SECTION 14210

TRACTION ELEVATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions, apply to this Section.

1.2 SUMMARY

A. Heavy duty, geared traction elevator(s) as shown on the contract documents.

B. Design Requirements: Meet all requirements as described in this specification section.

C. All engineering, equipment, labor, and permits required to satisfactorily complete elevator installation as required by contract documents.

D. Applicable conditions of General and Special Conditions.

E. Preventive maintenance as described herein.

F. Other equipment installed under the vertical transportation sections:

1. CCTV – Wiring inside hoistway and mounting inside car.
2. Access control (card reader) – Wiring inside hoistway and mounting inside car for car operating panels and for hall pushbutton stations as specified herein.

G. Materials and Equipment:

1. All materials and equipment incorporated in the Works shall be suitable for the duty specified and shall be new and of first class quality, free from imperfections, and selected for long life and minimum maintenance under the site conditions specified.
2. A commercial grade unit or an upgraded commercial unit as an attempt to meet the specifications shall not be acceptable.

H. Design Criteria including Operational, Seismic and Environmental Requirements: All requirements as stated in this specification section shall apply.

I. Reliability Requirements:

1. Hours of operation shall be twenty-four (24) per day, seven (7) days per week.
2. Contractor shall ensure that the elevator system is suitable for its intended use when subject to the climatic conditions and operating environment of the terminal.
3. The elevator system shall achieve a level of safety and reliability that is as high as reasonably practicable.

1.3 RELATED WORK

A. Hoistway and Pit:

1. Clear, plumb, substantially flush hoistway with variations not to exceed 1" at any point.
2. Bevel cants not less than 75 degrees with 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.
3. Divider beams between adjacent elevators at each floor, pit and overhead supports at each floor for rail fastening.
4. For two or more cars in a hoistway: Divider beams between adjacent elevators at each floor, pit, and overhead.
5. Supports at each floor for guide rail fastening. Additional car and counterweight rail supports where floor heights exceed 14'-0". Building supports not to exceed deflection of 1/8" and 1/4" under seismic conditions.
6. Vertical car guide rail support between floors shown on contract documents full height of hoistway.
7. Installation of guide rail bracket supports in concrete. Inserts or embeds, if used, will be furnished under this Section.
8. Wall blockouts and fire rated backing for control and signal fixture boxes which penetrate walls.
9. Cutting and patching walls and floors.
10. Wall pockets and/or structural beams for support of machine, sheave, and dead-end hitch beams. Support beam deflection shall not exceed 1/1666 of span under static load. Machine hold down means for the hoist machine.
11. Erect front hoistway wall after elevator entrances installed.
12. Grout around hoistway entrances and sills.
13. Electronic Interlocked Lockable self-closing, self-locking pit door for walk-in pits with access and warning sign.
14. Pit access ladder.
15. Structural support for car and counterweight buffer impact loads and guide rail loads.
16. Waterproof pit. Indirect waste drain and sump with flush grate and pump.
17. Protect open hoistways and entrances during construction per OSHA Regulations.
18. Protect car enclosure, hoistway entrance assemblies, and special metal finishes from damage after installation.
19. Hoistway venting as indicated on contract documents and as required by local building and elevator code.
20. Seal fireproofing to prevent flaking.
21. Partition between machine room and hoistway where hoist machine mounted beside hoistway.
22. Emergency access doors as detailed on the drawings and pits.
23. Hoistway emergency access ladders and grates as detailed on the drawings for access to overhead machinery spaces and to pits.

B. Machine Room and Machinery Spaces:

1. Legal, fire rated enclosure with access.
2. Self-closing and locking access door.

3. Constant cooling and heating to maintain temperature range between 55 and 90 degrees Fahrenheit. Maximum relative humidity 80% non-condensing.
4. Paint walls, ceiling and floor.
5. Class “ABC” fire extinguisher in each elevator machine room.
6. Seal fireproofing to prevent flaking.
7. Self-closing and locking governor access door and access means.
8. Fire sprinklers where required.
9. Pressurized machine room as required by code.

C. Electrical Service, Conductors and Devices:

1. Lighting and GFCI convenience outlets in pit, machine room and overhead machinery space. Provide one additional non-GFCI convenience outlet in pit for sump pump.
2. Three-phase mainline copper power feeder to terminals of each elevator controller in the machine room with protected, lockable “open”, disconnecting means. Wiring from the building power supply to each disconnect and to each controller in the machine room(s).
3. Single-phase copper power feeder to each elevator controller for car lighting and exhaust blower with individual protected, lockable “open”, disconnecting means located in machine room(s) from building power supply to each disconnect.
4. Emergency public telephone service with dedicated line to each individual elevator control panel in elevator machine room.
5. Products-of-combustion sensor (NFPA No. 72, Chapter 5-3) in each elevator lobby, for each group of elevators or single elevator and machine room to initiate firefighters' return feature. Detector at top of hoistway if sprinklered. Provide means for service access from outside the hoistway. Provide alarm initiating signal wiring from hoistway and/or machine room connection point to elevator controller terminals. Device in machine room and at top of hoistway shall provide a signal for general alarm and a discrete signal for Phase II firefighters’ operation.
6. Temporary power and illumination to install, test, and adjust elevator equipment.
7. Firefighters' telephone jack and announcement speaker in car with connection to elevator control panel in elevator machine room and elevator control panel in firefighters' control room.
8. Data connection, CAT6A connection and junction box in elevator machine room(s).
9. Means to manually and automatically disconnect power to affected elevator drive unit and controller prior to activation of machine room overhead fire sprinkler system, and/or hoistway overhead fire sprinkler system. Manual shut-off means shall be located outside bounds of machine room.
10. Conduit from the closest hoistway of each elevator group or single elevator to the firefighter’s and main control console. Coordinate size, number and location of conduits.
11. When sprinklers are provided in the hoistway all electrical equipment, except seismic protective devices, located less than 4’-0” above the pit floor shall be identified for use in wet locations.
12. Power feeders to main control console and firefighters' control panel.
13. Single-phase power feeders to controllers for CCTV with lockable “open” disconnecting means.

14. Single-phase power feeders to machine room elevator group control monitor with single-phase, protected, lockable “open”, disconnect means.

D. Security Systems and Displays:

1. Card Access Reader Security System: Reader control unit, mounting brackets, wiring material, logic circuits, etc. Coordinate requirements with card reader specification section. Card readers shall be installed inside all cars and adjacent to hall pushbuttons as indicated on the contract documents.
2. CCTV System: CCTV unit, system control unit, antenna and all required monitoring hardware, etc. Coordinate requirements with CCTV specification section.

E. Standby Power Provision:

1. Standby power of the same voltage characteristics via normal electrical feeder to run the elevator at full-rated car speed and capacity.
2. Conductor from auxiliary form “C” dry contacts, located in the standby power transfer switch to the designated elevator control panel. Provide a time delay of approximately 30-45 seconds for pre-transfer signal in either direction.
3. Standby single-phase power to group controller, and each elevator controller for car lighting, exhaust blower, emergency call bell, intercom amplifier, hoist machine cooling fan, and car heating and air conditioning unit.
4. Means for absorbing regenerated power during an overhauling load condition, per NEC 620-101. Elevator will employ SCR or IBGT drive, presenting a non-linear active load.
5. IBC Section 3003.1.4 requires elevator machine room ventilation or air conditioning to function under a standby power condition.

F. Pre-Engineered Elevator Panel Systems: Pre-engineered elevator cab systems as shown on the drawings, fabricated and installed according to Specification Section 10250.

G. Related Sections:

1. Division 5 Section “Metal Fabrications” for machine beams, hoist beams, divider beams, sill angles, and ladders.
2. Division 5 Section “Gratings”.
3. Division 9 Section “Ceramic Tile”.
4. Division 10 Section “Pre-Engineered Elevator Panel Systems”.
5. Division 13 Section “Fire Monitoring System / Building Management Control System”.
6. Division 13 Section “Security System Equipment”.
7. Division 13 Section “Closed Circuit Television System”.
8. Division 14 Sections “Passenger and Service Hydraulic Elevators”, “Freight Hydraulic Elevators”, “Escalators”, and “Moving Walks”.
9. Division 16 Sections for Electrical and Communications systems.

1.4 DEFINITIONS

A. Terms used are defined in the latest edition of the Safety Code for Elevators and

Escalators, ASME A17.1.

B. Reference to a device or a part of the equipment applies to the number of devices or parts required to complete the installation.

