



Division of Finance and Business Operations

Procurement & Strategic Sourcing  
5700 Cass Avenue, suite 4200  
Detroit, Michigan 48202  
(313) 577-3734

February 28, 2024

**Addendum #2 Clarifications To  
Request for Proposal**

**For Wayne State University Detroit Campus Wide Elevator Modernization: Project 005-352965 Science Hall, 034-357608 Student Center, 036-406207 Reuther Library, 042-357625 Alumni House, 045-401743 Parking Structure 5, 051-344289 Parking Structure 1, 071-400578 5057 Woodward, 088-402566 Parking Structure 6, 089-406148 Biological Sciences Building, 130-400577 Faculty/Administration Building, 629-409520 Elliman Clinical Research  
Dated February 14, 2024**

**The Addendum must be acknowledged on your lump sum bid.**

**NOTE:** You must have attended a Pre-Bid conference in order to be eligible to bid on a particular project. Receipt of minutes or addenda without being at a Pre-Bid conference does not qualify your company to bid.

The following Addendum #2 serves to provide Clarifications to the above bid opportunity.

All questions concerning this project must be emailed to: **Kimberly Tomaszewski**, Procurement & Strategic Sourcing. Email: **Rfpteam1@wayne.edu**.

Bids are due **by electronic submission** on no later than 2:00 p.m., **March 15, 2024**. The link for bid submission will be posted with the bid details at <http://go.wayne.edu/bids> beginning **February 14, 2024**.

**Do not contact either FP&M or the Design Firm directly as this may result in disqualification of your proposal.**

Thank you for interest shown in working with Wayne State University.

**Robert Kuhn on behalf of Kimberly Tomaszewski, Senior Buyer**

CC: **Svetlana Vrubel** (Project Manager), Attendee list.



**Design and Construction Services**  
Facilities Planning & Management

**ADDENDUM**

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Project Name: Wayne State University  
Campus

Addendum Number: 2

WSU Project No: Multiple

Date: February 26, 2024

Prepared by: S. Vrubel

*This Addendum is issued pursuant to the Wayne State University Campus Wide Elevator Modernization Project. This Addendum serves to clarify, revise, and supersede information in the Pre-Bid Meeting, Specifications, and previously issued Addenda. Portions of the Addendum affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the CONTRACT FOR CONSTRUCTION MANAGEMENT SERVICES. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.*

**PART 1 - NEW DOCUMENTS ISSUED WITH THIS DOCUMENT**

- A. Specification Documents Issues February 26, 2024 by Lerch Bates, Inc. for the modernization of three elevators at Elliman Clinical Research Building.
- B. Specification Documents dated February 26, 2024 by VDA Inc. for the modernization of the Elevators in the following facilities:
  - a. Parking Structure 1
  - b. Parking Structure 5
  - c. Parking Structure 6
  - d. 5057 Woodward Ave.
  - e. Biological Sciences Building

**PART 2 - DOCUMENTS DELETED BY THIS DOCUMENT**

- A. Specification Documents dated February 14, 2024 by VDA Inc. for the modernization of the Elevators in the following facilities:
  - a. Parking Structure 1
  - b. Parking Structure 5
  - c. Parking Structure 6
  - d. 5057 Woodward Ave.
  - e. Biological Sciences Building

**END OF DOCUMENT**

**ADDENDUM #2**

**DIVISION 14**

**SECTION 142403**

**HYDRAULIC SPECIFICATIONS FOR  
THREE (3) ELEVATORS**

**AT**

**ELLIMAN CLINICAL RESEARCH  
421 EAST CANFIELD AVENUE  
DETROIT, MI**

SECTION 142403 –  
HYDRAULIC ELEVATOR MODERNIZATION

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes modernization of hydraulic elevators:
  - 1. Two (2) passenger elevators, Cars #1 and #2.
  - 2. One (1) service elevator, Car #3.
- B. Products Installed but Not Furnished Under This Section:
  - 1. CCTV camera provisions.
  - 2. Elevator security devices, control unit, mounting brackets, wiring materials, logic circuits, security system interface terminals, boxes, and relays.

**1.2 DEFINITIONS**

- A. All technical terms in these Contract Documents are used as defined in the latest edition of American National Standard Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks ASME A17.1. and A17.2.
- B. ELEVATOR CONSULTANT or CONSULTANT refers to Lerch Bates Inc. (Lerch Bates).
- C. PURCHASER refers to Wayne State University.
- D. CONTRACT or CONTRACT DOCUMENTS consists of the Agreement, Conditions of Contract, Specifications, Addenda, Drawings if included, and Alternates if accepted.
- E. CONTRACTOR or ELEVATOR CONTRACTOR refers to any persons, partners, firm, or corporation having a contract with Purchaser to furnish labor and materials for the execution of work required.
- F. CONTRACT AWARD refers to Purchaser's verbal or written award for work required.
- G. SUBCONTRACTOR refers to any persons, partners, firm, or corporation having a contract with Contractor to furnish labor and materials for the execution of work required.
- H. PROVIDE means "furnish and install."
- I. MANUFACTURER means either the Original Equipment Manufacturer (OEM) or the principal manufacturer of a component or system.
- J. RETAIN means, unless otherwise specified, the existing equipment is to be left in place with no alterations and no change in the original manufacturer's designed performance or functionality. Items that are "retained" shall be thoroughly cleaned in place and adjusted to achieve originally designed function.
- K. REFURBISH means, unless otherwise specified, the existing equipment is to be cleaned, repainted, repaired, and parts replaced to put the equipment into a condition to provide the same appearance, performance, and functionality as the equipment provided when it was originally installed. Unless otherwise specified, the scope of replacement of components is limited to those items currently available for purchase as replacement parts from the manufacturer or after-market suppliers approved by the manufacturer.

- L. REUSE means that the Contractor shall carefully remove equipment from the existing installation, avoiding any damage or additional wear. Store in a safe location to maintain equipment in its pre-removal condition. Reinstall and incorporate into the modernized elevator installation using the same procedures and recommendations provided by the manufacturer of the equipment.
- M. INCLUDES or INCLUDING means including the items specified but not limited solely to those items if additional work or components are required to achieve the specified outcome.
- N. CALL BACK means a request from the Purchaser to the Contractor to provide a technician on site to evaluate an elevator that is out of service or not functioning properly, rectify the root cause of the malfunction, and place the unit back into normal service.
- O. Words in the singular shall include the plural whenever applicable or context so indicates.

### 1.3 WORK INCLUDED

- A. Modernize two hydraulic passenger elevators and one hydraulic service elevator.
- B. All labor, engineering, tools, transportation, services, supervision, materials, and equipment necessary for and incidental to satisfactory completion of required work as indicated in Contract Documents.
- C. Provide all required staging, hoisting, and movement of new equipment, reused equipment, or removal of existing equipment.
- D. Applicable conditions of Purchaser's General, Special, and Supplemental Conditions.
- E. Warranty maintenance as described herein.
- F. Cartage and Hoisting: All required staging, hoisting, and movement to, on, and from the site including new equipment, retained equipment, or dismantling and removal of existing equipment.
- G. Unless specifically identified as "Retain," "Reuse," or "Refurbish," provide new equipment. Contractor may, with approval prior to quotation, provide new equipment in lieu of refurbishing existing.
- H. Reference to a device or a part of the equipment applies to the number of devices or parts required to complete the installation.
- I. Provisions of this specification are applicable to all elevators unless identified otherwise.
- J. Provide hoistway, pit, and machine room barricades.
- K. Provide temporary and permanent pit ladders, working platforms, inspection platforms, and guard rails required to comply with applicable Building Code, work safety standards, and AHJ requirements.
- L. Protective barriers between cars in normal operation and adjacent cars in the modernization process, full depth and height of hoistway.
- M. Scope of Contract includes, but is not limited to, the following:
  - 1. Coordination, scheduling, and management of work of component suppliers and subcontractors.
  - 2. Modernize or furnish and install equipment as specified utilizing existing and/or modified hoistways and machine rooms.

