LERCH BATES
Building Insight

NEVADA COUNTY ADMINISTRATION CENTER
NEVADA CITY, CALIFORNIA

VERTICAL TRANSPORTATION MODERNIZATION SPECIFICATION

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Prepared For:

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HYDRAULIC ELEVATOR MODERNIZATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. One hydraulic passenger elevator, Car 1.

B. All engineering, equipment, labor, and permits required to satisfactorily complete elevator modernization required by Contract Documents.

C. Applicable conditions of General, Special, and Supplemental Conditions, Division 1, and all sections listed in Contract Documents “Table of Contents.”

D. Quote monthly cost for five-year Preventive Maintenance Agreement commencing upon completion of the warranty period specified. Submit quote based upon terms and conditions of the Preventative Maintenance Agreement. Base quotation on present labor and material cost. Price adjustment will be made at Agreement commencement date and thereafter as provided in Agreement.

E. Use competent personnel, acceptable to the Purchaser, employed and supervised by Contractor.

F. Additional equipment or finishes furnished under other sections, installed under this section:
1. Wiring provisions for CCTV system
2. Wiring provisions for Card reader security system
3. Car interior finishes
4. Car finish flooring

G. Cartage and Hoisting: All required staging, hoisting, and movement to, on, and from the site including new equipment, reused equipment, or dismantling and removal of existing equipment.

H. Unless specifically identified as “Reuse,” “Retain,” or “Refurbish,” provide new equipment.

I. Protective barriers between cars in normal operation and adjacent cars in the modernization process. Full depth and height of hoistway.

J. Hoistway, pit, and machine room barricades as required.

1.2 RELATED WORK BY CONTRACTOR

A. Hoistway and Pit:
1. Wall blockouts and fire rated closure for control and signal fixture boxes which penetrate walls.
2. Cutting and patching walls as required for installation of new hall fixtures.
3. Opening in hoistway wall or pit wall for hydraulic piping. Trench and back fill underground piping if required.
4. Pit access stationary ladder for each elevator. Retractable ladder if provided shall include an electrical contact conforming to ASME A17.1, Rule 2.2.2.4.2.7.
5. Protect open hoistways and entrances during construction per OSHA Regulations.
6. Painting existing hoistway entrance door panels.
7. Protect car enclosure, hoistway entrance assemblies, and special metal finishes from damage.

8. Paint pit floor. Floors are to be pained deck gray with high impact resistant epoxy based paint.
9. Seal fireproofing to prevent flaking.

B. Machine Room and Machinery Spaces:
1. Enclosure with access.
2. Self-closing and locking access door as required.
3. Ventilation and heating. Maintain minimum temperature of 55° F, maximum 90° F. Maintain maximum 80% relative humidity, non-condensing.
4. Paint floor of machine room deck gray. Paint to be high impact resistant epoxy based paint.
5. Class “ABC” fire extinguisher in each elevator machine room.
6. Seal fireproofing to prevent flaking.
7. Remove fire sprinklers where required by AHJ.

C. Electrical Service, Conductors, and Devices:
1. Lighting and GFCI convenience outlets in pit, machine room, and overhead machinery spaces. 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.
3. Provide lighting fixtures in machine room that are above existing controllers to provide 19 fc of illumination throughout the machine room.
4. Replace existing unguarded lighting in each pit with guarded fluorescent lighting to provide 10 fc of illumination throughout the pit. Lighting should be mounted lower than the current position so that the new extended 48" toe guard installed on the elevator cabs does not strike the new lighting.
5. Install GFCI convenience outlets in pit and machine room.
6. 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.
7. Emergency telephone line to designated elevator control panel in elevator machine room.
8. Fire alarm initiating devices in each elevator lobby, for each group of elevators or single elevator and each machine room to initiate firefighters’ return feature. Device at top of hoistway if sprinklered. Provide alarm initiating signal wiring from hoistway or machine room 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.
9. Means to automatically disconnect power to affected elevator drive unit/pump unit and controller prior to activation of machine room fire sprinkler system and/or hoistway fire sprinkler system. Manual shut-off means shall be located outside bounds of machine room.
10. 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.

D. Standby Power Provision:
1. 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-rated car speed and capacity.
2. 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.
3. Standby single-phase power to group controller, and each elevator controller for car lighting, exhaust blower, emergency signaling device, intercom amplifier, hoist machine cooling fan.

4. Standby power to machine room, and pit lighting.

1.3 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.

1.4 QUALITY ASSURANCE

A. Approved equipment vendors, Hydraulic Elevator: KONE Inc., Minnesota Elevator Inc., Mitsubishi Electric Corporation, Otis Elevator Company, Schindler Elevator Corporation, thyssenkrupp Elevator Corporation or approved equal.