C. Provisions of this specification are applicable to all elevators unless identified otherwise.

1.5 QUALITY CONTROL

A. Qualifications: Contractor shall be able to demonstrate a successful track record of at least 7 years of similar installations with equipment proposed.

B. Acceptable MANUFACTURERS:

1. Geared Elevator:

   a. ThyssenKrupp
   b. KONE
   c. Otis
   d. Schindler
   e. Mitsubishi

2. Car Enclosure:

   a. ThyssenKrupp
   b. Hauenstein & Burmeister
   c. KONE
   d. Otis
   e. Schindler
   f. Tyler
   g. Mitsubishi
   h. Courion

3. Hoistway Entrance:

   a. ThyssenKrupp
   b. Hauenstein & Burmeister
   c. KONE
   d. Otis
   e. Schindler
   f. Tyler
   g. Mitsubishi
   h. Courion

4. Textured Stainless Steel:

   a. Rimex 5SL
   b. Rigid-Tex 6WL

5. Fixtures: Vandal Resistant.

a. EPCO
b. Innovation
c. ERM

C. Compliance with Regulatory Agency: Comply with most stringent applicable provisions of following Code and/or Authority, including revisions and changes in effect on date of this specification:

1. Safety Code for Elevators and Escalators ASME A17.1, A17.2.3 and A17.5 (APTA)
2. Inspectors' Manual, ASME A17.2.1
3. Elevator and Escalator Electrical Equipment, ASME A17.5
4. National Electrical Code, NFPA 70
5. Americans with Disabilities Act (ADA)
6. Local fire jurisdiction
7. Requirements of IBC, and all other Codes, Ordinances and Laws applicable within the governing jurisdiction
8. Life Safety Code, NFPA 101.
9. Uniform Federal Accessibility Standard (UFAS)
10. Nevada State and Clark County Elevator Code

C. Warranty:

1. Material and workmanship of the installation shall comply in every respect with contract documents. In accordance with General Conditions, correct defective material or workmanship which develops within Warranty period to the satisfaction of the Owner at no additional cost.
2. Defective is defined to include, but not limited to, operation or control system failures, performance below required minimum, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unsatisfactory conditions.
3. Make modifications, adjustments and improvements to meet performance requirements in Parts 2 and 3.

1.6 DOCUMENT VERIFICATION

A. Contractor shall review contract documents for compatibility with its product prior to bidding. Review structural, architectural, electrical, mechanical documents, and elevator specification. Compliance with all provisions of contract documents is assumed and required. Owner will not pay for change to structural, mechanical, electrical, or other systems required to accommodate Contractor’s equipment.

1.7 SUBMITTALS

A. After award of contract and before beginning equipment fabrication, submit shop drawings and required material for review. Allow 30 days for response to initial submittal.

1. Scaled Layout: Plan of pit, hoistway and machine room indicating equipment arrangement, elevation section of hoistway, details of car enclosures, hoistway entrances, and car/hall signal fixtures.

2. Design Information: Indicate equipment lists, reactions, and design information on layouts.
3. Power Confirmation Sheets: Include motor horsepower, code letter, starting current, full-load running current, and demand factor for applicable motors.
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 by Owner. Compliance with other requirements is the exclusive responsibility of the Contractor. Include, if requested, signal fixtures, lights, graphics, Braille plates, and mounting provisions.

B. Acknowledge and/or respond to drawing comments within 10 days of return; promptly incorporate required changes due to inaccurate data or incomplete definition so that delivery and installation schedules are not affected. Revision response time is not justification for equipment delivery or installation delay. Field verify existing conditions and dimensions prior to ordering equipment and verify all sizes.

1.8 PERMIT, TEST AND INSPECTION

A. Obtain and pay for permit, license, and inspection fee necessary to complete the installation.

B. Perform test required by Governing Authority in accordance with procedure described in ASME A17.2 Inspectors' Manual for Elevators and Escalators in the presence of Owner.

C. Supply personnel and equipment for test and final review required by Owner, as indicated in Part 3.

D. Test Specification:

1. Contractor shall submit for review a Test Specification for the Factory Acceptance Tests, Partial Acceptance Tests, System Acceptance Tests and Tests to be conducted on completion. The specification shall detail the methods of conducting the tests and the tools and instruments used. Reference to the documents and drawings reviewed shall be included in this submission. The records/results shall be tabulated in a prescribed format applicable to this Contract and as reviewed by Owner.
2. The Test Specification shall include the design values of all quantities to be verified, with allowable tolerance or limits. Summary drawings or diagrams shall be verified with the Test Specification to show the dimensions and tolerances of all structural assemblies and sub-assemblies. In the case of welded fabrications, key diagrams giving all weld data shall be provided to enable systematic inspection to take place.
3. Inspection of incoming goods and components and sub-assembly tests, shall be performed in accordance with the Contractor’s Quality Plan.
4. Verification of accuracy shall be required for all tools, apparatus, testing jigs, measuring instruments and “go” or “no go” gauges used for the purpose of routine tests.

E. Factory Acceptance Test:

1. The factory acceptance test is a pre-installation activity, the purpose of which is

to ensure that equipment has been manufactured in accordance with the Particular Specification as well as the General Conditions and that it is able to be commissioned.

2. Contractor shall submit before commencement of manufacture, a proposed Factory Acceptance Test Specification showing the components manufacturing program, quantities of each batch of manufacture, itemized for all major components.
3. All tests shall be carried out in the presence of Owner unless Owner waives such requirements. Contractor shall make available all premises used for manufacture of the Works to Owner for witnessing.
4. Contractor shall identify those components, both hardware and software, for which no reliable validated performance data exists, including assemblies of components which have no validated data produced specifically for this project.
5. For each component identified, Contractor shall produce a detailed test procedure, acceptance criteria and check sheets.
6. Owner will determine those tests where certification may be acceptable in lieu of Owner witnessed tests.
7. A log (Factory Acceptance Testing Log) shall be kept by Contractor, recording the tests carried out and their results, classified into the levels of acceptability, with copies of all test certification documents.
8. No installation of equipment shall begin until factory acceptance testing has been satisfactorily completed and certified by the Supplier. Certificates shall be supported by copies of the Factory Acceptance Testing Log and report on faults found and corrective action taken, if any.

F. Tests on Completion:

1. Each elevator after completion shall require a site acceptance test, which will be comprised of comprehensive testing of the completely assembled installation, to ensure that every item has been correctly installed and adjusted and that the system operates in every respect in accordance with the requirements of this Particular Specification.
2. These test shall be made by Contractor and, if necessary, the Supplier/Manufacturer and observed by Owner. Any defects, which become apparent in the course of these tests and/or deviations discovered without prior review by Owner during the tests, shall be made good. The defects shall be entered into a defect list. The Substantial Completion Certificate for the Works will not be issued until these tests have been completed and Owner considers that the equipment is safe for operation.

1.9 MAINTENANCE

A. The maintenance programs shall be designed to optimize safety, reliability and availability and reduce cost while minimizing disruption to the station daily operation. The levels of planned preventive maintenance shall be as follows:

1. First Line Maintenance: These are the regularly planned, routine inspections and minor associated work, such as greasing, replacing minor worn and faulty parts, checking and re-setting tolerances and reporting on condition. This shall also include the semi-annual and annual testing and examination of all the safety devices of the elevator.

2. Second Line Maintenance: This coves the overhaul of equipment and usually includes the replacement of modules, major parts and assemblies. Used parts or modules could be returned to a central workshop or the manufacturer for repair/overhaul.
3. Third Line Maintenance: This is also known as workshop maintenance where the major components and assemblies are removed during the second line maintenance for maintenance and overhaul.
4. Corrective Maintenance: This covers the repair of defective equipment/systems and can take place at any of the above levels. At times it will be necessary to supplement the regular maintenance staff with more experienced staff and technical support for more complex diagnostic testing required to locate faults.

B. Warranty Maintenance:

1. Provide preventive maintenance and 24-hour emergency callback service for one year commencing on date of final acceptance by Owner with after-hours callback at no additional cost to Owner. Systematically examine, adjust, clean, and lubricate all equipment. Repair or replace defective parts using parts produced by the manufacturer of installed equipment. Maintain elevator machine room, hoistway, and pit in clean condition.
2. Use competent personnel, acceptable to Owner, supervised and employed by Contractor.
3. The warranty maintenance period specified in Item 1 above shall be extended one month for each three month period in which equipment related failures average more than .25 per unit per month.