- N. Specific item of required work which cannot be determined to be included in another contract is thereby determined to be included in prime contract.

#### 1.4 CONSULTANT STATUS

- A. Consultant shall act as Purchaser's and/or Building Management's representative on all matters pertaining to required work. Consultant shall interpret Contract Documents, analyze Contractor's quotations, review Contractor's suggested alternates, review all Contractor's submittals, approve billings, review technical details and construction procedure, perform work progress reviews, and review and test completed work for compliance with Contract Documents prior to acceptance of work by Purchaser.
- B. Field Review Scheduling: Schedule progress and final work reviews with Consultant. Reply promptly, in writing, to corrective work indicated on Consultant's progress and/or final review reports, indicating status and schedule for completion. Consultant anticipates scheduled site review appointments will be met.

#### 1.5 CODES AND ORDINANCES

- A. All work covered by these Contract Documents is to be done in full accord with national code, state and local codes, ordinances, and elevator safety orders in effect at time elevator alteration permit issuance. All requirements of local Building Department and fire jurisdiction are to be fulfilled by Contractor and its Subcontractors.

#### 1.6 PRIME CONTRACTOR'S DUTIES

- A. Prime Contractor's duties include the following:
  - 1. Provide and pay for labor, materials and equipment, tools, construction equipment and machinery, and other facilities and services necessary for proper execution and completion of required work.
  - 2. Pay for legally required sales, consumer, and state remodel taxes.
  - 3. Secure and pay for required permits, fees, and licenses necessary for proper execution and completion of required work, as applicable at time of quotation due date.
  - 4. Give required notices.
  - 5. Comply with codes, ordinances, rules, regulations, orders, and other legal requirements of public authorities which bear on performance of required work.
  - 6. Promptly submit written notice to Consultant of observed variance of Contract Documents from legal requirements.
  - 7. Enforce strict discipline and good order among employees. Do not employ persons unskilled in assigned task.

#### 1.7 STAGING AREA

- A. An equipment staging area will be available for use by Contractor. Contractor shall restrict usage to area designated and shall notify Purchaser prior to storing of any large equipment which will impose heavy concentrated loading on floor area. Do not store such equipment until approval is received.

#### 1.8 WORK SEQUENCE

- A. Construct work in stages.

**1.9 WORKING HOURS**

- A. Unless otherwise stated below or elsewhere in the Contract Documents, Contractor shall have access to the building for work activities during the following regular building operating hours:
  - 1. 8:00 a.m. to 5:00 p.m., Monday through Friday or as agreed upon by Wayne State University.
- B. Contractor shall perform all work that has the potential to result in any of the following conditions outside of regular building operating hours at no additional cost to the Purchaser.
  - 1. Interruptions or changes in normal automatic operation.
  - 2. Activation of Firefighter's Emergency Operation Phase I.
  - 3. Noise levels in excess of 80 dBA measured in any occupied or public space.
  - 4. Transport of large equipment through public or tenant spaces.
  - 5. Coordination with WSU staff for planned events in the building.

**1.10 CONTRACTOR USE OF PREMISES**

- A. Confine operations at site to areas permitted by law, ordinances, permits, Contract Documents, and Purchaser's specific instructions.
- B. Do not unreasonably encumber site with materials or equipment. Staging area will be located as directed by Purchaser.
- C. Do not load structure with weight that will endanger structure. Coordinate with Purchaser.
- D. Assume full responsibility for protection and safekeeping of tools and products stored on or off premises.
- E. Move stored products which interfere with operations of building or the operations of other trades.
- F. Obtain and pay for use of additional storage or work areas needed for operations.

**1.11 CONCURRENT MODERNIZATION WORK AND BUILDING OPERATION**

- A. This project is a major elevator modernization in an existing building which is a private residence and open for public business. The building will continue to operate throughout all phases of required work. It is essential that Contractor give special attention and priority to all matters concerning project safety, protection from dust and loose materials, reduction of noise level, protection from water and air infiltration into building, and maintenance of neat, sightly conditions in and around work areas inside and outside of building. Packaging, scrap materials, and demolition debris shall be promptly removed from building and site on a daily basis.
- B. At all times Contractor shall provide clearly visible warning and directions signs. At all times give special attention to building entrances, exits, and proper safe exiting through work areas as required by law.
  - 1. Barricade design must be approved by client prior to start of modernization work.
  - 2. Standard folding maintenance barricades are not acceptable.
- C. Contractor shall consult Purchaser and other Contractors to establish and maintain safe temporary routes including, but not limited to, proper barricades, walking surfaces, lighting, fire protection, exiting, warning and directional signs, and general protection of persons from all hazards in accordance with OSHA Standards due wholly or partially to its operations.

**1.12 ALTERNATES**

- 1. None.

1.13 RELATED WORK PROVIDED BY ELEVATOR 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 and floors.
  - 3. Opening in hoistway wall or pit wall for hydraulic piping. Trench and backfill underground piping.
  - 4. Pit access stationary ladder for each elevator.
  - 5. Waterproof pit. Indirect waste drain or sump with flush grate and pump. Sump pump/drain capacity minimum 3,000 gallons per hour, per elevator. Coordinate installation of sump pump and/or drain with plumbing code.
  - 6. Provide oil separator per Michigan Plumbing Code.
  - 7. Protect open hoistways and entrances during construction per OSHA Regulations.
  - 8. Protect car enclosure, hoistway entrance assemblies, and special metal finishes from damage.
  - 9. Hoistway venting per building code.
- B. Machine Room and Machinery Spaces:
  - 1. Retain existing ventilation and heating. Maintain minimum temperature of 55° F, maximum 90° F. Maintain maximum 80% relative humidity, non-condensing.
  - 2. Repair damaged ceiling in the machine room for Elevators #1 and #2.
- C. Electrical Service, Conductors, and Devices:
  - 1. Lighting and GFCI convenience outlets in pit and machine room. Provide one additional non-GFCI convenience outlet in pit for sump pump and oil return pump.
  - 2. Provide guarded lighting with an illumination level of not less than 100 lx (10 fc) at the pit floor.
  - 3. Provide guarded lighting with an illumination level of 200 lx (19 fc) at the machine room floor.
  - 4. Three-phase mainline copper power feeder with true earthen grounding to terminals of each elevator controller in the machine room with protected lockable “open” disconnecting means with auxiliary contacts to allow Elevator Contractor to electrically interlock battery power lowering unit.
  - 5. 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.
  - 6. Emergency telephone line to each individual elevator control panel in elevator machine room.
  - 7. Upgrade existing automatic Fire Recall System:
    - a. Fire alarm initiating devices in each elevator lobby.
    - b. Fire alarm initiating devices in elevator machine room.
    - c. Three Relay Activation Modules for single elevator. Locate modules within three feet of controller designated by the Elevator Contractor to minimize un-supervised wiring. Program Modules as follows:
      - 1) PRIMARY: Activate when any hallway device, except primary floor, activates.
      - 2) ALTERNATE: Activate when hallway device at primary floor activates.
      - 3) FIRE HAT: Activate when machine room device activates.
    - d. Device in machine room and at top of hoistway to provide signal for general alarm.
    - e. Provide technician from fire alarm contractor for pre-test of system during normal working hours.
    - f. Provide technician from fire alarm contractor for acceptance test of system with AHJ during normal working hours.
    - g. Fire alarm contractor to submit drawings to the State and Purchaser for review and approval.
    - h. Apply for and obtain variance with Fire Protection Department. Since the building does not currently contain sprinklers, it is not feasible to add sprinklers to the building.