B. Compliance with Regulatory Agencies: Comply with most stringent applicable provisions of following Codes, laws, and/or Authorities, including revisions and changes in effect:
1. Safety Code for Elevators and Escalators, ASME A17.1
2. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2
3. Elevator and Escalator Electrical Equipment, ASME A17.5
4. National Electrical Code, NFPA 70
5. Americans with Disabilities Act, ADA
6. California Accessibility Standards, Title 24 Chapter 11b.
7. Local Fire Authority
8. Requirements of most stringent provision of local applicable building code within the governing jurisdiction
9. Life Safety Code, NFPA 101, and California Code of Regulations Title 19.
10. Uniform Federal Accessibility Standard, UFAS
11. California Code of Regulations Title 8 and California Building Code Title 24.

C. Warranty:
1. Material and workmanship of installation shall comply in every respect with Contract Documents. Correct defective material or workmanship which develops within one year from date of final acceptance of all work to satisfaction of Architect, Purchaser and Consultant at no additional cost, unless due to ordinary wear and tear or improper use or care by Purchaser. Perform maintenance in accordance with terms and conditions indicated in the Preventive Maintenance Agreement.
2. Defective is defined to include, but not be limited to, operation or control system failures, car 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. Retained Equipment: All retained components, parts, and materials shall be cleaned, checked, modified, repaired, or replaced so each component and its parts are in like new operating condition. Retained equipment must be compatible for integration with new systems. All retained equipment shall be covered under the warranty provisions, of Article 1.4 D. 1. and 2. above. No prorations of equipment or parts shall be allowed on preventive maintenance contract, between the Contractor and Purchaser.
4. Make modifications, requirements, adjustments, and improvements to meet performance requirements of Article 2.3.

1.5 DOCUMENT AND SITE VERIFICATION

A. In order to discover and resolve conflicts or lack of definition which might create problems, Contractor must review Contract Documents and site conditions for compatibility with its product prior to submittal of quotation. Review existing structural, electrical, and mechanical provisions for compatibility with Contractor's products. Purchaser will not pay for change to structural, mechanical, electrical, or other systems required to accommodate Contractor's equipment.

1.6 SUBMITTALS

A. Within sixty calendar days after award of contract and before beginning equipment fabrication submit shop drawings, and required material samples for review. Allow thirty days for response to initial submittal.
   1. Scaled or Fully Dimensioned 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 Information: Design for existing conditions.
   4. Fixtures: Cuts, samples, or shop drawings.
   5. Finish Material: Submit 3" x 12" samples of actual finished material requested for review of color, pattern, and texture. Compliance with other requirements is the exclusive responsibility of the Contractor. 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.
      d. Adequacy of existing retained elevator machine beams.
      e. Adequacy of existing car platform structure for intended loading.
   7. Written Maintenance Control Program (MCP) specifically designed for the equipment included under this contract. Include any unique or product specific procedures or methods required to inspect or to test the equipment. In addition, identify weekly, bi-weekly, monthly, quarterly, and annual maintenance procedures, including statutory and other required equipment tests.

B. Submittal review shall not be construed as an indication that submittal is correct or suitable or 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 Contractor's responsibility.

C. Acknowledge and/or respond to review comments within fourteen calendar days of return. 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 Contractor elective revisions on each re-submittal. Contractor's revision response time is not justification for equipment delivery or installation delay.

1.7 PERMIT, TEST, AND INSPECTION

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

B. Perform test required by Governing Authority in accordance with procedure described in ASME A17.2 Guide for Inspection of Elevators, Escalators, and Moving Walks in the presence of Authorized Representative.

C. Contractor shall perform review and evaluation of all aspects of its work prior to requesting Consultant's final review. Work shall be considered ready for Consultant's final contract compliance review when all Contractor's tests are complete and all elements of work or a designated portion thereof are in place and elevator or group of elevators are deemed ready for service as intended.

D. Furnish labor, materials, and equipment necessary for Consultant's review. Notify Consultant five working days in advance when ready for final review of elevator or group of elevators.

1.8 MAINTENANCE

A. Warranty Maintenance:
1. Provide preventive maintenance and 24-hour emergency callback service for one year commencing on date of final acceptance by Purchaser. Systematically examine, adjust, clean, and lubricate all equipment. Repair or replace defective parts using parts produced by the Contractor of installed equipment. Maintain elevator machine room, hoistway, and pit in clean condition.
2. Use competent personnel, acceptable to the Purchaser, supervised and employed by Contractor.
3. The warranty maintenance period specified in Item 1.2 A. above shall be extended one month for each three-month period in which equipment related failures average more than .25 per unit per month.
4. Purchaser retains the option to delete cost of warranty maintenance from new equipment contract and remit twelve equal installments directly to Contractor during period in which maintenance is being performed.
5. The Elevator Contractor shall contact ownership approximately two months prior to the end of the contract term. The Owner will make a thorough maintenance inspection of all elevators covered under the contract. At the conclusion of this inspection, the Owner shall give the Contractor written notice of any deficiencies found. The contractor shall be responsible for correction of these deficiencies within thirty days after receipt of such notice.

B. Interim and Preventative Maintenance:
1. Provide Interim and Preventative maintenance in accordance Manufacturers requirements and the Nevada County contract. Provide lump sum rate for each year for the next 5 years which would include travel costs and provide list of what maintenance would be included and at what intervals.