1.10 RELIABILITY REQUIREMENTS AND PENALTIES

A. Reliability:

1. Contractor shall provide elevators that comply with the performance requirements of the Contract documents and that are of the highest market quality available. Contractor shall advise Owner if system performance or manufacturer requirements and/or recommendations conflict with operating parameters and reliability requirements established in the Contract documents.
2. A system failure shall be defined as any interruption of the normal mode of operation of an individual elevator where said unit is not available for Owner use. Interruption of Availability due to scheduled maintenance and inadvertent or automatic engagement of safety systems shall not constitute a system failure.
3. Each elevator shall be capable of operating at full load under normal modes of operation at a level of reliability (availability) of not less than 99 percent (round calculation to nearest whole percentage number) over a period of 365 days.
4. Availability (A) is defined as the portion of normal operational time during which the equipment is available for use, or

$$A = \frac{ATBF}{ATBF + ATTR}$$

Where:

ATBF = Average time between failure in days

= Operating time, t (in days)
Number of failures in time (t)

ATTR = The average time to restore (in days) an elevator to operation after a report of failure.

B. Penalty To Be Assessed Through Warranty Period:

1. A level of availability of 99% or more shall not be penalized. If availability is between 96 and 99%, 1% of the value of the bid item for the specific equipment (or scheduled value in the case of a Lump Sum bid) shall be assessed as liquidated damages. If availability is between 90 and 96%, 3% of the value of the bid item for the specific equipment (or scheduled value in the case of a Lump Sum bid) shall be assessed as liquidated damages. If availability is between 80 and 90%, 5% of the value of the bid item for the specific equipment (or scheduled value in the case of a Lump Sum bid) shall be assessed as liquidated damages. If the availability is less than 85%, the equipment shall be replaced at the sole expense of Contractor. The warranty for the new equipment will commence at Owner acceptance of the new installation and will run for the duration specified in the appropriate technical specification.

PART 2— PRODUCTS

2.1 SUMMARY [*modify as required by project*]

A. [*Insert number and type of elevator(s), repeat for each different type*]:

NUMBER:	[*Insert new elevator number(s)*]
CAPACITY:	[*Insert capacity*]
SPEED:	[*Insert speed*]
OPENINGS:	[*Insert number of openings*]
FLOORS SERVED:	[*Insert all floors served*]
TRAVEL:	[*Insert travel*]
MINIMUM CLEAR INSIDE CAR:	[*Insert dimensions*]
ENTRANCE SIZE:	[*Insert dimensions*]
ENTRANCE TYPE:	[*Insert type*]
OPERATIONAL CONTROL:	SINGLE OR GROUPED AUTOMATIC MICROPROCESSOR BASED SYSTEM NON-PROPRIETARY
DOOR OPERATION:	HIGH SPEED, HEAVY-DUTY MASTER DOOR OPERATOR, MINIMUM OPENING SPEED 2.2 F.P.S.

DOOR PROTECTION:	INFRARED, FULL SCREEN DEVICE, WITH DIFFERENTIAL TIMING AND NUDGING AND INTERRUPTED BEAM TIME
MACHINE:	GEARED TRACTION
MACHINE LOCATION:	[*Insert location of machine*]
SAFETY:	FLEXIBLE GUIDE CLAMP-TYPE B
MOTOR CONTROL:	AC VARIABLE VOLTAGE , VARIABLE FREQUENCY MICROPROCESSOR BASED WITH DIGITAL CLOSED-LOOP FEEDBACK AND AUTOMATIC STOPPING
GUIDE RAILS:	PLANED STEEL TEES; ADEQUATE TO SPAN 14'-0" WITHOUT ADDITIONAL SUPPORT
BUFFERS:	OIL
CAR ENCLOSURE:	AS SPECIFIED HEREIN AND AS DETAILED ON ARCHITECTURAL DRAWINGS
	CAR CANOPY HEIGHT [__ ’-__ ”]
	FINISH CEILING HEIGHT OF [__ ’-__ ”]; AS SPECIFIED AND AS DETAILED ON ARCHITECTURAL DRAWING
SIGNAL FIXTURES:	VANDAL RESISTANT; ALL BUTTONS SHALL HAVE STAINLESS STEEL CAPS WITH HALO LIGHTING
REGISTRATION LIGHTS:	DUAL HALL PUSHBUTTON RISERS ON ALL 3 CAR GROUPS; SINGLE HALL PUSHBUTTON RISER ON DUPLEX GROUPS; DUAL CAR OPERATING PANEL ON ALL CARS;
	MOUNT RECESSED FLUSH ON SIDEWALLS OF EACH CAR; VERIFY DESIGN ON ARCHITECTURAL DRAWINGS
	VANDAL-RESISTANT CAR AND HALL PUSHBUTTONS; VERIFY DESIGN ON DRAWINGS
CAR POSITION INDICATORS:	DIGITAL WITH DIRECTION ARROWS INSIDE CAR
COMBINATION HALL POSITION INDICATOR AND HALL LANTERNS:	VANDAL RESISTANT AT ALL FLOORS WITH VOLUME ADJUSTABLE ELECTRONIC CHIME OR TONE. SOUND TWICE FOR DOWN DIRECTION; VERIFY ON ARCHITECTURAL DRAWINGS

COMMUNICATION SYSTEM:	SELF DIALING, VANDAL RESISTANT, PUSH TO CALL, TWO-WAY COMMUNICATION SYSTEM WITH RECALL, TRACKING AND VOICELESS COMMUNICATION
ADDITIONAL FEATURES:	
	CAR AND COUNTERWEIGHT ROLLER GUIDES
	CAR TOP INSPECTION STATION
	FIREFIGHTERS' SERVICE, INCLUDING ALTERNATE FLOOR RETURN FEATURE
	STANDBY POWER TRANSFER (AUTOMATIC TO MAIN FLOOR) WITH MANUAL OVERRIDE IN FIRE CONTROL PANEL
	EMERGENCY MEDICAL AND GURNEY ACCESS AND SIGNAGE
	PROVIDE FAULT FINDING AND MONITORING PANELS IN EQUIPMENT ROOMS AND PROVIDE REMOTE WIRING TO PANELS.
	PROVIDE ALL EQUIPMENT AND WIRING NECESSARY TO INTERFACE WITH THE OWNER’S EXISTING HONEYWELL EBI BUILDING MANAGEMENT AND CONTROL SYSTEM FOR MONITORING EACH ELEVATOR. COORDINATE WITH HONEYWELL.
	HOISTWAY ACCESS SWITCHES AT TOP AND BOTTOM FLOORS
	INDEPENDENT SERVICE FEATURE
	PLATFORM ISOLATION
	LOAD-WEIGHTING DEVICE
	FIREFIGHTERS' CONTROL PANEL AND REMOTE WIRING
	MAIN CONTROL PANEL AND REMOTE WIRING
	VANDAL RESISTANT FASTENERS FOR SIGNAL FIXTURE FACEPLATES
	SILL SUPPORT ANGLES; MANUFACTURER’S STANDARD
	ONE YEAR WARRANTY MAINTENANCE WITH 24-HOUR CALLBACK SERVICE

	FIREFIGHTERS' TELEPHONE JACK INSTALLATION
	EMERGENCY PAGING SPEAKER INSTALLATION
	MACHINE, POWER CONVERSION UNIT, AND CONTROLLER SOUND ISOLATION
	SEISMIC DEVICES
	PAD BUTTONS AND VINYL-COVERED PADS
	INDIVIDUAL FLOOR LOCKOFF SWITCHES; ALL FLOORS LOCATED ON MAIN CONTROL PANEL
	CARD READERS; PROVISIONS ON THE CAR OPERATION PANELS FOR ALL CARS WHERE INDICATED ON DRAWINGS
	CCTV PROVISIONS
	BATTERY PACK EMERGENCY CAR LIGHTING. PROVIDE SEPARATE CONSTANT PRESSURE TEST BUTTON IN CAR SERVICE COMPARTMENT ILLUMINATE PORTION OF NORMAL CAR LIGHTING
	SIGNAGE ENGRAVING FILLED WITH BLACK PAINT OR APPROVED ETCHING PROCESS
	NO VISIBLE COMPANY NAME OR LOGO
	WIRING DIAGRAMS, OPERATING INSTRUCTIONS, AND PARTS ORDERING INFORMATION
	SYSTEM DIAGNOSTIC MEANS AND INSTRUCTIONS
	NON-PROPRIETARY CONTROL SYSTEM AND DIAGNOSTICS PROVISIONS
WEATHER PROOFING:	WEEP HOLES IN CAR AND HOISTWAY SILS TO DRAIN WATER. GALVANIZED TUBE TO DRAIN WATER INTO PIT TO BE ATTACHED TO THE HOISTWAY SILLS.
	FULL WIDTH BOTTOM DOOR GIBS ON CAR AND HOISTWAY DOORS.
	RUBBER SAFETY ASTRAGALS FULL ENTRANCE HEIGHT OF LEADING EDGA OF CAB AND HOISTWAY DOORS.