8. Conduit from the closest hoistway of each elevator group or single elevator to the firefighters' control room and/or main control console. Coordinate size, number, and location of conduits with Elevator Contractor.
9. Means to automatically disconnect power to affected elevator 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.
11. Single-phase power feeders to firefighters' control panel.
12. Three-phase power feeder to each freight elevator power door controller in machine room with protected lockable "open" disconnecting means.
13. Card or Proximity Readers, elevator contractor to coordinate and assist with installation of readers in car operating panel or hall stations.

#### 1.14 ACTION AND INFORMATIONAL SUBMITTALS

- A. Within sixty (60) calendar days after award of contract and before beginning equipment fabrication, submit shop drawings, and required material samples for review. Allow 30 days for response to initial submittal.
  1. Scaled or Fully Dimensioned Layout: Plan of machine room indicating equipment arrangement, details of car enclosures, 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: Shop drawings.
  5. Finish Material: If requested, submit 3" x 12" samples of actual finished material for review of color, pattern, and texture. Compliance with other requirements is the exclusive responsibility of the 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. Machine room heat emissions in B.T.U.
    - c. Adequacy of existing car platform structure for intended loading.
    - d. Adequacy of plunger wall thickness 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 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 14 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.

1.15 PURCHASER'S INFORMATION

- A. Non-Proprietary Equipment Design: Provide two (2) sets of digital and three (3) sets of neatly bound written information necessary for proper maintenance and adjustment of equipment within 30 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. 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. 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 test the equipment. In addition, identify weekly, bi-weekly, monthly, quarterly, and annual maintenance procedures, including statutory and other required equipment tests.
  3. Printed instructions explaining all operating features.
  4. Complete software documentation for all installed equipment.
  5. Lubrication instructions, including recommended grade of lubricants.
  6. Parts catalogs listing all replaceable parts including Contractor's identifying numbers and ordering instructions.
  7. Four sets of keys for all switches and control features properly tagged and marked.
  8. Diagnostic test devices together with all supporting information necessary for interpretation of test data, troubleshooting of elevator system, and performance of routine safety tests.
  9. 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.
  10. 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.

1.16 PERMITS, TESTS, AND CERTIFICATES

- A. Permits:
1. Secure and pay for all permits required for Work to be performed, including but not limited to:
    - a. Municipal and State permits.
    - b. Device or equipment removal permits.
    - c. Hot works permits.
    - d. Confined space access permits.
  2. Post, maintain, and renew all permits in compliance with local governmental requirements.

3. Obtain documentation of final AHJ close-out of all permits. Provide copies to Purchaser.

**B. Tests and Inspections:**

1. Schedule and perform all tests required in accordance with procedure described in ASME A17.2 Guide for Inspection of Elevators, Escalators, and Moving Walks in the presence of Authorized Representative of the AHJ and Owner's representative.

**C. Certificates:** Obtain, pay for, and deliver to Purchaser with all temporary and final inspection certificates provided by proper governing authorities.

**D. Violations:** Resolve any outstanding violations on record with the AHJ on devices being removed prior to final acceptance by the Purchaser.

**1.17 QUALITY ASSURANCE**

**A. Compliance with Regulatory Agencies:** Comply with most stringent applicable provisions of currently enforced codes, laws, and/or authorities, including revisions and changes in effect.

**B. Inspections:** Provide access to areas where work is being performed for the Consultant at any time throughout the project.

**1.18 WARRANTY**

**A. Material and workmanship of installation** shall comply in every respect with Contract Documents. Correct defective material or workmanship which develops within one (1) year from date of final acceptance of all elevators to satisfaction of 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.

**B. 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.

**C. 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 1.18, A. & B above. No prorations of equipment or parts shall be allowed on preventive maintenance contract between the Contractor and Purchaser.

**D. Make modifications, requirements, adjustments, and improvements** to meet performance requirements of Section 142403.

**1.19 WARRANTY MAINTENANCE**

**A. Provide preventive maintenance and 24-hour emergency callback service** for one (1) year commencing on date of final acceptance of modernized elevator 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.

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

- C. Warranty Maintenance Hours: Contractor shall perform one (1) hour per unit per month for preventive maintenance.
- D. All work, except as otherwise noted, including unlimited call-back service, shall be performed during the building's regular hours. These hours are 8:00 a.m. to 5:00 p.m.
- E. Response Time for Callback Service:
  - 1. During regular time hours, Contractor shall arrive at Property within 60 minutes from time of notification of equipment problem or failure by Purchaser.
  - 2. Contractor shall arrive at Property in response to passenger entrapment calls within 30 minutes from time of notification by Purchaser.
- F. Purchaser retains the option to delete cost of warranty maintenance from modernization equipment contract and remit twelve equal installments directly to Contractor during period in which maintenance is being performed.

#### 1.20 DELIVERY, STORAGE, AND HOISTING

- A. General:
  - 1. Protect all equipment and exposed finishes during delivery, handling, and installation until completion of project.
  - 2. Replace damaged materials with new, with no additional cost for material or labor to Purchaser.
- B. Delivery and Storage:
  - 1. Ensure manufacturers' original packing adequately protects materials during delivery.
  - 2. Deliver materials, identical to accepted samples, to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name.
  - 3. Store materials under cover in a secure, dry, and clean location, off the ground. Remove delivered materials that are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
  - 4. Store and protect all materials in space provided or designated by the Purchaser against damage, stains, scratches, corrosion, weather, construction debris, and other environmental conditions.
  - 5. Comply with Purchaser's requirements for access to and use of any building loading docks, parking lots, parking garages, and any interior spaces required for delivery and storage.
- C. Hoisting: Arrange and pay for all required hoisting and movement of equipment.

#### 1.21 COORDINATION

- A. Prime contracts are defined below, and each is recognized to be a major part of required work to be performed concurrently in close coordination with work of other Contractors.
  - 1. This Contract: Elevator Modernization including associated related work specified herein.
- B. Scope of Contract includes, but is not limited to, the following:
  - 1. Coordination, scheduling, and management of work of component suppliers and subcontractors.
  - 2. Modernize or furnish and install equipment as specified utilizing existing and/or modified hoistways and machine rooms.
  - 3. Specific item of required work which cannot be determined to be included in another contract is thereby determined to be included in prime contract.

## PART 2 - PRODUCTS

### 2.1 REFERENCES

- A. American National Standard Institute (ANSI): A117.1, Accessible and Usable Buildings and Facilities.
- B. American Society of Mechanical Engineers:
  - 1. ASME A17.1, Safety Code for Elevators and Escalators.
  - 2. ASME A17.2, Guide for Inspection of Elevators, Escalators, and Moving Walks.
  - 3. ASME A17.5, Elevator and Escalator Electrical Equipment.
  - 4. ASME A17.6, Standard for Elevator Suspension, Compensation, and Governor Systems.
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 70, National Electric Code.
  - 2. NFPA 80, Fire Doors and Windows.
  - 3. NFPA 101, Life Safety Code.
  - 4. NFPA 13, Installation of Sprinkler Systems.
- D. International Building Code (IBC).
- E. City of Detroit Elevator Code.
- F. Accessibility:
  - 1. American National Standard Institute (ANSI): A117.1, Accessible and Usable Buildings and Facilities.
  - 2. ADAAG, Americans with Disabilities Act Accessibility Guidelines.