PART 2 - PRODUCTS

2.1 SUMMARY

A. Passenger Elevator 1: Unless specifically identified as "retain existing," provide new equipment.

ELEVATOR 1	Existing Equipment	Disposition
Capacity:	2,500 lbs.	Retain existing
Class Loading:	Passenger Class A	Retain existing
Contract Speed:	100 fpm	Retain existing
Machine:	Hydraulic pump	Provide new submersible unit

ELEVATOR 1	Existing Equipment	Disposition
Machine Location:	Adjacent	Retain existing
Supervisory Control:	Relay-based	Selective collective microprocessor-based
Motor Control:	Single speed AC with Wye Delta start	Single speed AC with electronic soft start with closed transition
Power Characteristics:	480 volts, 3 phase, 60 hertz, Field verify	Retain existing
Stops and Openings:	2, all front	Retain existing
Floors Served:	1-2	Retain existing
Travel:	14'-0"±, field verify	Retain existing
Minimum Clear Interior:	6'-8" wide x 4'-3" deep, field verify	Retain existing
Entrance Size:	3'-6" wide x 7'-0" high	Retain existing
Entrance Type:	Single-speed side-opening	Retain existing
Door Operator:	Medium-speed heavy-duty	High-speed heavy-duty with minimum 2½ fps opening speed
Door Protection:	Infrared full screen device	Infrared full screen device with differential timing, nudging, and interrupted beam time
Hydraulic Type:	Holeless Dual jack	Retain existing
Guide Rails:	Planed steel tees	Retain existing. Reinforce to meet seismic requirements
Buffers:	Spring	Retain existing

2.2 MATERIALS

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/A568M-03.
   3. Structural Steel Shapes and Plates: ASTM A36.

B. Stainless Steel: Type 302 or 304 complying with ASTM A240, 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 University Representative's sample. Protect with adhesive paper covering.
   1. No. 4 Satin: Directional polish finish. Graining directions as shown or, if not shown, in longest dimension.
   2. No. 8 Mirror: Reflective polish finish with no visible graining.
   3. Textured: 5WL 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).
   4. Burnished: Non-directional, random abrasion pattern.

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

D. Plastic Laminate: ASTM E84 Class A and NEMA LD3.1, Fire-Rated Grade (GP-50), Type 7, 0.050" ±.005" thick, color and texture as follows:
   1. Exposed Surfaces: Color and texture selected by University Representative.
   2. Concealed Surfaces: Contractor's standard color and finish.

E. Fire-Retardant Treated Particle Board Panels: Minimum 3/4" 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.

F. Natural Finish Wood Veneer: Standard thickness, 1/40" 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 University Representative.

G. 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.

H. 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.

I. Baked Enamel Finish: Prime finish per above. Unless specified "prime finish" only, apply and bake three additional coats of enamel in the selected solid color.

2.3 CAR AND GROUP PERFORMANCE

A. Car Speed: ±10% of contract speed under any loading condition.

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

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

D. Door Opening Time: 2.5 seconds from start of opening to fully open.

E. Door Closing Time: 4.0 seconds from start of closing to fully closed.

F. Car Floor-to-Floor Performance Time: 17.7 seconds from start of doors closing until doors are 1/2 open, and car is level and stopped at next successive floor under any loading condition or travel direction (13'-6" typical floor height).

G. Car Ride Quality:
   1. Horizontal and vertical acceleration within car during all riding and door operating conditions. Not more than 20 mg peak to peak (adjacent peaks) in the 1-10 Hz range.
   2. Acceleration and Deceleration: Smooth constant and not more than 3 feet/second^2 with an initial ramp between 0.5 and 0.75 second.
   3. Sustained Jerk: Not more than 6 feet/second^3.
   4. Measurement Standards: Measure and evaluate ride quality consistent with ISO 18738, using low pass cutoff frequency of 10 Hz and A95 peak-to-peak average calculations.

H. Noise and Vibration Control:
   1. Airborne Noise: Measured noise level of elevator equipment and its operation shall not exceed 60 dBA inside car under any condition including door operation and car ventilation exhaust blower on its highest speed. Limit noise level in the machine room

relating to elevator equipment and its operation to no more than 80 dBA. All dBA readings to be taken 3'-0" off the floor and 3'-0" from the equipment using the “A” weighted scale.

2. Vibration Control: All elevator equipment provided under this contract, including power unit, controller, oil supply lines, and their support shall be mechanically isolated from the building structure and electrically isolated from the building power supply and to each other to minimize the possibility of objectionable noise and vibrations being transmitted to occupied areas of the building.

2.4 OPERATION

A. Selective Collective Microprocessor-Based:
1. Approved microprocessor-based, car and motion control systems as follows:
   a. KONE:
   b. Otis: Elevonic
   c. Schindler: 330A
   d. thyssenkrupp: TAC 32
   e. MCE: Motion 2000
   f. Smartrise: SRH
   g. Or approved equal
2. 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 and in the order the floors are reached.
3. Do not reverse car direction until all car calls have been answered, or until all hall calls ahead of car and corresponding to the direction of car travel have been answered.
4. 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 the same manner. Hold car at arrival floor an adjustable time interval to allow passenger transfer.
5. Answer calls corresponding to direction in which car is traveling unless call in the opposite direction is highest (or lowest) call registered.
6. Illuminate appropriate pushbutton to indicate call registration. Extinguish light when call is answered.

