precautions to prevent access or use. Additionally, the Contractor shall notify LAWA immediately if it observes any “dangerous” conditions as defined herein and Contractor will remove the equipment from service and take all necessary precautions to prevent access or use.

SC-7. WORK RESPONSE TIME

7.01 Response time for work requirements is dependent upon the type of work performed. Any noncompliance with the specified standards noted in Section SC-6, Service Calls may result In the Contractor being issued a Contractor Discrepancy Report (CDR) by LAWA. If 3 CDR's are issued to the contractor within any twelve (12) month period of the contract, LAWA reserves the right to terminate the contract within ten (10) days after the contractor receives the 3RD CDR. The Contractor will acknowledge any request for work requirements within the same working day such request is received.

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 Contract 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 Contract.

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 LAWA access requirements.

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 Contract, 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 Contract Documents.

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 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 Contract, 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 available for lease to the Contractor through separate coordination with LAWA's Commercial Development Group (CDG). 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 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 Contract. 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 provide the EPRM of the vertical transportation systems installed as part of the Midfield Satellite Concourse Contract in conformance with the LAWA approved O&M Manuals and Manufacturer's recommended preventative maintenance. 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.
b. The Contractor shall be responsible to provide (employ) Senior I Supervising Maintenance Technicians that are licensed elevator mechanics. The Contractor must also possess a valid C-11 Contractor's License.
c. The Contractor shall be capable of operation, maintenance, trouble- shooting, updating and repairing the equipment computer systems and software.
d. 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 obtained/procured from the OEM as part of the equipment supply and installation at the Contractors cost.
e. 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.
f. 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.

18.02. Basic Maintenance Requirements

a. Service Agreement tasks include, but are not limited to:

1. Inspection and monthly testing to maintain conveyance equipment in completely operable, like new condition.
2. Provide preventative maintenance on each elevator, escalator and moving walk unit at least monthly for a minimum of four (4) hours per unit. (Total On-Site Time). Provide monthly documentation of the same to LAWA.
3. 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.
4. Perform work without removing equipment from service during peak traffic periods as determined by LAWA.
5. Unlimited regular time callbacks are included at no cost to the Owner with a required response time of one (1) hour from the time the call is registered with the Contractor. 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 Elevator Contractor at no additional cost to the Owner
6. Annual clean down of the moving walkway, drip pans, pits, pallets, steps and all interior parts is required. Make necessary arrangements with LAWA in order to minimize any inconvenience.
7. Reporting: Detailed monthly records, in electronic format, of tasks performed including names of individuals performing the tasks, date and time performed, and other pertinent data. Vertical Transportation Equipment Supplier is required to conform to the requirements of LAWA's maintenance system.

b. Routine Maintenance - Activities such as routine inspections and tests designed to identify any unusual or abnormal equipment condition, and to keep the equipment in reliable and consistent operation.
c. Preventative Maintenance - Activities required to keep the equipment operating at the prescribed levels of safety, efficiency and reliability as defined in the O&M Manuals, which are performed on a regular basis at specified intervals. Preventative measures shall also include cleaning the surrounding area as required to keep equipment free from any trash, dirt and/or debris. All escalators and moving walks shall be operated in the reverse direction on a regular basis to allow units to be used in either direction as required for operational need.
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. Monthly Phase 1 and Phase 2 fire service testing and log accordingly.
g. Hours Available for Maintenance Functions – shall be as stated in SC-5, 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. Repairs shall begin within 24 hours of notification and shall be completed in 72 hours. 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 SC-6, where the need for the repairs did not result from:
        a. The routine operation and maintenance of the system.
        b. 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.
    2. LAWA requires the Contractor to provide sufficient resources to promptly repair the systems at all times. Repairs shall begin within 24 hours of notification and shall be completed in 72 hours
        a. Any additional costs not associated with this contract 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 Contract 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 equipment in operation or is required to comply with any LAWA, city, or national safety requirements.

SC-19. REPORTS

19.01 Unless specified elsewhere in the Contract, the following are minimum reports to be submitted to LAWA monthly. All maintenance records and reports created as part of this contract shall remain the property of LAWA:
    a. Completed Preventative Maintenance tasks, identifying times escalators have been operated in the reverse direction.
    b. Preventative Maintenance Inspection Sheets and Maintenance Logs, including total hours worked on each unit.
    c. Emergency Service Call-log
    d. Contractor shall provide any and all documentation that may be requested from LAWA Risk Management as part of any pending litigation.

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 Contract 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 contract. The file shall be property of LAWA and shall be turned over to LAWA upon completion or termination of Contract.

END OF EXHIBIT A