### 2.2 MANUFACTURERS AND PRODUCTS

- A. Approved Elevator Contractors:
  - 1. Approved subject to compliance with the requirements of the contract and specifications.
    - a. KONE
    - b. Lardner Elevator
    - c. Otis Elevator
    - d. Schindler Elevator Corporation
    - e. TK Elevator
    - f. Toledo Elevator
    - g. Approved Equal
- B. Approved Elevator Components:

The following Manufacturers/Assemblers are approved for the specific components listed below, subject to the requirements of the contract:

  - 1. Car and Hall Signal Fixtures:
    - a. Innovation
    - b. MAD Fixtures
    - c. Monitor
    - d. PTL
  - 2. Controllers:
    - a. GAL GALaxy
    - b. Elevator Controls Corporation
    - c. Smart Rise
  - 3. Door Protective Device:
    - a. Janus

- b. T.L. Jones
  - c. Tri-Tronics
- 4. Elevator Cab Interiors:
  - a. Architectural Metals
  - b. A Better Elevator Co.
  - c. G&R
  - d. Globe Architectural & Metals
  - e. Snap Cab
  - f. Weir Inc.
- 5. Guide Shoes
  - a. Delco
  - b. ELSCO
  - c. GAL
  - d. Hollister-Whitney
- 6. Hydraulic Elevator Systems and Components:
  - a. Canton
  - b. EECO
  - c. MEI
  - d. Schumacher
- 7. Hydraulic Jack Assemblies
  - a. EECO
  - b. Bore-Max
  - c. Canton Elevator
- 8. Hoistway Entrances and Door Panels:
  - a. Columbia
  - b. EDI/ECI
  - c. Elevator Products
  - d. Gunderlin
  - e. Tyler
  - f. United Cab
- 9. Passenger Elevator Door Equipment (Operators, Tracks, Hangers, and Closers):
  - a. ECI
  - b. GAL
  - c. Wittur
- 10. Traveling Cables:
  - a. Draka
  - b. James Monroe
- 11. Two-Way Emergency Communication Device:
  - a. Janus
  - b. K-Tech
  - c. Kings III
  - d. Rath Microtec
  - e. Wurtec

## 2.3 PERFORMANCE REQUIREMENTS

- A. Car Speed:  $\pm 10\%$  of contract speed in up direction,  $\pm 20\%$  of contract speed in down direction.
- B. Car Capacity: Safely lower, stop, and hold rated load.
- C. Car Stopping Zone:  $\pm 1/4"$  under any loading condition.

- D. Door Times: Seconds from start to fully open or fully closed:
  - 1. Cars #1 and #2: Door Open: 1.7 seconds. Door Close: 2.4 seconds.
  - 2. Car #3: Door Open: 2.7 seconds. Door Close: 4.6 seconds
  
- E. Car Floor-to-Floor Performance Time: Seconds from start of doors closing until doors are 3/4 open for center-opening doors or 1/2 open for side-opening doors, and car is level and stopped at next successive floor under any loading condition or travel direction:
  - 1. Cars #1 and #2: 14.0 seconds. Floor Height: 14'-0" between floors 2 and 3.
  - 2. Car #3: 14.0 seconds. Floor Height: 20'-5" between floors B and 1
  
- F. Noise and Vibration Control:
  - 1. Airborne Noise:
    - a. 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.
    - b. Limit noise level in the machine room relating to elevator equipment and its operation to no more than 80 dBA.
    - c. 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: Mechanically isolate all new elevator equipment from the building structure and other components. Minimize objectionable noise and transmission of vibrations to occupied areas of the building. 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 ELEVATOR DUTY ALTERATIONS

### A. Passenger Elevator

ALTERATION SUMMARY		
CAR #1	EXISTING INSTALLATION	MODERNIZED INSTALLATION
Capacity:	2500 lbs.	No Change
Class of Loading:	Class A	No Change
Contract Speed:	125 fpm	No Change
Hydraulic Power Unit Location:	At Floor B	No Change
Operation Control:	Duplex Selective Collective	No Change
Floors Served:	Front: B, 1 - 3	No Change
Total Entrances:	All Front	No Change
Entrance Type:	Single-Speed Center-Opening	No Change
Entrance Size:	3'-6" wide x 7'-0" high	No Change
Minimum Clear to Underside of Canopy:	8'-0" high	No Change

ALTERATION SUMMARY		
CAR #2	EXISTING INSTALLATION	MODERNIZED INSTALLATION
Capacity:	4500 lbs.	No Change
Class of Loading:	Class A	No Change
Contract Speed:	125 fpm	No Change
Hydraulic Power Unit Location:	At Floor B	No Change
Operation Control:	Duplex Selective Collective	No Change
Floors Served:	Front: B, 1 - 3	No Change
Total Entrances:	All Front	No Change
Entrance Type:	Single-Speed Center-Opening	No Change
Entrance Size:	3'-6" wide x 7'-0" high	No Change
Minimum Clear to Underside of Canopy:	8'-0" high	No Change

ALTERATION SUMMARY		
CAR #3	EXISTING INSTALLATION	MODERNIZED INSTALLATION
Capacity:	4500 lbs.	No Change
Class of Loading:	Class A	No Change
Contract Speed:	100 fpm	No Change
Hydraulic Power Unit Location:	At Floor B	No Change
Operation Control:	Two-Landing Collective	No Change
Floors Served:	Front: B, 1	No Change
Total Entrances:	All Front	No Change
Entrance Type:	Two-Speed Side-Opening	No Change
Entrance Size:	4'-0" wide x 7'-0" high	No Change
Minimum Clear to Underside of Canopy:	8'-0" high	No Change

## 2.5 MATERIALS

- A. All colors will be selected from the Manufacturer's standard range unless custom colors are specified herein.
- B. 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.
- C. 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 Purchaser'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.
- D. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.
- E. Plastic Laminate: ASTM E84 Class A and NEMA LDI-1964, 1/16", Fire-Rated Grade (GP-50), Type1, 1/16" high pressure general purpose laminate, color and texture as follows:
1. Exposed Surfaces: Color and texture selected by Purchaser.
  2. Concealed Surfaces: Contractor's standard color and finish.
- F. 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.
- G. 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 Purchaser and/or Consultant.
- H. 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.
- I. 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.
- J. 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.
- K. Entrance Field Paint: Clean all surfaces to remove dirt and grease. Sand and finish surfaces as necessary to remove pits and scratches and prepare surface for painting. Apply filler to ensure smooth surface; sand and apply one coat of electrostatic enamel in the selected solid color.
- L. Refinishing of natural metals: Remove existing protective finish. Buff as necessary to remove scratches. Regrain or finish as specified and protect as indicated for particular metal type.

- M. Entrance Support Equipment within Hoistway: Include strut angles, headers, sill support angles, fascia, hanger covers, etc. Clean, remove, and check for corrosive activity. Replace components which exhibit severe deterioration. Tighten all fastenings.

## 2.6 OPERATION

### A. General, All Cars:

1. Cars automatically slow down and stop level at floors in response to car and landing calls with stops made in sequence in the established direction of travel, regardless of order in which buttons are pressed.
2. Landing calls are canceled when the assigned car arrives at the landing.
3. Automatic Leveling:
  - a. When arriving at a floor cars level to within 1/4" above or below the landing sill prior to opening doors, without travelling past the landing during leveling
  - b. Maintain leveling accuracy regardless of carload, direction of travel, <>rope slippage or stretch.
4. Power Conservation:
  - a. Car interior illumination and ventilation turns off after adjustable period (60-180 seconds) of no elevator demand and turns on prior to opening car doors when elevator demand returns.

### B. Door Operation, All Cars:

1. Automatically open doors when car arrives at a floor.
2. Stop and reopen doors or hold doors in open position upon activation of "door open" button.
3. At expiration of normal dwell time, or upon activation of "door close" button, close doors:
  - a. Prevent doors from closing and reverse doors at normal opening speed if door reopening device beams are obstructed while doors are closing, except during nudging operation.
4. Nudging Operation:
  - a. After beams of door reopening device are obstructed for a predetermined time interval (minimum 20.0-25.0 seconds), sound warning signal, and attempt to close doors with maximum of 2.5 foot-pounds kinetic energy.
  - b. Activation of the door open button overrides nudging operation and reopens doors.
5. Interrupted Beam Time:
  - a. When beams are interrupted during initial door opening, hold door open a minimum of 3.0 seconds.
  - b. 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.
6. Differential Door Time:
  - a. Field adjustable time doors remain open after stopping in response to calls.
  - b. Car Call: Hold open time adjustable between 3.0 and 5.0 seconds.
  - c. Hall Call:
    - 1) Hold open time adjustable between 5.0 and 8.0 seconds.
    - 2) Use hall call time when car responds to coincidental calls.