B. Other Items:
1. Low Oil Control: In the event oil level is insufficient for travel to the top floor, provide controls to return elevator to the main level and park until oil is added.
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.

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

D. Automatic Car Stopping Zone: Stop car within 1/4" above or below the landing sill. Maintain stopping zone regardless of load in car, direction of travel, distance between landings.

E. Motion Control: AC type with unit valve suitable for operation specified and capable of providing smooth, comfortable car acceleration and retardation. Limit the difference in car speed between full load and no load to not more than ±10% of the contract speed in either direction of travel.

F. Remote Monitoring and Diagnostics: Equip each controller and the group dispatch logic controller with standard ports, interface boards, and drivers to accept maintenance, data logging, fault finding diagnostic and monitoring computers, keyboards, modems, and programming tools. The system shall be capable of driving remote color CRT monitors that

continually scan and display the status of each car and call. Do not provide full monitoring system, provide output capability only.

G. Door Operation: Automatically open doors when car arrives at main floor. At expiration of normal dwell time, close doors. Reopen doors when car is designated for loading. Provide "heavy door/variable air pressure" feature for consistent specified door operation within appropriate speed and inertia limits.

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

I. Standby Power Operation: Upon loss of normal power, adequate standby power will be supplied via building electrical feeders to simultaneously start and run one car in each group and single cars at contract car speed and capacity.
   1. Automatically return single car nonstop to designated floor, open doors for approximately 3.0 seconds, close doors, and park car. During return operation, car and hall call pushbuttons shall be rendered inoperative.
   2. When all cars have returned to the designated floor, one car in each group shall be designated for automatic operation.
   3. Provide separate group selection switches in firefighters' control panel.
      a. Switches shall be labeled "STANDBY POWER OVERRIDE" with positions marked "AUTO" and appropriate car numbers controlled by each respective switch. Key shall be keyed same as key utilized for firefighters' Phase I and II key switch. Key shall be removable in "AUTO" position only.
      b. Provide "STANDBY POWER" indicator lights, one per car, in firefighters' control panel. Indicator light illuminates when corresponding car is selected, automatically or manually, to operate on standby power.
   4. 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.

J. Card/Proximity Reader Security System: Provide provisions inside Car 1 for reader unit. Mount reader unit as directed by Owner and cross connect from car pushbuttons to control module in machine room. Reader control unit, mounting brackets, wiring materials, logic circuits, etc., by Security Subcontractor. Provide a filler plate to match card slot size and car return panel finish, including direction of graining, where card slot or proximity reader cutout is not initially utilized. Elevator control systems shall facilitate system tracking of persons accessing secure floors via printout by passenger I.D. number, floor accessed, and time of entry.

K. Car Light and Fan Timer: Provide necessary logic and power relay to allow car lights and fan to turn off automatically when not in use.

2.5 MACHINE ROOM EQUIPMENT

A. Arrange equipment in existing machine room spaces.

B. Pump Unit: Provide OEM, Canton, MEI or approved equal equipment. Provide new submersible unit. Assembled unit consisting of positive displacement pump, induction motor, master-type control valves combining safety features, holding, direction, bypass, stopping, manual lowering functions, shut off valve, oil reservoir with protected vent opening, oil level gauge, outlet strainer, drip pan, muffler, all mounted on isolating pads. Provide oil thermal unit and oil temperature thermostat to maintain oil at operating temperature. Enclose entire unit with removable sheet steel panels lined with sound-absorbing material. Provide electronic soft start with closed transition. Design unit for 80 up starts/hour.

C. Landing Systems: Solid-state, magnetic, or optical type.

D. 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 with one leg of power supply 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 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 boards, etc.) with symbols shown on wiring diagrams.
6. Monitoring System Interface: Provide controller with serial data link through RJ45 Ethernet connection and install all devices necessary to monitor items outlined herein. Elevator contractor responsible to connect monitoring system interface to machine room monitoring compartment and LAN. Wiring from the LAN to the machine room monitoring compartment by others. Provide interface only.
7. Provide controller or machine mounted auxiliary, lockable “open,” disconnect if mainline disconnect is not in sight of controller and/or machine.

E. Muffler: Provide in discharge oil line near pump unit. Design shall dampen and absorb pulsation and noise in the flow of hydraulic fluid.

F. Piping and Oil: Provide piping, connections, and oil for the system. Buried piping shall be secondarily contained with watertight Schedule 40 PVC sleeves between elevator machine room and pit. A minimum of two sound isolation couplings shall be provided between the pump unit and oil line and the oil line and jack unit. Provide isolated pipe stands or hangers as required.