WEATHERPROOF ELECTRICAL CONNECTIONS ON CAR TOP EQUIPMENT, ON OPERATING PANEL, AND ON NEW JUNCTION BOXES. ALL ELECTRICAL BOXES ON THE CAR AND ON THE CAR TOP SHALL BE WEATHERPROOF, WATER TIGHT, AND GALVANIZED.

TOP AND BOTTOM ROLLERGUIDE FENDERS.

SLOPE EXTERIOR CAR ROOF AWAY FROM FRONT OF HOIST.

HOISTWAY SIDE OF CAR WALLS AND CANOPY TO BE SATIN STAINLESS STEEL.

CAULK WALL JOINTS IN CAR WALLS AND CANOPIES.

WEATHER STRIPPING AROUND EMERGENCY EXIT IN CANOPY.

PROVIDE EITHER HOT DIPPED GALVANIZED METAL OR PAINT WITH THREE COATS OF RUSTOLEUM ALL EXPOSED FERROUS METAL ON CAR AND ON ALL NEW HOISTWAY.

WIRING THE FOLLOWING EQUIPMENT SHALL BE PROVIDED WITH WEATHER RESISTANT WATER TIGHT HOUSING:

LIMIT SWITCHES
INTERLOCKS
CAR OPERATING STATION ON TOP OF THE ELEVATOR
CAR DOOR CONTACT

CAR OPERATING MECHANISM AND ELECTRICAL EQUIPMENT

2.2 MATERIALS [*modify as required by project*]

A. Steel:

1. Sheet Steel (Furniture Steel for Exposed Work): Stretcher-leveled, cold-rolled, commercial quality carbon steel, complying with ASTM A366, matte finish.
2. Sheet Steel (for Unexposed Work): Hot-rolled, commercial quality carbon steel, pickled and oiled, complying with ASTM A568 and A569.
3. Structural Steel Shapes and Plates: ASTM A7 and ASTM A36.

B. Stainless Steel: Type 302 or 304 complying with ASTM A167. Provide with standard tempers and hardness required for fabrication, strength and durability. Apply mechanical finish on fabricated work in the locations shown or specified (Federal Standard and

NAAMM nomenclature) with texture and reflectivity required to match Owner's sample. Protect with adhesive-paper covering.

1. No. 4: Directional polish (satin finish). Graining directions as shown or, if not shown, in longest dimension.
2. No. 8: Reflective polish (mirror finish).
3. Burnished: Non-directional, random swirl pattern.

C. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.

D. Nickel Silver Extrusions: ASTM B151)ASTM B151M), alloy UNS No. C74500.

E. 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.

F. 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.

G. Baked Enamel Finish: Prime finish per Item E. above. Unless specified “prime finish” only, apply and bake 3 additional coats of enamel in the selected solid color.

2.3 CAR PERFORMANCE [*modify as required by project*]

A. Car Speed: +/- 3% of contract speed under any loading condition.

B. Car Capacity: Safely lower, stop and hold up to 125% of rated load.

C. Car Stopping Zone: +/- 1/4" under any loading condition.

D. Door Opening Time: All Cars: Seconds from start of opening to fully open:

1. 2.0 seconds (4’-6” single speed center opening)
2. 3.1 seconds (6’-0” two speed center opening)

E. Door Closing Time: All Cars: Seconds from start of closing to fully closed:

1. 3.0 seconds (4’-6” single speed center opening)
2. 3.3 seconds (6’-0” two speed center opening)

F. Car Floor-to-Floor Performance Time: 15 seconds from start of doors closing until doors 3/4 open (1/2 open for side opening doors) and car in stopping zone at next successive floor under any loading condition or travel direction (Based on 12’-0” typical floor height).

G. Car Ride Quality:

1. Horizontal acceleration within car during all riding and door operating conditions: Not more than 20 mg peak to peak in the 1-10 Hz range.
2. Acceleration and Deceleration: Smooth constant and not more than 5

feet/second/second with an initial ramp between 0.5 and 0.75 second.

3. Sustained Jerk: Not more than 8 feet/second/second squared.

H. Sound Isolation:

1. Noise level relating to elevator equipment and its operation shall not exceed 60 dBA in the machine room.
2. All dBA readings to be taken 3 feet off the floor and 3 feet from the equipment.
3. Airborne Noise: Measured noise level of elevator equipment and its operation shall not exceed 50 dBA in elevator lobbies and 60 dBA inside car under any condition including door operation and car ventilation exhaust blower on its highest speed.

I. Vibration Isolation: All elevator equipment provided under this contract, including power conversion unit, controller and their support, shall be mechanically isolated from the building structure and from electrically induced vibration to minimize the possibility of objectionable noise and vibrations being transmitted to the car, building structure, or occupied areas of the building.

J. Radio Frequency Protection: The elevator equipment shall operate properly with a 500 KHZ to 1300 MHZ radio frequency signal, transmitted at a power level of not less than 100 watts effective radiated power (ERP) at a distance of 3 feet. The equipment shall be provided with electro-magnetic interference (EMI) shielding within FCC guidelines and per airport requirements.

2.4 OPERATION [*modify as required by project*]

A. Selective Collective Microprocessor Based:

1. Operate car without attendant from pushbuttons in car and located at each floor. When car is available, automatically start car and dispatch it to floor corresponding to registered car or hall call. Once car starts, respond to registered calls in direction of travel in order floors are reached.
2. Do not reverse car direction until all car calls have been answered or until all hall calls ahead of car and corresponding to direction of car travel have been answered.
3. Slow car and stop automatically at floors corresponding to registered calls, in the order in which they are approached in either direction of travel. As slowdown is initiated for a hall call, automatically cancel hall call. Cancel car calls in same manner. Hold car at arrival floor an adjustable time interval to allow passenger transfer.
4. Answer calls corresponding to travel direction of car unless call in the opposite direction is highest or lowest call registered.
5. Illuminate appropriate pushbutton to indicate call registration. Extinguish light when call is answered.

B. Other Items:

1. Load Weighing: Provide means for weighing car passenger load. Design control system to provide dispatching at main floor in advance of normal intervals when car fills to capacity. Provide hall call by-pass when the car is filled to preset

percentage of rated capacity and traveling in down direction. (Field adjustment range: 10% to 100 %.)

2. Independent Service: Provide controls for operation of each car from its pushbuttons only. Close doors by constant pressure on desired destination floor button or door close button. Open doors automatically upon arrival at selected floor.
3. Car-to-Lobby Feature: Provide the means for automatic return to **[*insert level*]**. Return car nonstop after answering pre-registered car calls, and park with doors open until car is returned to normal operation.

C. Firefighters' Service: Provide equipment and operation in accordance with Code requirements.

D. Automatic Stopping Zone: Stop car within 3/8" above or below the landing sill. Avoid overtravel/undertravel, and maintain stopping accuracy regardless of load in car, direction of travel, or distance between landings, rope slippage or stretch.

E. Motion Control: Microprocessor based AC, variable-voltage, variable frequency with digitally encoded closed-loop velocity feedback suitable for operation specified and capable of providing smooth, comfortable car acceleration, retardation, and dynamic braking. Limit the difference in car speed between full load and no load to not more than +/-3% of the contract speed.

F. Door Operation: Automatically open door when car arrives at main floor whether car call has been registered or not. Provide “heavy door/variable air pressure” feature for operation of doors at all levels within appropriate inertia limits.

G. Standby Lighting and Alarm: Car-mounted, battery unit with solid-state charger to operate alarm bell and car emergency light fixture. Battery to be rechargeable with minimum 5-year life expectancy. Provide constant pressure test button in service compartment of car operating panel. Provide lighting integral with portion of normal car lighting system. Include required transformer.

H. Standby Power Transfer: Upon loss of normal power, adequate standby power will be supplied via the normal electrical feeders to simultaneously start and run one car in each group and single cars at rated speed and load.