### A. Group Operation (Cars #1 and #2):

1. General:
  - a. Arrange for automatic operation through car and landing buttons in conjunction with a microprocessor-based group supervisory system.
2. Group Supervisory System - Passenger Elevators:
  - a. The supervisory system shall, through a dispatching algorithm, continually measure the number of corridor calls, their duration, their direction, distance, service to previously assigned car and hall calls, carload, door and car motion status, coincidence of car and hall

- calls, etc., to determine the intensity of traffic and its direction. The supervisory system shall automatically adjust to all demands with preference given to the registered calls in the following order:
- 1) Main Landing Calls
  - 2) Long wait Down calls.
  - 3) Long wait Up calls.
  - 4) Up calls.
- b. Long wait calls shall be considered those that have been registered for over 30 seconds.
  - c. Dynamic zoning strategies may be employed to provide shortened wait times.
3. Hall Call Assignment:
- a. Assign registered hall calls to car that will provide the fastest possible response time.
  - b. Car assignment and response time determined by evaluating factors such as distance from demand, service to previously assigned car and hall calls, carload, direction, door and car motion status, and coincident car and hall calls. Continuously assign car available to answer call in the shortest amount of time.
  - c. A car without registered car calls arriving at a floor, where both up and down hall calls are registered, initially responds to the hall call in the direction that car was traveling. If no car call is registered for further travel in that direction, lantern immediately indicates change of direction without closing and reopening doors.
4. Delayed Car:
- a. If, for any reason, a car is delayed after it receives a start signal, system transfers the call to another car.
  - a. When cause of delay is corrected car automatically returns to normal operation.
- B. 2-Landing Collective Operation, Car #3:
1. Elevator operates via momentary pressure buttons to:
    - a. Place hall call by selecting direction of travel at each hall landing (single buttons at each terminal landing).
    - b. Place car call by selecting destination floor from inside the car (individual buttons for each floor served).
  2. Hall calls, other than calls placed at the landing at which car is standing, start car, and cause the car to stop at first landing for which a call is registered in the direction of travel.
  3. Stops are made in order in which landings are reached.
  4. Parked Car (No Demand):
    - a. Elevator remains at the 2<sup>nd</sup> floor with doors closed.
    - b. If elevator is at the 1<sup>st</sup> floor, it shall return to the 2<sup>nd</sup> floor and remains at landing with the doors closed until a hall call is registered.
  5. Hall Lanterns:
    - a. Lanterns provide audio and visual signal upon each stop, regardless of responding to car or hall call.
- C. Auxiliary Power Lowering Operation (All Cars):
1. Upon loss of normal power automatically lower car to the nearest landing depending on position at time of power outage.
  2. Upon arrival at the landing, the elevator doors shall open automatically and remain open until regular door time has expired; the elevator shall then be removed from service.
  3. Include solid-state charger and testing means mounted in a common metal container.
  4. Battery to be rechargeable lead acid or nickel cadmium with a ten-year life expectancy.
  5. Upon restoration of normal power, the elevator shall automatically resume normal operation.
  6. Disable if normal power switched off.

- D. Firefighters' Emergency Operation, All Cars: Provide equipment and operation in accordance with code requirements.
- E. Battery Operation of Emergency Lighting, Communications, and Alarm: All Cars.
  - 1. Car mounted battery unit with solid-state charger to operate alarm bell, car emergency lighting, and voice communication system.
    - a. Car lighting and communication shall be provided with a minimum of 4 hours of operation on back-up power during a loss of normal power, and a minimum of 1 hour of operation for car-mounted alarm and any remote alarm mounted at the designated level.
    - b. Battery to be rechargeable with minimum five-year life expectancy.
    - c. Provide constant pressure test button in service compartment of car operating panel.
- F. Emergency Car Communication System Operation, All Cars:
  - 1. Hands-Free Phone System:
    - a. New two-way communication instrument in car to provide automatic dialing, tracking, and recall features.
      - 1) Automatic dialer to include automatic rollover capability with minimum two numbers:
    - b. Activated by "Help" button in car or by external telephone call.
    - c. Adjacent light jewel illuminates and flashes when call is acknowledged.
- G. Electrical Wiring and Wiring Connections: New, All Cars.
  - 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.
    - d. Run spare wires from car connection points to individual elevator controllers in the machine room.
  - 2. Conduit:
    - a. Galvanized steel conduit, EMT, or duct.
    - b. Flexible conduit length not to exceed 3'-0".
  - 3. Traveling Cables:
    - a. Flame and moisture-resistant outer cover. Prevent traveling cable from rubbing or chafing against hoistway or equipment within hoistway.
    - b. Provide 12 twisted shielded pairs in addition to wires needed to connect specified items and code required spares.
    - c. Tag spares in machine room.
    - d. Provide cables from controller to car top.
  - 4. Auxiliary Wiring:
    - a. Connect fire alarm initiating devices, emergency two-way communication system, CCTV, and card reader in each controller in machine room.
    - b. Provide machine room demarcation junction boxes for the fire alarm initiating devices, CCTV, security system and card reader interface terminals and relays.
    - c. Provide conduit, wiring and connections for the fire alarm initiating devices, emergency two-way communication system, CCTV, security system and card reader interface terminals and relays, from machine room junction box to car controller in machine room.

## 2.7 MACHINE ROOM EQUIPMENT

- A. Provide and arrange equipment in existing machine room spaces.

- B. Identification: Permanently identify (painted on or securely attached) machine room equipment for each elevator with minimum 3" characters corresponding to elevator identification.
  - 1. Hydraulic Machine (Power Unit)
  - 2. Controller.
  - 3. Main line disconnect switch.
  - 4. Pit equipment.
- C. Hydraulic Machine (Power Unit), All Cars:
  - 1. New assembled unit consisting of submersible 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. Mount power unit on isolating pads.
  - 2. Submersible pump motor shall be permitted up to 50 HP.
- B. Controller: New, All Cars.
  - 1. Compartment:
    - a. UL/CSA labeled.
    - b. Securely mount all assemblies, power supplies, chassis switches, relays, etc., on a substantial, self-supporting steel frame.
    - c. Completely enclose equipment with covers.
    - d. Provide means to prevent overheating.
  - 2. Relay Design:
    - a. Magnet operated with contacts of design and material to insure maximum conductivity, long life, and reliable operation without overheating or excessive wear.
    - b. Provide wiping action and means to prevent sticking due to fusion.
    - c. Contacts carrying high inductive currents shall be provided with arc deflectors or suppressors.
  - 3. Microprocessor Hardware:
    - a. Provide built-in noise suppression devices that 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:
    - a. CSA labeled copper for factory wiring.
    - b. Neatly route all wiring interconnections and securely attach wiring connections to studs or terminals.
    - c. Provide labels for all extra or spare wires, neatly organized at base of controller cabinet.
  - 5. Permanently mark components (relays, fuses, PC boards, etc.) with symbols shown on wiring diagrams.
  - 6. Provide electrical design compliant with UL 508A SB.SCCR of 5000A required.
- C. Muffler: New, All Cars.
  - 1. Provide in discharge oil line near pump unit.
    - a. Design shall dampen and absorb pulsation and noise in the flow of hydraulic fluid.
- D. Piping and Oil: New, All Cars.
  - 1. Provide piping, connections and oil for the system.