G. Shutoff Valve: Manual valve in line adjacent to pump unit. Provide second valve in pit adjacent to jack unit.

2.6 HOISTWAY EQUIPMENT

A. Guide Rails: Retain main guide rails in place.
1. Clean rails and brackets. Remove rust.
2. Check all rail and bracket fastenings and tighten.
3. Realign rails as required to provide smooth car ride.
4. Provide supplemental rail brackets and/or backing as required by code or to enhance car ride quality.

B. Buffers: Retain existing. Rebuild as required and paint.

C. Hydraulic Jack Assembly: Retain existing.
   1. Cylinder: Retain existing. provide means to collect oil at cylinder head and return automatically to oil reservoir. Provide cylinder stabilizer bracketing between guide rails as required.
   2. Plunger: Retain existing. Isolate plunger from car frame.

D. Jack Support and Fluid Shut-Off Valve: Retain existing steel pit channels to support jack assembly and transmit loads to building structure. Provide intermediate stabilizers as required. Provide manual on/off valve in oil line adjacent to pump unit and jack unit in pit.

E. Overspeed Valve: Provide a pressure sensitive, mechanically-actuated seismic safety valve, conforming to ASME A17.1. Connect valve directly to jack assembly inlet.

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

G. Electrical Wiring and Wiring Connections:
   1. Conductors and Connections:
      a. Copper throughout with individual wires coded and connections on identified studs or terminal blocks.
      b. Use no splices or similar connections in wiring except at terminal blocks, control compartments, or junction boxes.
      c. Provide 10% spare conductors throughout. Run spare wires from car connection points to individual elevator controllers in the machine room.
      d. Provide four pair of spare shielded communication wires in addition to those required to connect specified items.
      e. Tag spares in machine room.
   2. Conduit:
      a. Painted or galvanized steel conduit, EMT, or duct.
      b. Minimum Conduit Size: 1/2".
      c. Flexible heavy-duty service cord may be used between fixed car wiring and car door switches for door protective devices.
   3. Traveling Cables:
      a. Flame and moisture-resistant outer cover.
      b. Prevent traveling cable from rubbing or chafing against hoistway or equipment within hoistway.
      c. Provide five pair of shielded wires and two RG-6/U type coaxial cables for card reader.
      d. Provide two RG-6/U coaxial CCTV cables within traveling cable from car controller to car top, plus 3'-0" excess loop at both ends.
      e. Provide two pair 14-gauge wire for CCTV power.
   4. Auxiliary Wiring: Connect fire alarm initiating devices, emergency two-way communication system, CCTV, card reader, intercom, and announcement speaker and/or background music in each car controller in machine room.

H. Entrance Equipment: Retain existing. Refurbish/replace and adjust assemblies to ensure smooth and quiet mechanical open and close of doors.
   1. Door Hangers and Rollers: Replace all rollers. Modify hangers to include door retainer mechanism to address failure of primary upper door panel guidance.
   2. Door Track: Refurbish. Clean and sand for smooth, quiet operation.
   3. Door Interlocks: Provide new. Operable without retiring cam. Paint interlock box flat black.
   4. Door Closers: Provide new. Spring-activated spirator or jamb/strut mounted counterweight type. Design and adjust to insure smooth, quiet mechanical close of doors.

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

J. Floor Numbers: Stencil paint 4" high floor designations in contrasting color on inside face of hoistway doors or hoistway fascia in location visible from within car.

2.7 HOISTWAY ENTRANCES

A. Frames: Retain existing. Provide Arabic floor designation/Braille plates, centered at 60" above finished floor, on both side jambs of all entrances. Provide plates at main egress landing with “Star” designation. For designated emergency car, provide “Star of Life” designation plates at height of 78"-84" above finished floor on both side jambs at all floors. Braille indications shall be below Arabic floor designation. Provide flat stainless floor designation/Braille plates.

B. Door Panels: Retain existing. Provide new door gibs with fire tabs at all floors. Minimum two gibs per panel, one at leading edge, and one at trailing edge of each panel. Provide code required door panel retainer mechanism on lower edge of door panel to address failure of primary lower edge door guidance.

C. Sight Guards: Retain existing. Replace damaged sight guards.

D. Sills: Retain existing. Clean and polish. Check and tighten all fastenings.

E. Sill Supports: Retain existing. Check and tighten all fastenings.

F. Fascia, Toe Guards, and Hanger Covers: Retain existing. Provide as required where damaged or missing. Check and tighten all fastenings. Paint/Stencil floor number on fascia or hoistway wall at all floors visible where car doors are initially opened.

G. Struts and Headers: Retain existing. Check and tighten all fastenings.

2.8 CAR EQUIPMENT

A. Frame: Retain Existing. Check and tighten all fastenings.

B. Platform: Retain existing. Reinforce if required. Check and tighten all fastenings.

C. Platform Apron: Provide new extended platform apron to meet Code. Minimum 14 gauge steel, reinforced and braced to car platform front with black enamel.

D. Guide Shoes: Roller type, 6" with three or more spring dampened, sound-deadening rollers per shoe. Provide seismic retainer plates.