1. Automatically return one car at a time, in each group, nonstop to designated floor, open doors for approximately 3.0 seconds, close doors and park car out-of-service. During return operation, car and hall call pushbuttons shall be rendered inoperative. As each car parks, system shall immediately select next car until all cars in a group have returned to the designated floor. If a car fails to start or return within 30 seconds, system shall automatically select next car in the group to automatically return. When all cars in a group have returned to the designated floor, one car in each group shall be designated for automatic operation. When a service demand exists for two minutes and the designated car fails to start, the next available car in the group shall be automatically selected for operation.
2. Provide separate key-operated group rotary switch in the firefighters' control panel. Switch shall be labeled “Standby Power Override” with positions marked “Auto” and the appropriate car numbers. Key shall be keyed differently than utilized for firefighters' Phase I and II switch, key removable in “Auto” position

only.

a. Switch shall override automatic return and automatic selection functions, and shall cause the manually selected car to operate. Manual selection shall cause car to start and proceed to the designated floor and open and close its doors before standby power is manually transferred to the next selected car.
b. Provide “Standby Power” indicator lights (one per car) in firefighters' control panel control panel. Indicator light illuminates only when corresponding car is selected to automatically or manually operate on standby power.
c. Successive starting: When normal power is restored or there has been a power interruption, individual cars in each bank shall restart at five second intervals.

I. Card/Proximity Reader Security System: Provide provisions inside all cars and adjacent to hall pushbuttons for the reader unit as indicated on the drawings. Mount reader unit as detailed on the architectural drawings and cross connect from car pushbuttons to control module in machine room via five pair of shielded wires and two RG-6/U type coaxial cables. Provide a filler plate to match slot size and car return panel finish including direction of graining where card slot is not initially utilized. Size and requirements as required by the Contractor.

2.5 MACHINE ROOM EQUIPMENT [*modify as required by project*]

A. Arrange equipment in spaces shown on drawings.

B. Geared Traction Hoist Machine:

1. Worm geared traction type with motor, brake, gear, drive shaft, deflector sheave, and gear case mounted in proper alignment on an isolated bedplate. Provide blocking to elevate deflector sheave above machine room floor.
2. Provide hoist machine mounted direct drive, digital, closed-loop velocity encoder.
3. Provide hoist machine drip pans to collect lubricant seepage.
4. Provide machine bedplate mounted deflector sheave A-frame and/or supporting steel beams and fastenings to mount deflector sheaves to building structure. Provide minimum 16-gauge easily removable sheet metal closures in wall opening around machine between the machine room and hoistway.
5. Provide ladders and platforms with handrails and toe plates for overhead sheave access.

C. Solid State Power Conversion and Regulation Unit:

1. Design unit to limit current, suppress noise, and prevent transient voltage feedback into building power supply. Provide internal heat sink cooling fans for the power drive portion of the converter panels. Conform to IEEE standards 446-1987 for line harmonics and switching noise.
2. Isolate unit to minimize noise and vibration transmission. Provide isolation transformers, filter networks, and choke inductors.
3. Suppress solid-state converter noises, radio frequency interference, and eliminate regenerative voltage transients induced into the mainline feeders or the

building standby power generator.

4. Supplement direct-current power for the operation of hoist machine brake, door operator, dispatch processor, signal fixtures, etc., from separate static power supply.

D. Encoder: Direct drive, solid-state, optical, digital type. Update car position at each floor and automatically restore after power loss.

E. Controller: UL/CSA labeled.

1. Compartment: Securely mount all assemblies, power supplies, chassis switches, relays, etc., on a substantial, self-supporting steel frame. Completely enclose equipment with covers. Provide means to prevent overheating.
2. Relay Design: Magnet operated with contacts of design and material to insure maximum conductivity, long life and reliable operation without overheating or excessive wear. Provide wiping action and means to prevent sticking due to fusion. Contacts carrying high inductive currents shall be provided with arc deflectors or suppressors.
3. Microprocessor-Related Hardware:

    a. Provide built-in noise suppression devices which provide a high level of noise immunity on all solid-state hardware and devices.
    b. Provide power supplies with noise suppression devices.
    c. Isolate inputs from external devices (such as pushbuttons) with opto-isolation modules.
    d. Design control circuits so that one side of power supply is grounded.
    e. Safety circuits shall not be affected by accidental grounding of any part of the system.
    f. System shall automatically restart when power is restored.
    g. System memory shall be retained in the event of power failure or disturbance.
    h. Equipment shall operate properly with a 500 KHZ to 1300 MHZ radio frequency signal, transmitted at a power level of not less than 100 watts Effective Radiated Power (ERP) at a distance of 3 feet.
    i. Equipment shall be provided with Electro Magnetic Interference (EMI) shielding within FCC guidelines.

4. Wiring: CSA labeled copper for factory wiring. Neatly route all wiring interconnections and securely attach wiring connections to studs or terminals.
5. Permanently mark components (relays, fuses, PC board, etc.) with symbols shown on wiring diagrams.
6. Provide controller or machine mounted auxiliary, lockable “off” disconnect if mainline disconnect not in sight of controller and machine.
7. Monitoring System Interface: Provide controller with serial data link through RJ45 Ethernet CAT 6 or data connection and install all devices necessary to provide monitoring, which is compatible with the existing Building Management Control System. Provide monitoring for the following:

    a. Location
    b. Power
    c. Safeties

d. Doors and Gates Closed
e. Door Open Signal
f. Door Close Signal
g. Door Fully Open
h. Door Fully Closed
i. Photo Eye Beam Broken
j. Up Direction
k. Down Direction
l. Running
m. Level with Floor
n. In Car Stop Switch Open
o. Car on Automatic
p. Gate Closed
q. Doors Closed
r. On Independent Service
s. On Emergency Power
t. On Earthquake
u. On Fire Phase I
v. On Fire Phase II
w. Top or Bottom Limit Switch Open
x. Car Safeties Set
y. Safety Circuit
z. Power to Controller ON
aa. Safety, Power, and Limits OK

Contractor responsible to connect monitoring system interface to machine room monitoring compartment and LAN.

F. Sleeves and Guards: 2" steel angle guards around cable or duct slots through floor slabs or grating. Provide rope and smoke guards for sheaves, cables, and cable slots in machine room and secondary levels.

G. Machine and Equipment Support Beams: Provide structural steel beams required for direct support of elevator hoist machine, deflector sheaves, overhead sheaves, governor, and dead-end hitch assemblies. Overhead machines shall employ the use of structural slab.

1. Provide bearing plates, anchors, shelf angles, blocking, embedments, etc., for support and fastening of machine beams or equipment to the building structure.
2. Isolate overhead beams to eliminate noise and vibration transmission to building structure.
3. Provide and set in place, hold down bolts for machines located beside the hoistway.
4. Provide ladders and platforms with handrails and toe boards for overhead structure.

H. Governor: Centrifugal-type, car driven, with pull-through jaws and bi-directional electrical shutdown switches. Provide required auxiliary supports for attachment to building structure.

I. Emergency Brake: Provide means to prevent ascending car overspeed and unintended

car movement.

2.6 HOISTWAY EQUIPMENT [*modify as required by project*]

A. Guide Rails: Planed steel T-sections of suitable size and weight for the application, structural support spacing, car weight, counterweight, and seismic reactions, with brackets for attachment to building structure. Provide car rail backing and intermediate counterweight tie brackets to meet Code requirements. Rails shall be designed to span 14'-0" without additional supports.

B. Buffers, Car and Counterweight: Oil with blocking and support channels. Provide switch on buffer to limit car speed if buffer is compressed. Provide buffer access ladders and platforms, and grating as required for access to pit equipment.

C. Sheaves: Machined grooves with sealed bearings. Provide mounting means to machine beams, machine bedplate, car and counterweight structural members, etc. Code required access to overhead sheaves from the car top or inside hoistway is Contractor's responsibility. Locate sheaves to be accessible from the top of the car.

D. Pit Access: Provide electrical interlocks where walk in pit access doors or emergency hoistway access doors are shown.

E. Counterweight: Steel frame with metal filler weights, guided by roller guide shoes.

F. Counterweight Guard: Metal guard in pit.

G. Governor and Encoder Pit-Tensioning Sheave: Mount sheave and frame on pit support member or guide rail. Provide with guides or pivot point to enable free vertical movement and proper tension of cable/tape.

H. Hoist and Governor Ropes:

1. 8 x 19 or 8 x 25 Seale construction, traction steel type. Fasten with staggered length adjustable spring isolated shackles.
2. Governor rope to suit manufacturer's specification.