2. Provide isolated pipe stands or hangers.

E. Shut-Off Valves: New, All Cars.

1. Provide oil line shut off valve in the machine room.
2. Provide second valve in pit adjacent to jack unit.

2.8 HOISTWAY EQUIPMENT

- A. Provide and arrange equipment in existing hoistways.

B. Guide Rails: Retain main guide rails in place for each elevator.

1. Clean rails and brackets. Remove rust.
2. Check all rail and bracket fastenings and tighten.

- C. Terminal Stopping: Provide normal and final devices.

D. Hoistway Entrance Equipment, All Cars:

1. Door Hanger: New two-point hanger roller with neoprene roller surface and suspension with eccentric upthrust roller adjustment.
2. Door Hanger Rollers: Replace.
3. Door Track: New bar or formed, cold-drawn removable steel tracks with smooth roller contact surface.
4. Door Interlocks: New. Operable without retiring cam.
5. Door Closers: New spring-activated spirator. Install and adjust to insure smooth, quiet mechanical close of doors.

- E. Hoistway Door Unlocking Device, All Cars: Provide unlocking device including new escutcheon in door panel at all floors.

- F. Hoistway Access Switches, All Cars: Mount in wall at top and bottom floors. Provide switch with faceplate. Locate within easy reach to entrance so entrance can be guarded by one technician.

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

2.9 PIT EQUIPMENT

- A. Buffers: Retain existing, All Cars. Remove rust and repaint non-machined surfaces.

- B. Hydraulic Jack Assembly, All Cars: Retain Existing. Provide new gland packing for each elevator.

- C. Jack Support, All Cars: Retain Existing.

2.10 HOISTWAY ENTRANCES

- A. Provide and arrange equipment in same location as existing entrances.

B. Frames: Retain existing, All Cars.

1. Paint existing door frames at each floor. Color as selected by Purchaser.
2. Provide new Arabic floor designation/tactile marking plates:
  - a. Centered at 60" above finished floor.
  - b. Located on both side jambs of all entrances.
  - c. Minimum 4" high.

- d. Tactile marking indications shall be below Arabic floor designation.
  - 3. Provide plates at main egress landing with "Star" designation.
  - 4. Provide car identification label:
    - a. Mounted directly below floor designation/tactile marking plates.
    - b. Located on both side jambs at the following levels:
      - 1) Designated level.
      - 2) Alternate level.
    - c. Finish and design to match floor designation/tactile marking plates.
  - C. Hoistway Door Panels: Retain existing, All Cars.
    - 1. Paint existing door frames at each floor. Color as selected by Purchaser.
    - 2. Provide new door gibs with fire tabs at all floors.
    - 3. Minimum two gibs per panel, one at leading edge, and one at trailing edge of each panel.
    - 4. Provide door panel retainer mechanism on lower edge of door panel.
  - D. Sight Guards: Retain existing. Replace any damaged or missing sight guards.
  - E. Sills, Hoistway Entrance: Retain existing. Clean. Check and tighten all fastenings.
  - F. Sill Supports, Hoistway Entrance: Retain existing. Check and tighten all fastenings.
  - G. Fascia, Toe Guards, and Hanger Covers: Retain existing, All Cars.
    - 1. Provide as required where damaged or missing.
    - 2. Check and tighten all fastenings.
    - 3. Paint/Stencil floor number on fascia or hoistway wall all floors visible where car doors are initially opened.
  - H. Struts and Headers: Retain existing. Check and tighten all fastenings.
  - I. Finish of Frames and Doors: Retain existing.
- 2.11 CAR EQUIPMENT
- A. Frame: Retain Existing, All Cars. Check and tighten all fastenings. Adjust as required for plumb and square alignment.
  - B. Platform: Retain existing, All Cars.
    - 1. Adjust as necessary for plumb and level alignment.
    - 2. Reinforce if required.
    - 3. Check and tighten all fastenings.
  - C. Platform Guard, All Cars:
    - 1. New extended platform guard to meet Code requirements.
    - 2. Minimum 0.059" (1.5 mm) thick steel, or material of equivalent strength and stiffness.
    - 3. Reinforced and braced to car platform front.
    - 4. Contractor's standard finish.
  - D. Passenger Elevator Car Guides, All Cars:
    - 1. New roller type with three or more spring dampened sound-deadening rollers per shoe. Minimum 3 1/4" outside diameter.
  - E. Finish Floor Covering:

1. Car #1: New Seamless resilient non-slip rubber as approved by the Purchaser. Refer to Appendix A for approved material and finishes.
  2. Cars #2 and #3: Retain existing.
- F. Car Sills: Retain existing. Clean full width. Check and tighten all fastenings.
- G. Car Door Panels, All Cars:
1. New fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  2. Adjust vertical and horizontal clearances to meet Code requirements.
- H. Door Hangers, All Cars: New two-point hanger roller with eccentric upthrust roller adjustment and Manufacturer's recommended neoprene roller surface
- I. Door Track, All Cars: New bar or formed, cold-drawn removable steel track with smooth roller contact surface.
- J. Door Header, All Cars: New. Construct of minimum 12-gauge steel, shape with stiffening flanges.
- K. Car Door Electric Contact, All Cars: Prohibit car operation unless car door is closed.
- L. Door Clutch, All Cars:
1. New heavy-duty clutch, linkage arms, drive blocks and pickup rollers or cams to provide positive, smooth, quiet door operation.
  2. Design clutch so car doors can be closed, while hoistway doors remain open.
- M. Restricted Opening Device, All Cars:
1. Restrict opening of car doors to Code required limit outside unlocking zone.
  2. Adjust for smooth and quiet operation with operating noise undetectable from inside any car or outside of the hoistway.
  3. Plunger type restrictors not acceptable.
  4. Utilize mechanical angle to prevent door opening.
- N. Door Operator, All Cars:
1. New high-speed, harmonic drive, heavy-duty door operator capable of opening doors at no less than 2.5 fps.
  2. Accomplish reversal in no more than 2½" of door movement.
  3. Solid-state door control with closed loop circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current.
  4. Maintain consistent, smooth, and quiet car door operation at all floors, regardless of door weight or varying air pressure.
- O. Door Reopening Device, All Cars:
1. New black fully enclosed infrared 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.
- P. Car Operating Panel, All Cars:
1. One car operating panel with faceplate:
    - a. Consisting of a metal box containing vandal resistant operating fixtures, mounted behind the car stationary front return panel.

- b. Faceplate shall be hinged and constructed of satin finish stainless steel.
  - 2. Provide Exposed Pushbuttons to Initiate:
    - a. Car call registration.
    - b. Alarm.
    - c. Door open.
    - d. Door close.
    - e. Emergency push-to-call communication.
    - f. Push/Pull stop switch.
  - 3. Pushbuttons:
    - a. Provide minimum 3/4" diameter raised floor pushbuttons which illuminate to indicate call registration.
    - b. Locate operating controls no higher than 48" above the car floor; no lower than 35" for emergency push-to-call button and alarm button.
    - c. Identify buttons with cast tactile symbols rear mounted.
  - 4. Locked Firefighters' Emergency Operation Panel:
    - a. Openable by the same key which operates the Fire Operation switch.
    - b. Including the following features:
      - 1) Phase II fire access switch.
      - 2) Firefighters' visual indication.
      - 3) Call cancel button.
      - 4) Stop switch, manually operated.
      - 5) Door open button.
      - 6) Door close button.
      - 7) Floors served.
  - 5. Service Compartment:
    - a. Provide lockable service compartment with recessed flush door.
    - b. Door material and finish to match car return panel or car operating panel faceplate.
    - c. Include the following controls in lockable service cabinet with function and operating positions identified by permanent signage or engraved legend:
      - 1) Access switch.
      - 2) Light switch.
      - 3) Four-position exhaust blower switch.
      - 4) Independent service switch.
      - 5) Constant pressure test button for battery pack emergency lighting.
      - 6) 120-volt, AC, GFCI protected electrical convenience duplex outlet.
      - 7) Card reader override switch.
      - 8) Switch to select either floor voice annunciation, floor passing tone, or chime.
      - 9) Keyed stop switch.
  - 6. 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 inside face of firefighters' compartment door.
    - b. Engrave filled red firefighters' operation on outside face of compartment door.
    - c. Building identification car number on main car operating panel.
    - d. "No Smoking" over on main car operating panel.
    - e. Car capacity in pounds on main car operating panel service compartment door.
    - f. "Certificate of Inspection on File in Building Office" on main car operating panel.
- Q. Car Top Control Station, All Cars:
- 1. Mount to provide safe access and utilization while standing on car top.
  - 2. Operating device with Up and Down direction buttons, a Run button, an Inspection/Automatic switch and Emergency Stop switch.