E. Finish Floor Covering: Provide flooring as detailed by ownership.

F. Sills: Retain existing. Clean and polish. Check and tighten all fastenings.

G. Doors: Fully enclosed 16 gauge steel, sandwich construction without binder angles. Provide leading edges of center-opening doors with rubber astragals. Provide a minimum of two gibs per panel, one at leading and one at trailing edge with gibs in the sill groove entire length of door travel. Construct door panels with interlocking, stiffening ribs. Architectural metal cladding shall wrap around leading and trailing edge of panel and return a minimum of 1/2" on rear side of leading edge of panel.

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

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

J. Door Header: Retain existing. Check and tighten all fastenings.

K. Door Electrical Contact: Prohibit car operation unless car door is closed.

L. 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.

M. Restricted Opening Device: Restrict opening of car doors outside unlocking zone. Plunger type restrictors not acceptable.

N. Door Operator: Provide OEM or GAL door equipment. High-speed heavy-duty door operator capable of opening doors at no less than 2.5 fps. Accomplish reversal in no more than 2½" of door movement. Provide solid-state door control with closed loop circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current. Maintain consistent, smooth, and quiet door operation at all floors, regardless of door weight or varying air pressure. Provide closed loop operation, monitoring door speed, torque and closing force, at all times.

O. Door Control Device:
   1. Infrared Reopening Device: Black fully enclosed device with full screen infrared matrix or multiple beams extending vertically along leading edge of each door panel to minimum height of 7'-0" above finished floor. Provide extension of housing and lens full height of door panels. 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. In event of device failure, provide for automatic shutdown of car at floor level with doors open.
   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 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 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.

P. Car Operating Panel:
   1. One car operating panel with faceplate, consisting of a metal box containing operating fixtures, mounted behind the car stationary front return panel. Faceplates shall be hinged and constructed of satin finish stainless steel.
   2. Suitably identify floor buttons, alarm button, door open button, door close button, and emergency push-to-call button with SCS, Visionmark, or Entrada cast tactile symbols surface mounted. Configure plates per local building code accessibility standards including Braille. Locate operating controls no higher than 48" above the car floor; no lower than 35" for emergency push-to-call button and alarm button.

3. Provide minimum 3/4" diameter raised floor pushbuttons which illuminate to indicate call registration.
4. Provide alarm button to ring bell located on car. Illuminate button when actuated.
5. Provide keyed stop switch at bottom of car operating panel in locked car service compartment. Mark device to indicate “run” and “stop” positions.
6. Provide “door open” button to stop and reopen doors or hold doors in open position.
7. Provide “door close” button to activate door close cycle. Cycle shall not begin until normal door dwell time for a car or hall call has expired, except firefighters’ operation.
8. Provide firefighters’ locked box with code required devices and illuminated fire hat jewel in car operating panel.
9. Provide firefighters’ Phase II key switch with engraved instructions filled red. Include light jewel, audible signal, and call cancel button.
10. Install firefighters’ telephone jack with bezel matching adjacent controls as required by AHJ.
11. Provide lockable service compartment with recessed flush door. Door material and finish shall match car return panel or car operating panel faceplate. Inside surface of door shall contain an integral flush window for displaying the elevator operating permit.
12. Include the following controls in lockable service cabinet with function and operating positions identified by permanent signage or engraved legend:
    a. Inspection switch.
    b. Light switch.
    c. Three-position 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. Stop switch.
    h. Switch to select either floor voice annunciation, floor passing tone, or chime.
13. Provide black paint filled (except as noted), engraved, or approved etched signage as follows with approved size and font:
    a. Phase II firefighters’ operating instructions on main operating panel above corresponding keyswitch filled red.
    b. Car number on main operating panel.
    c. Car capacity in pounds on service compartment door.

Q. Car Top Control Station: Mount to provide safe access and utilization while standing in an upright position on car top.

R. Work Light and Duplex Plug Receptacle: GFCI protected outlet at top and bottom of car. Include on/off switch and lamp guard. Provide additional GFCI protected outlet on car top for installation of car CCTV.

S. 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 car operating panel pushbutton design. Provide uppercase “PUSH TO CALL” “HELP ON THE WAY” engraved signage adjacent to button to indicate when call is placed and when call is received. Coordinate signage with communications provider.
    b. Provide “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 speakers provided under Item 1.1 F.1. in car canopy, with shielded wiring to machine room junction box.