I. Terminal Stopping: Provide normal, final and emergency terminal speed limiting devices.

J. Electrical Wiring and Wiring Connections:

1. Conductors and Connections: Copper throughout with individual wires coded and connections on identified studs or terminal blocks. Use no splices or similar connections in wiring except at terminal blocks, control compartments, junction boxes, or condulets. Provide 10% spare conductors throughout. Run spare wires from car connection points to individual elevator controllers in the machine room. Provide four pairs of spare shielded communication wires in addition to those required to connect specified items. Tag spares in machine room.
2. Conduit: Painted or galvanized steel conduit and duct. Conduit size, 3/4" minimum. Flexible conduit not to exceed 36" in length. Flexible heavy-duty service cord may be used between fixed car wiring and car door switches for door protective devices.

3. Traveling Cables: Cables shall comply with APTA specifications (as referenced herein). In the event of conflict between the specifications and APTA, the more stringent requirements shall prevail. In the case of equal requirements, the APTA requirements shall prevail.
4. Auxiliary Wiring: Connect smoke sensors, emergency telephone system, firefighters' phone jack, paging speaker, CCTV, card reader, intercom, and announcement and/or background music in each car controller in machine room.

K. Entrance Equipment:

1. Door Hangers: Two-point hanger roller with neoprene roller surface and suspension with eccentric upthrust roller adjustment.
2. Door Tracks: Bar or formed, cold-drawn removable steel tracks with smooth roller contact surface.
3. Door Interlocks: Operable without retiring cam. Paint interlocks flat black. Enclose interlock wiring in flexible steel conduit with covering of liquid tight Type “EF” with connectors having nylon insulated throat. Interlock and wiring shall comply with APTA specifications (as referenced herein). In the event of conflict between the specifications and APTA, the more stringent requirements shall prevail. In the case of equal requirements, the APTA requirements shall prevail.
4. Door Closers: Spring, spirator or jamb/strut mounted counterweight type. Design and adjust to insure the smooth quiet mechanical close of doors.
5. Hoistway switches: Mount in entrance frame side jamb at top and bottom floors. Provide switch without faceplate.

L. Floor Numbers: Stencil paint 4" high floor designations in contrasting color on inside face of hoistway doors at each landing and adjacent to the leading edge of the door.

2.7 HOISTWAY ENTRANCES [*modify as required by project*]

A. Complete entrances assembly shall be UL labeled.

B. Frames: Brushed No. 4 stainless steel (verify on drawings) at all floors. Mitered and welded flush head to jamb connection assembly fabricated from not less than 14-gauge material. All frames shall be securely fastened to fixing angles mounted in the hoistway.

C. Entrance Frame Braille: Permanently attach rear and flange mount Arabic floor designation plates, centerline at 60” above finished floor, on both side jambs. Provide main egress landing plates with “Star” designation. Provide rear and flange mounted “Star of Life” designation plate at height of 78” – 84” above finished floor on both side jambs.

D. Door Panels: 14-gauge hollow metal steel sandwich construction without binder angles. Panels front and rear, framing. Operating levels and integral hardware shall be type 304 stainless steel; panel shall be 2 mm. Provide a textured stainless steel (verify on drawings), sandwich construction without binder angles. Provide a minimum of two gibs per panel, one at leading and one at trailing edge with gibs in the sill groove their entire length of travel. Construct doors with interlocking, stiffening ribs. Architectural metal cladding shall wrap around leading and trailing edge of panel and return a minimum of 2" on rear side of panel.

E. Sight Guards: 14-gauge, same material and finish as hoistway entrance door panels. Construct without sharp edges.

F. Sills: Extruded stainless steel type 304. Extend sills entire length of door travel.

G. Sill Support Angles: Structural or formed steel designed to support door sill, based upon car loading classification. Mount to eliminate need for grout under the sill. 5" x 5" x 1/2" cold-rolled structural steel angle, extend full width of hoistway. Fasten to building structure at maximum 12" on center.

H. Fascia, Toe Guards and Hanger Covers: Provide 304 stainless steel fascia. Provide fascia for express hoistway travel. Provide fascia, toeguards and hanger covers for rear entrances.

I. Struts and Headers: Provide for vertical support of entrances and related material. Provide door open bumpers on entrances equipped with vertical struts.

2.8 CAR EQUIPMENT [*modify as required by project*]

A. Frame: Welded or bolted, rolled or formed steel channel construction to accommodate load classification requirements.

B. Safety Device: Type “B”, flexible guide clamp.

C. Platform: Isolated type, constructed of steel, or steel and wood which is fireproofed on the underside. Design and construct to accommodate load classification requirements. Minimum Class “A” construction for all passenger elevators.

D. Guide Shoes: Roller type with three or more spring dampened, sound-deadening rollers per shoe; 5" minimum roller diameter.

E. Finish Floor Covering: Provide ¾” thick water tight marine plywood subfloor.

1. Provide finish floor material as detailed on drawings and shown in the finish schedule.

F. Sills: One piece nickel silver extrusion with extruded extension between car entrance columns to face of car front return. Extruded extension to match finish of sill. Extend sills entire length of door travel.

G. Toe Guard: Reinforced and braced to car platform, with flat black finish.

H. Doors: Provide as specified for hoistway entrance doors.

I. Door Hangers: Two-point hanger roller with neoprene roller surface and suspension with eccentric upthrust roller adjustment.

J. Door Track: Bar or formed, cold-drawn removable steel track with smooth roller contact surface.

K. Door Header: Shape to provide stiffening flanges.

L. Door Electrical Contact: Prohibit car operation unless car door is closed within tolerance allowed by Code.

M. Door Clutch: Heavy-duty clutch, linkage arms, drive blocks and pickup rollers or cams to provide positive, smooth, quiet door operation. Design clutch so car doors can be closed, while hoistway doors remain open.

N. Restricted Opening Device: Restrict opening of car doors outside the unlocking zone.

O. Door Operator: High speed, heavy-duty, closed loop master door operator capable of opening doors at no less than 2.2 f.p.s. Accomplish reversal in no more than 1/2 of door movement. Open doors automatically when car arrives at a floor.

1. Acceptable closed-loop door operators:

a.	Otis	I Motion II
b.	G.A.L.	MOVFR
c.	ThyssenKrupp	HD 91 Startrac
d.	Schindler	QKS 15
e.	KONE	AMP 2.0
f.	Mitsubishi	LV4K

P. Door Control Device:

1. Infrared Reopening Device: 3D Reopening device. Black, fully enclosed device. Full screen infrared matrix or multiple beams extending vertically along edge of each leading door panel. Device shall prevent doors from closing and reverse doors at normal opening speed if beams are obstructed while doors are closing, except during nudging operation. Include discreet beams at 5" and 29" above floor for ADA compliance. If device fails, provide for automatic shutdown of car at floor level with doors open.

a. Acceptable Infrared 3D Reopening Device:

1) Microlite 3D by Thyssen Corporation
2) Pana 40 Plus 3D by Janus Products
3) Lambda 3D by Otis Elevator Company

2. Nudging Operation: After beams of door control device are obstructed for a predetermined time interval (minimum 20.0-25.0 seconds), warning signal shall sound and doors shall attempt to close with a maximum of 2.5 foot pounds kinetic energy. Activation of the door open button shall override the nudging operation and reopen the 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 open 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. Use hall call time when car responds to coincidental calls.

Q. Car Operating Panel:

1. Two (2) car operating panels consisting of a metal box containing the operating vandal without faceplate as detailed on architectural drawings. Mount recessed flush on car side or front panels as indicated. Provide each panel with continuous hinge and concealed three point latching. Provide a type 304 stainless steel #4 vertical finish panel.
2. Suitably identify assemblies including floor buttons, alarm button, door open button, door close button with SCS, Visionmark or Entrada Cast Tactile symbols recessed flush flange and rear mounted. Provide plates per ADA Standards and Local Accessibility Standards including Braille. Locate operating controls no higher than 48" above the car floor; no lower than 35" for alarm button.
3. Provide minimum 3/4" diameter vandal resistant floor pushbuttons designed to bottom out against the panel plate and not the contacts, key switches or other operating components. Provide with stainless steel caps and halo lighting. Illuminate to indicate call registration. Include 5/8" high designation of the floors.
4. Provide alarm button at bottom of car operating panel to ring bell located on car, and sound distress signal at control panel. Illuminate button when actuated.
5. Provide keyed stop switch with markings to show “run” and “stop”. Locate in panel faceplate or in locked car service compartment. Arrange switch or button to sound main control panel distress signal when actuated.
6. Provide “door open” button to stop and reopen closing doors or hold doors in open position. Button operable only while car is stopped at a floor regardless of special operational features, except firefighters' service.
7. Provide “door close” button to activate door close cycle. Cycle shall not begin until normal door dwell time for a car call has expired, except firefighters’ service.
8. Provide firefighters' Phase II key switch with engraved instructions per Code requirements. Include light jewel, buzzer, and call cancel button.
9. Provide firefighters' telephone jack with bezel matching adjacent controls.
10. Provide lockable service compartment with recessed flush door. Door material and finish to match car return panel or car operating panel faceplate.
11. In-Service Cabinet: Include the following controls with function and operating positions identified by engraved signage painted black:

    a. Inspection switch.
    b. Light switch.
    c. 3-speed exhaust blower switch.
    d. Independent service switch.
    e. Constant pressure test button for battery pack emergency lighting.
    f. 120-volt, AC, GFCI protected electrical convenience outlet.
    g. Car lighting dimmer switch.
    h. Card reader override switch.
    i. Stop switch, if allowed by code.