3. Operating device provides an audible and visible indicator that fire recall has been initiated.
  4. Fix station to the car crosshead or provide portable station provided the extension cord and housing is permanently attached to the car crosshead.
  5. The car will be operated by constant pressure on the appropriate directional button and the Run button simultaneously.
  6. Normal operating devices will be inoperative while this device is in use.
- R. Car Top Emergency Audible Signal:
1. Provide on top of each elevator.
  2. Activation of Alarm Button or Emergency Stop switch will cause Emergency Audible Signal.
  3. Provide auxiliary power supply to provide 1-hr. power in the event of loss of normal power.
- S. Work Light and Duplex Plug Receptacle:
1. GFCI protected outlet at top and bottom of each car.
  2. Include on/off switch and lamp guard.
  3. Provide additional GFCI protected outlet on car top for installation of car CCTV.

## 2.12 COMMUNICATION

- A. Car Communication System, All Cars:
1. Hands-Free Phone System:
    - a. New two-way communication instrument in car with automatic dialing, tracking, and recall features, with shielded wiring to car controller in machine room. System includes:
      - 1) "Help" button on car operating panel to initiate two-way communication from Car. Button shall match car operating panel pushbutton design.
      - 2) Auto dialer with automatic rollover capability with minimum two numbers:
      - 3) Adjacent light jewel illuminates and flashes when call is acknowledged.
      - 4) "Help" button tactile symbol, engraved signage, and Tactile marking adjacent to button mounted integral with car front return panel.

## 2.13 CAR ENCLOSURE AND INTERIOR FINISHES

- A. Unless specifically identified as "Retain," "Reuse," or "Refurbish," provide new equipment. Contractor may, with Consultant approval, provide new equipment in lieu of refurbishing existing.
- B. Refer to Appendix A for approved material and finishes.
- C. Car Enclosure and Interior Finishes, All Cars: Retain existing car enclosure and provide new interior finishes.
1. Verify and document overall car weight prior to removal of any equipment from the existing car frame or car enclosure.
  2. Check and tighten all fastenings.
  3. Provide new interior finishes as specified herein.
  4. Modify car enclosure for application of new signal and pushbutton fixtures.
  5. New cab weight including all new finishes to be verified following completion of modernization. Post modernization weight not to exceed code allowable limits.
  6. Provide the following features:
    - a. Enclosure: Retain existing. Apply sound-deadening mastic to exterior.
    - b. Stationary Return Panels: Retain existing.
    - c. Entrance Columns: Retain existing.
    - d. Transom: Retain existing.
    - e. Base: New for Car #1. Stainless steel with concealed ventilation cutouts. Retain existing for Cars #2 and #3.

- f. Interior Wall Finish: Retain existing.
  - g. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
  - h. Lighting: New for all cars. LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - i. Suspended Ceiling: New for all cars. Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - j. Handrails: Retain existing.
- 7. Pads and Buttons: Provide hooks and 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.
- D. Top of Car Guardrail: Provide car top railings where fall hazard exceeds 12". Install guardrails, necessary hardware, and toe board to meet code requirements.
- E. Card/Proximity Reader Security Provisions, Cars #1 and #2:
  - 1. Mount reader unit inside car as directed by Purchaser, and cross connect from car pushbuttons to control module in machine room.
  - 2. Reader control unit, mounting brackets, wiring materials, logic circuits, etc., provided by others.
  - 3. 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.

## 2.14 HALL CONTROL STATIONS

- A. Pushbuttons: New.
  - 1. Provide single riser for each group with flush mounted enlarged faceplate to cover existing wall block out. Provide any cutting and patching required.
  - 2. Vandal resistant pushbuttons for each direction of travel which illuminate to indicate call registration. Provide LED illumination.
  - 3. Approved engraved message and pictorial representation prohibiting use of elevator during fire or other emergency as part of faceplate.
  - 4. Pushbutton design to match car operating panel pushbuttons.
  - 5. For Car #3, make necessary wire connections to existing card/proximity reader at the 1<sup>st</sup> floor.

## 2.15 SIGNALS

- A. Hall Direction Lanterns, All Cars:
  - 1. Provide new at each entrance to indicate travel direction of arriving car. Faceplate to cover existing wall block out. Provide any cutting and patching required.
  - 2. Illuminate up or down LED lights and sound tone once for up and twice for down direction prior to car arrival at floor.
  - 3. Illuminate light until the car doors start to close.
  - 4. Sound level shall be adjustable from 20-80 dBA measured at 5'-0" in front of hall control station and 3'-0" off floor.
  - 5. Provide advanced hall lantern notification to comply with ADA hall call notification time.
  - 6. Provide advanced predictive hall lantern notification to comply with ADA hall call notification time.
  - 7. Provide adjustable car door dwell time to comply with ADA requirements relative to hall call notification time.
  - 8. Hall direction lenses shall be arrow-shaped with faceplates.
  - 9. Lenses shall be minimum 2½" in their smallest dimension.

- B. Hall Position Indicator, All Cars at 1<sup>st</sup> Floor:
  - New alpha-numeric digital indicator containing floor designations and direction arrows a minimum of 2½" high to indicate floor served and direction of car travel.
  - 1. Mount integral with hall lanterns at 1<sup>st</sup> floor.
- C. Car Position Indicator, All Cars:
  - 1. New alpha-numeric digital indicator containing floor designations and direction arrows a minimum of 2" high to indicate floor served and direction of car travel.
  - 2. Locate fixture in each car operating panel.
  - 3. When a car leaves or passes a floor, illuminate indication representing position of car in hoistway.
  - 4. Illuminate proper direction arrow to indicate direction of travel.
- D. Floor Passing Tone, All Cars: 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, All Cars:
  - 1. New electronic device with easily reprogrammable message and voice to announce car direction, floor, emergency exiting instructions, etc.
  - 2. Once the doors close, the destinations remain illuminated until the car approaches the next destination floor, whereupon the floor numeral or light flashes and the audible signal sounds to denote the next stopping floor.
  - 3. When the doors open, Destination Indicator displays the next floors to be served.
- F. Fixture Faceplate Material and Finish:
  - 1. Satin finish stainless steel, all fixtures.
  - 2. Tamper resistant fasteners for all public facing fastenings.

## 2.16 FIREFIGHTERS CONTROL AND EMERGENCY POWER PANEL

- A. Provide and arrange new equipment as directed by Purchaser or Consultant.
- B. Firefighters' Control Panel, All Cars:
  - 1. Locate in building as directed by Purchaser.
  - 2. Fixture faceplate, satin finish stainless steel, including the following features:
    - a. Car position and direction indicator, digital-readout, or LCD flat screen color monitor.
    - b. Identify each position indicator with car number.
    - c. Indicator showing operating status of car.
    - d. Two-position firefighters' emergency return switches and indicators with engraved instructions filled red.
  - 3. Where applicable, identify all indicators and manual switches with appropriate engraving.
  - 4. Provide wiring and conduit to control panel.
- C. Firefighters' Key Box: Flush-mounted box with lockable hinged cover. Engrave instructions for use on cover per Local Fire Authority requirements.