4. Provide onsite two-way communication between car and emergency personnel as required by code.

2.9 CAR ENCLOSURE

A. Retain existing car shell. Car weight to be verified prior to removal of interior cab finishes. Remove existing interior finishes, weigh, and document. Provide complete as specified herein. New cab weight including all new finishes to be verified following completion of modernization. Post modernization weight not to exceed code allowable limits. Provide the following features.
   1. Shell: Retain. Apply sound-deadening mastic to exterior.
   2. Canopy: Retain.
   3. Return Panels and Integral Entrance Columns: Refinish satin finish stainless steel with directional graining to match the new car operating panels.
   4. Transom: Refinish.
   5. Car Door Panels: Reinforced minimum 16-gauge stainless steel satin finish. Metal cladding shall wrap around leading and trailing edge of panel and return a minimum of 1/2" on rear side of leading edge of panel.
   6. Base: Stainless steel with concealed ventilation cutouts.
   7. Interior Wall Finish: Removable panels, faced and edged, with color core plastic laminate. Color and finish as selected by owner.
   8. Ventilation: Morrison Products, Inc. two-speed model SOE No. 06-01055 exhaust blower mounted to car canopy on isolated rubber grommets. Exhaust blower shall meet requirements of Item 2.3, I. Ventilation shall shut off after adjustable period (60-180 seconds) of no elevator demand.
   9. Lighting: Provide LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements. Lighting shall shut off after adjustable period (60-180 seconds) of no elevator demand. Provide emergency lighting integral with portion of normal car lighting system. Include required transformer.
   10. Suspended Ceiling: Three section, 6 stainless steel panels mounted in an extruded aluminum angle and T-frame.
   11. Handrails: Minimum 1¼" diameter aluminum tubular grab bar across rear wall.
   12. Pads and Buttons or Hooks: Three-piece removable pads. Two pads covering side walls and adjacent front returns and one covering rear wall. Provide cutouts to access main car operating panel.
   13. Provide flooring as selected by ownership.

2.10 HALL CONTROL STATIONS

A. Pushbuttons: Provide OEM, Innovation or approved equal fixtures. Provide one riser with flush mounted faceplates. 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 pushbutton and light assemblies. Include approved engraved message and pictorial representation prohibiting use of elevator during fire or other emergency situation as part of faceplate. Provide any cutting and patching required.

2.11 SIGNALS

A. Car Direction Lantern: Provide OEM, Innovation or approved equal fixtures. Provide flush-mounted car lantern in all car entrance columns. Illuminate up or down LED lights and sound electronic tone once for up and twice for down direction travel as doors open. Sound tone once for up direction and twice for down direction. Sound level shall be adjustable from 0-80 dBA measured at 5'-0" in front of hall control station and 3'-0" off floor. Provide adjustable car door dwell time to comply with ADA requirements relative to hall call notification time. Car direction lenses shall be arrow shaped with faceplates. Lenses shall be minimum 2½" in their smallest

dimension. Provide vandal resistant lantern and light assemblies consisting of series of dots or lines for maximum visibility.

B. Car Position Indicator: Alpha-numeric digital indicator 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 operating 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. Faceplate Material and Finish: Satin stainless steel, all fixtures.

D. 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.

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

2.12 INTERCOM AND DISTRESS SIGNAL SYSTEM

A. General: Provide intercommunication system for all cars. Include all wiring between elevator hoistways and control panels. Include the following stations:

Station Location	Type Station	Selection Buttons to Call
Elevator Machine Room	Master	Control Panels, Car
Lobby Control Panel	Master	Machine Rooms, Car
Firefighters' Control Panel	Master	Machine Rooms, Car
Car	Remote	Lobby Control Panel

B. Basic Equipment:
1. Amplifier providing static-free voice transmission with adequate volume and minimum distortion at all stations, with pre-amplifier capable of receiving voice and music inputs from building and emergency building communication system.
2. Activation of emergency building communication system overrides all other conversations and permits one-way conversation to all master stations in system.
3. Master Stations:
   a. Speaker-microphone combination, and/or handset for two-way communication.
   b. Selection buttons to enable communication with all master stations. Maintain continual reception of hands-free reply from station when a selected button is depressed.
   c. Two-Position "Talk/Listen" Button: Press to talk; release to listen.
   d. Illuminate "in use" light when any master station is being used.
   e. Reset button to make system available for use by any master station.
   f. Volume control knob for adjustment of incoming volume.
   g. Button to establish communications with all stations.
   h. Distress light in lobby panel which illuminates when "push to call" button or alarm button in car is actuated. Energize distress light and buzzer or chime until intercom selection button for that car has been depressed. Sound buzzer or chime in lobby panel simultaneously with illumination of distress light.
4. Remote Stations:
   a. Station in car shall be activated by "push to call" two-way communication button. "Push to call" button shall illuminate and flash when call is acknowledged. Button shall match car operating panel pushbutton design. Provide uppercase "PUSH TO CALL," "HELP ON THE WAY" engraved signage adjacent to button. Provide "push to call" button tactile symbol, engraved signage, and Braille adjacent to button.

b. Locate car microphone and speaker, or transceiver/speaker combination in car canopy with drilled speaker pattern, with shielded wiring to machine room junction box.

C. Station Housings:
1. House master station in machine room in a metal compartment with baked enamel finish. Attach to the group elevator supervisory control panel or wall mount. Provide communication handset with 25'-0" long cord.
2. Provide control center master intercoms with stainless steel satin finish faceplates and engraved operating instructions. Coordinate faceplate size and installation of units with building Console Supplier.

2.13 SEISMIC OPERATIONS AND EQUIPMENT

A. Provide design, components, and operation per governing code.

PART 3 - EXECUTION

3.1 SITE CONDITION INSPECTION

A. Prior to beginning installation of equipment, examine hoistway and machine room areas. Verify 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 Contractor’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 Contractor’s instructions, referenced codes, specification, and approved submittals.