12. Provide black paint filled, engraved or approved etched signage with size and style approved by Owner as follows:

a. Phase II firefighters' operating instructions on main operating panel above corresponding keyswitch.
b. Car number on main car operating panel.
c. “NO SMOKING” on main car operating panel.
d. Car capacity in pounds on main car operating panel.
e. Any code required language.
f. Building name and address, including terminal designation.
g. Certificate of Inspection on file in Risk Management Office.

13. Extended Door Hold Open Button: Provide button to extend normal door hold open period up to 30 seconds. Cancel extended time by registration of destination car call or actuation of door close button.

R. Car Top Control Station: Per Code. Mount to provide utilization while standing in an upright position.

S. Work Light and Duplex Plug Receptacle: GFCI protected outlet top and bottom of car. Include on/off switch and lamp guard.

T. Communication System:

1. “Push to Call”, two-way communication instrument in car with automatic dialing, tracking and recall features with shielded wiring to car controller in machine room. Provide dialer with automatic rollover capability with minimum two numbers.

a. “Push to Call” button or adjacent light jewel shall illuminate and flash when call is acknowledged. Button shall match floor pushbutton design. Provide uppercase “PUSH TO CALL”, “HELP ON THE WAY” engraved signage Sans Serif or simple Serif type.
b. Provide a “Push to Call” button tactile symbol engraved signage and Braille adjacent to button mounted integral with car front return panel.

2. Firefighters' telephone jack in car and firefighters' panel, with four shielded wires to machine room junction box. Jack bezel shall match adjacent controls.
3. Install remote speaker in car canopy with shielded wiring to machine room junction box.
4. Provide two-way communication between car and machine room per ASME Code A 17.1, Rule 2.11.1 (c).

2.9 CAR ENCLOSURE [*modify as required by project*]

A. Provide complete car enclosure as specified herein. Verify design on architectural drawings. Provide the following features:

1. Shell: Reinforced 14-gauge furniture steel with interior finish as selected. Wall panels shall not exceed 15” widths. Apply sound-deadening mastic to exterior.
2. Canopy: Reinforced 12-gauge furniture steel with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
3. Front Return Panels and Integral Entrance Columns: Reinforced 14-gauge

brushed No. 4 stainless steel; verify on architectural drawings.

4. Entrance Columns: Extend to top of cars; reinforced 14-gauge stainless steel; verify on architectural drawings.
5. Transom: Reinforced 14-gauge brushed No. 4 stainless steel full width of enclosure; verify on architectural drawings.
6. Car Door Panels: Minimum reinforced 14-gauge textured stainless steel or as detailed on architectural drawings. Same construction as hoistway door panels. Architectural metal cladding to wrap around leading and trailing edge of panel and return a minimum of 1" on rear side of panel.
7. Floor: As detailed on architectural drawings.
8. Base: Sandstone finish stainless steel with concealed ventilation cutouts.
9. Interior Wall Finish: Provide wall panels per requirements of Specification Section 10250.
10. Ventilation: Three-speed exhaust blower mounted to car canopy on isolated rubber grommets. Morrison Products, Model AA with diffuser and grille.
11. Lighting: Provide halogen fixtures with wiring and hookup. Coordinate with emergency lighting requirements. Provide emergency lighting integral with portion of normal car lighting system. Include required transformer. Provide temporary lighting as required.
12. Suspended Ceiling: Brushed stainless steel drop ceiling with provisions for 9 mini halogen down lights, as detailed on architectural drawings.
13. Handrails: Two lines. Top line 1-1/2” diameter type 304 solid stainless steel #4 brushed finish and wall connectors. Lower line 5” x 3/8" solid stainless steel flatstock bars mounted on both sides and rear of car. Locate lower handrail line at 10” to centerline above finished floor; top handrail line at 32” above finished floor. Bolt handrails through car walls from back and mount on 1-1/2” deep round stainless steel standoff spacers no more than 15” on center. Return handrail ends to car walls.
14. Pads and Buttons: Provide three-piece removable pads. Two pads covering sidewalls and adjacent front returns and one covering rear wall. Provide cutouts to access main car operating panel. One set for each group of elevators. Provide hooks for all elevators.

2.10 HALL CONTROL STATIONS [*modify as required by project*]

A. Pushbuttons: Provide dual risers for 3 car groups and a single riser for 2 car groups. Provide with flush mounted stainless steel faceplates for each group. Include pushbuttons for each direction of travel which illuminate to indicate call registration. Include approved engraved message and pictorial representation prohibiting use of elevator during fire or other emergency situation as part of faceplate. Pushbutton design shall match car operating panel pushbuttons. Provide vandal resistant pushbuttons designed to bottom out against the panel plate and not the contacts, key switches or other operating components. Provide vandal resistant light assemblies with stainless steel caps and halo lighting with special faceplates; verify design on architectural drawings.

B. Hoistway Access Switches: Mount in entrance frame side jamb at top and bottom floors. Provide fixture without faceplate.

2.11 SIGNALS [*modify as required by project*]

A. Combination Hall Lantern and Hall Position Indicator: Provide alpha-numeric digital indicator type at each entrance to indicate position and travel direction of arriving car. Illuminate up or down lights and sound tone twice for down direction travel prior to car arrival at floor. Sound level to be adjustable from 20-80 dBA measured at 5'-0" in front of hall pushbutton and 3'-0" off floor. Illuminate light until the car doors start to close. Provide advanced hall lantern notification to comply with ADA hall call notification time. Minimum 2-1/2" in the smallest dimension, arrow lenses with stainless steel faceplates for each group.

B. Car Position Indicator: Alpha-numeric digital indicator type containing floor designations and direction arrows a minimum of 1/2" high to indicate floor served and direction of car travel. Locate fixture in car front return panel. When a car leaves or passes a floor, illuminate indication representing position of car in hoistway. Illuminate proper direction arrow to indicate direction of travel.

C. Floor passing tone: Provide an audible tone of no less than 20 decibels and frequency of no higher than 1500 Hz, to sound as the car passes or stops at a floor served.

D. Voice Synthesizer: Provide electronic device with easily reprogrammable message and female or male voice to announce car direction, floor, emergency exiting instructions, etc.

E. Verify design on architectural drawings.

2.12 GROUP CONTROL AND DISPLAY PANEL [*modify as required by project*]

A. Main Control Panel: Provide a control panel and color SVGA with the capability to activate, display, monitor, or control the following functions. Locate as shown on plans.

1. On/Off means to place car in or out of service. When placed in “off” position, return car(s) nonstop to designated floor and park with door(s) open for an adjustable period of 1 to 3 minutes. At expiration of time, restore car to service.
2. Car operating on normal/standby power.
3. Car position and direction of travel.
4. Car calls.
5. Hall calls.
6. Operating mode.
7. Door status.
8. Delayed car.
9. Load weighting and by-pass.
10. Car to lobby feature.
11. Car in/out of service.
12. Seismic operation.
13. Alarm distress signal.
14. Card reader override. Individual car on/off provisions.

Where applicable, identify all indicators and manual switches with appropriate engraving. Provide wiring to control panel. Size and location as detailed on drawings.

B. Fire Fighters' Control Panel: Locate in building fire control room as shown on architectural drawings. Fixture faceplate, No. 4 brushed finish stainless steel, including the following features:

1. Car position and direction indicator (digital-readout or color SVGA display type). Identify position indicator with car number.
2. Indicator showing operating status of car.
3. Wiring to panel.
4. Manual car standby power selection switch and power status indicator.
5. Firefighters' telephone jack.
6. Identify emergency elevators with engraved identification.