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, and pit equipment.

3. Neatly touch up damaged factory-painted surfaces with original paint color. Protect machine-finish surfaces against corrosion.

G. Paint cartops, machine room and pit floors.

3.4 FIELD QUALITY CONTROL

A. Work at jobsite will be checked during course of installation. Full cooperation with reviewing personnel is mandatory. Accomplish corrective work required prior to performing further installation.

B. 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 Contractor's instructions.

D. Adjust motors, power conversion units, brakes, 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, and operating and signal fixtures.

3.7 ACCEPTANCE REVIEW AND TESTS

A. Review procedure shall apply for individual elevators, portions of groups of elevators and completed groups of elevators accepted on an interim basis, or elevators and groups of elevators completed, accepted, and placed in operation.

B. Contractor shall perform review and evaluation of all aspects of its work prior to requesting Consultant's final review. Work shall be considered ready for Consultant's final contract compliance review when all Contractor's tests are complete and all elements of work or a designated portion thereof are in place and elevator or group of elevators are deemed ready for service as intended.

C. Furnish labor, materials, and equipment necessary for Consultant's review. Notify Consultant five working days in advance when ready for final review of elevator or group of elevators.

D. Consultant's written list of observed deficiencies of materials, equipment and operating systems will be submitted to Contractor for corrective action. Consultant's review shall include as a minimum:

1. Workmanship and equipment compliance with Contract Documents.
2. Contract speed, capacity, floor-to-floor, and door performance comply with Contract Documents.
3. Performance of following is 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 emergency two-way communication device
    i. Operations of firefighters' service
    j. Operations of seismic devices
    k. Operations of special security features and floor lock-off provisions
    l. Operations of remote monitoring devices
    m. Operations of emergency brake device
4. Test Results: In all test conditions, obtain specified contract speed, performance times, stopping accuracy without re-leveling, and ride quality to satisfaction of Purchaser and Consultant. Tests shall be conducted under both no load and full load condition.

E. Performance Guarantee: Should Consultant's review identify defects, poor workmanship, variance or noncompliance with requirements of specified codes and/or ordinances, or variance or noncompliance with the requirements of Contract Documents, Contractor shall complete corrective work in an expedient manner to satisfaction of Purchaser and Consultant at no cost as follows:
1. Replace equipment which does not meet code or Contract Document requirements.
2. Perform work and furnish labor, materials, and equipment necessary to meet specified operation and performance.
3. Perform retesting required by governing code authority, Purchaser and Consultant.

F. A follow-up final contract compliance review shall be performed by Consultant after notification by Contractor that all deficiencies have been corrected. Provide Consultant with copies of the initial deficiency report marked to indicate items which Contractor considers complete. If additional reviews are required due to Contractor's gross non-compliance with initial and follow-up deficiency reports, Consultant shall bill Contractor at normal billing rates plus expenses, and Contractor acknowledges it will pay for additional compliance reviews.

3.8 PURCHASER'S INFORMATION

A. Provide three sets of neatly bound written information necessary for proper maintenance and adjustment of equipment within thirty days following final acceptance. Final retention will be withheld until data is received by Purchaser and reviewed by Consultant. Include the following as minimums:
1. Straight-line wiring diagrams 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 all drawing sets with addition of all subsequent changes. These diagrams are Purchaser's property. A legend sheet shall be furnished with each set of drawings to provide the following information:
    a. Name and symbol of each relay, switch, or other apparatus.
    b. Location on drawings, drawing sheet number and area, and location of all contacts.
    c. Location of apparatus, whether on controller or on car.
2. Printed instructions explaining all operating features.
3. Complete software documentation for all installed equipment.

4. Lubrication instructions including recommended grade of lubricants.
5. Parts catalogs for all replaceable parts including Contractor's identifying numbers, ordering forms, and instructions.
6. Four sets of keys for all switches and control features properly tagged and marked.
7. Neatly bound instructions explaining all operating features including all apparatus in the car and lobby control panels.
8. 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.
9. 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.
10. The elevator installation shall be a design which can be maintained 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 Contractor.
    a. Provide onsite capability to diagnose faults to the level of individual circuit boards and individual discrete components for the solid state elevator controller.
    b. Provide a separate, detachable device, as required to the Purchaser as part of this installation if the equipment for fault diagnosis is not completely self-contained within the controller. Such device shall be in possession of and become property of the Purchaser.
    c. Installed equipment not meeting this requirement shall be removed and replaced with conforming equipment at no cost to the Purchaser.
11. Provide upgrades and/or revisions of software during the progress of the work, warranty period, and the term of the ongoing maintenance agreement between the Purchaser and Contractor.

B. Preventive Maintenance Contract: Furnish properly executed contract for continuing, preventive maintenance. Utilize contract form herein provided by Owner.

C. Acceptance of such records by Purchaser/Consultant shall not be a waiver of any Contractor deviation from Contract Documents or shop drawings or in any way relieve Contractor from his responsibility to perform work in accordance with Contract Documents.

END OF SECTION