C. Firefighters' Key Box: Flush-mounted box with lockable, hinged cover. Engrave instructions for use on cover per Clark County Fire Department requirements.

D. Machine Room Monitoring System: Provide on-site remote monitoring capability.

1. Include accumulation of hall call registration information as part of monitoring capability. Provide memory capacity for at least the preceding five, 24-hour periods, in blocks of 5 or 15-minute segments, running hour to hour (i.e., 2:00 p.m. to 3:00 p.m.) Provide battery backup to prevent loss of accumulated data due to loss of normal power.
2. Accumulate information for retrieval and use as follows:

    a. Visual and printed summary of hall call registration events by floor, direction, and duration, totaled in 5 or 15 minute segments during any 60-minute blocks using an internal clock.
    b. Visual and printed summary of hall call registration duration averaged for 5 or 15 minute and hourly periods.
    c. Visual and printed summary of percentage of hall calls answered within 30 and 60 seconds in each minute and hourly period.
    d. Visual and printed summary of time periods during which individual cars are not in group operation (operating separately or out of service).

3. Provide printer and interface with elevator microprocessor control in the machine room to download data and/or produce a hard copy of stored data. Provide directions and software to accomplish information retrieval.

2.13 SEISMIC OPERATIONS AND EQUIPMENT

A. Provide design, components and operation per governing code. Provide dual counterweight derailment sensing wires vertically each side of counterweight the entire height of travel. The counterweight frame shall be equipped with a minimum of four derailment rings. A dual axis seismic switch shall be provided that will activate at no less than 0.15 times gravity in the vertical or horizontal directions. A minimum of one seismic switch shall be provided per single or group of elevators. Counterweight retainer plates must be bolted; welded plates are not acceptable.

PART 3 - EXECUTION

3.1 SITE CONDITION INSPECTION

A. Prior to beginning installation or equipment, examine hoistway and machine room areas. Verify that no irregularities exist which affect execution of work specified.

B. Do not proceed with installation until work in place conforms to project requirements.

3.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver material in manufacturer's original, unopened protective packaging.

B. Store material in original protective packaging. Prevent soiling, physical damage, or moisture damage.

C. Protect equipment and exposed finishes from damage and stains during transportation, erection, and construction.

3.3 INSTALLATION

A. Install all equipment in accordance with manufacturer's instructions, referenced Codes, specification and approved submittal.

B. Install machine room equipment with clearances in accordance with referenced Codes and specification.

C. Install all equipment so it may be easily removed for maintenance and repair.

D. Install all equipment for ease of maintenance.

E. Install all equipment to afford maximum accessibility, safety, and continuity of operation.

F. Remove oil, grease, scale, and other foreign matter from the following equipment and apply one coat of field-applied machinery enamel.

1. All exposed equipment and metal work installed as part of this work which does not have architectural finish.
2. Machine room equipment, hoistway equipment including guide rails, guide rail brackets, and pit equipment.
3. Neatly touch up damaged factory-painted surfaces with original paint and color. Protect machine-finish surfaces against corrosion.

3.4 FIELD QUALITY CONTROL

A. Have Code Authority acceptance inspection performed and complete corrective work.

3.5 ADJUSTMENTS

A. Install rails plumb and align vertically with tolerance of 1/16" in 100'-0". Secure joints without gaps and file any irregularities to a smooth surface.

B. Static balance car to equalize pressure of guide shoes on guide rails.

C. Lubricate all equipment in accordance with manufacturer's instructions.

D. Adjust motors, valves, controllers, leveling switches, limit switches, stopping switches, door operators, interlocks, and safety devices to achieve required performance levels.

3.6 CLEANUP

A. Keep work areas orderly and free from debris during progress of project. Remove packaging materials on a daily basis.

B. Remove all loose materials and filings resulting from work.

C. Clean machine room equipment and floor.

D. Clean hoistways, car, car enclosure, entrances, operating and signal fixtures.

3.7 ACCEPTANCE INSPECTION AND TESTS

A. General: Furnish labor, materials, and equipment necessary for tests. Notify Owner five (5) days in advance when ready for final review of unit or group. Final acceptance of installation will be made only after all field-quality control reviews have been completed, identified deficiencies have been corrected, all Owner information and certificates have been received, and the following items have been completed to satisfaction of Owner.

1. Workmanship and equipment comply with specification.
2. Contract speed, capacity, floor-to-floor, and door performance comply with specification.
3. Performance of following are satisfactory:

    a. Starting, accelerating, running
    b. Decelerating, stopping accuracy
    c. Door operation and closing force
    d. Equipment noise levels
    e. Signal fixture utility
    f. Overall ride quality
    g. Performance of door control devices
    h. Operations of special security operation and floor lock-off provisions.

4. Test Results:

    a. In all test conditions, obtain specified speed, performance times, stopping accuracy without re-leveling, and ride quality to satisfaction of the Owner.
    b. Temperature rise in motor windings limited to 50° Celsius above ambient. A full-capacity, 1-hour running test, stopping at each floor for ten (10) seconds in up and down directions, may be required.

B. Performance Guarantee: Should tests reveal defects, poor workmanship, variance or noncompliance with requirements of specified Codes and/or ordinances, or variance or noncompliance with the requirements of specification, complete corrective work to satisfaction of Owner at no cost:

1. Replace equipment that does not meet Code or specification requirements.
2. Perform work and furnish labor, materials, and equipment necessary to meet specified operation and performance.
3. Perform and assume cost for retesting required by Governing Code Authority and/or Owner to verify specified operation and/or performance.

3.8 OWNER'S INFORMATION

A. Provide three sets of neatly bound and one CD of written information necessary for proper maintenance and adjustment of equipment and include the following as minimums:

1. Straight-line wiring diagram of "as installed" elevator circuits, with index of location and function of components. Provide one set reproducible master. Mount one set wiring diagrams on panels, racked, or similarly protected, in elevator machine room. Provide remaining set rolled and in a protective drawing tube. Maintain machine room set with addition of all subsequent changes. These diagrams are Owner's property.
2. Lubricating instructions, including recommended grade of lubricants.
3. Parts catalogs for all replaceable parts including ordering forms and instructions.
4. Four sets of neatly tagged keys for all switches and control features properly tagged and marked.
5. Diagnostic equipment complete with access codes, adjusters' manuals and set-up manuals for adjustment, diagnosis and troubleshooting of elevator system, and performance of routine safety tests.

B. Non-Proprietary Equipment Design:

1. Contractor shall submit the following information within 30 days of final acceptance of the installation for Owner's file.

a. Wiring Diagrams: Three sets of "as installed" straight-line wiring diagrams showing the electrical connections of all equipment and all modifications to control circuits. One set of straight-line wiring diagrams shall be reproducible original. A legend sheet shall be furnished with each set of drawings to provide the following information:

1) Name and symbol of each relay, switch, or other apparatus.
2) Location on drawings, drawing sheet number and area, and location of all contacts.
3) Location of apparatus, whether on controller or on car.
4) Lubricating instructions, including recommended grade of lubricants.

b. Parts Catalog: Three sets and one CD of complete parts catalogs listing all replaceable parts including Manufacturer's identifying numbers and

ordering instructions.

c. Printed Instructions: Three sets of neatly bound and one CD of instructions explaining all operating features.

d. Complete software documentation for all installed equipment.

e. Diagnostic Test Equipment and Instructions: Provide all diagnostic test devices together with one set of all supporting information necessary for interpretation of test data and troubleshooting of system.

f. The elevator installation shall be a design that can be maintainable by any licensed elevator maintenance company employing journeymen mechanics, without the need to purchase or lease additional diagnostic devices, special tools, or instructions from the original equipment manufacturer.

    1) Provide on site capability to diagnose faults to the level of individual circuit boards and individual discreet components for the solid state elevator controller.
    2) If the equipment for fault diagnosis is not completely self-contained within the controllers but requires a separate, detachable device, that device shall be furnished to the Owner as part of this installation. Such device shall be in possession of and become property of the Owner.
    3) Installed equipment not meeting this requirement shall be removed and replaced with conforming equipment at no cost to the Owner.

g. Contractor is responsible for upgrades and/or revisions of software during the progress of the work and warranty period.

3.9 WARRANTY INSPECTION

A. At least 30 days prior to warranty expiration, schedule final inspection and retest with Owner. Requirement shall include close examination of all equipment.

B. Replace, repair or adjust any equipment found defective and covered by warranty prior to expiration of warranty period.

END OF SECTION 14210