## 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. Inform Purchaser and Consultant of any irregularities in writing prior to commencing work.
- C. Do not proceed with installation until work in place conforms to project requirements.

### 3.2 INSTALLATION

- A. Install all equipment as follows:
  - 1. in accordance with Contractor's instructions, referenced codes, specifications, and approved submittals.
  - 2. with clearances in accordance with referenced codes, and specifications.
  - 3. to be easily maintained and/or removed.
  - 4. to afford maximum accessibility, safety, and continuity of operation.
- B. 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.
  - 4. Protect machine-finish surfaces against corrosion.
- C. Paint machine room and pit floors.

### 3.3 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. Perform complete "Acceptance" level pre-testing as specified in the latest edition of ASME A17.2 "Guide for Inspection of Elevators, Escalators, and Moving Walks" prior to AHJ witnessed acceptance testing. Complete any adjustments, repairs, or replacements necessary to achieve code compliant operation including but not limited to:
  - 1. Hydraulic pressure relief valve.
  - 2. Car emergency communications. Inform Purchaser and Consultant of any noted failures of Purchaser provided and maintained equipment or systems.
  - 3. Car buffers.
  - 4. Phase I and II Firefighters' Emergency Operation. Phase I initiated by smoke sensing devices.
  - 5. Power car door operation including door closing force, reopening device, and restricted opening.
- C. Have Code Authority acceptance inspection performed and complete corrective work.
- D. Provide access to installed equipment and elevator personnel assistance for Consultants final observation and review requirements.
- E. ADJUSTMENTS
- F. Static balance car to equalize pressure of guide shoes on guide rails.
- G. Verify that weights of existing or altered cars, counterweights, and compensation comply with traction machine manufacturers' requirements and do not exceed total weights indicated on approved submittals.
- H. Lubricate all equipment in accordance with Contractor's instructions.

- I. Adjust motors, power conversion units, brakes, controllers, leveling switches, limit switches, stopping switches, door operators, interlocks, and safety devices to achieve required performance levels.

**3.4 CLEANUP**

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

END OF SECTION

Appendix A						
Bldg. No.	WSU Bldg. ID	WSU Bldg. Address	WSU ID #	Elevator Type	Cab Flooring Material (per specifications)	Interior Wall Finishes (per specifications)
5	Science Hall	5045 Cass Avenue, Detroit, MI 48202	005 01	Traction	Seamless Resilient Rubber	5WL hanging panels ???
34	Student Center Center	5221 Gullen Mall Detroit, MI 48202	034 03	Traction	diamond plate	5WL hanging panels ???
36	Reuther Library	5401 Cass Avenue, Detroit, MI 48202	036 01	Hydraulic	Seamless Resilient Rubber	Plastic laminate panels
42	Alumni House	441 Gilmour Mall Detroit, MI 48202	042 01	Hydraulic	Porcelain tile	Wood Veneer panels
45	Parking Structure 5	5501 Anthony Wayne Drive, Detroit, MI 48202	045 01 045 02	Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
51	Parking Structure 1	450 West Palmer, Detroit, MI 48202	051 03 051 04	Traction Traction	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
71	5057 Woodward	5057 Woodward, Detroit, MI 48202	071 01 071 02 071 03 071 03 071 03	Traction Traction Traction Traction Traction	Seamless Resilient Rubber	Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels
88	Parking Structure 6	61 Putnam Avenue, Detroit, MI 48202	088 01 088 03 088 02	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels 5WL hanging panels
89	Biological Sciences	5047 Gullen Mall, Detroit, MI 48202	089 01 089 02	Traction Traction	Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels 5WL hanging panels
130	Faculty / Administration Building	656 West Kirby Avenue, Detroit, MI 48202	130 03 130 02 130 01	Hydraulic Hydraulic Hydraulic	Existing to remain	Plastic laminate panels Plastic laminate panels Plastic laminate panels
629	Elliman Clinical Research	421 East Canfield Avenue	629 01 629 02 629 03	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels Plastic laminate panels 5WL hanging panels

## APPENDIX A

### WAYNE STATE UNIVERSITY CAR ENCLOSURE AND INTERIOR FINISH STANDARDS

#### CAR ENCLOSURE AND INTERIOR FINISHES

- A. Passenger Elevator: Retain existing car enclosure and provide new interior finishes.
  - 1. Check and tighten all fastenings.
  - 2. Provide new interior finishes as specified herein.
  - 3. Modify car enclosure for application of new signal and pushbutton fixtures.
  - 4. Post modernization weight not to exceed code allowable limits.
  - 5. Provide the following features:
    - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
    - b. Stationary Return Panels: Retain.
    - c. Entrance Columns: Retain.
    - d. Transom: Retain.
    - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
    - f. Base: Stainless steel with concealed ventilation cutouts.
    - g. Interior Wall Finish:
      - 1) Removable panels, faced and edged, with color core plastic laminate. Plastic laminate (HPDL) shall meet or exceed NEMA Standard LDI-1964 for Type 1, 1/16" high pressure general purpose laminate.
      - 2) Color and finish as selected by Purchaser.
      - 3) 5WL hanging panels with #4 stainless steel reveals between panels.
    - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
    - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
    - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
    - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
    - l. Cab Flooring, provide floor covering per below:
      - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
      - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
      - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
      - 4) Seamless resilient non-slip rubber or vinyl with sealed edges

- 5) Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

B. Service Elevator: Retain existing car shell enclosure and provide new interior finishes.

1. Check and tighten all fastenings.
2. Provide new interior finishes as specified herein.
3. Modify car enclosure for application of new signal and pushbutton fixtures.
4. Post modernization weight not to exceed code allowable limits.
5. Provide the following features:
  - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
  - b. Stationary Return Panels: Retain.
  - c. Entrance Columns: Retain.
  - d. Transom: Retain.
  - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - f. Base: Textured stainless steel with concealed ventilation cutouts.
  - g. Interior Wall Finish: Removable panels made of 5WL.
  - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
  - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - l. Cab Flooring: Provide a heavy vinyl cab floor covering as selected by the Purchaser.
  - m. Pads and Buttons: 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.

C. Passenger Elevator: New Car Enclosure and Interior Finishes.

1. Remove all existing interior finishes and shell components, weigh, and document.
2. Provide complete new car enclosure and interior finishes as specified herein.
3. Post modernization weight not to exceed code allowable limits.
4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel stainless steel formed panels Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - d. Entrance Columns: Reinforced 14 gauge satin finish stainless steel.
  - e. Transom: Reinforced 14 gauge satin finish stainless steel full width of enclosure.
  - f. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.

- g. Base: Stainless steel with concealed ventilation cutouts.
- h. Interior Wall Finish: Removable panels, faced and edged, with color core plastic laminate. Color and finish as selected by Architect/Purchaser.
- i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
- k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
- l. Subfloor; 5/8" thick marine grade plywood.
- m. Cab Flooring: Provide floor covering per below:
  - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
  - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
  - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
  - 4) Seamless resilient non-slip rubber or vinyl with sealed edges
- n. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
- o. Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

D. Service Elevator: New Car Enclosure and Interior Finishes.

- 1. Remove all existing interior finishes and shell components, weigh, and document.
- 2. Provide complete new car enclosure and interior finishes as specified herein.
- 3. Post modernization weight not to exceed code allowable limits.
- 4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel textured stainless steel formed panels with baked enamel interior finish as selected. Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Car Sill:
  - d. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - e. Entrance Columns: Reinforced 14 gauge textured satin finish stainless steel.
  - f. Transom: Reinforced 14 gauge textured satin finish stainless steel full width of enclosure.
  - g. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - h. Base: Textured stainless steel with concealed ventilation cutouts.
  - i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.

- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - l. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - m. Guardrails:
    - 1) Solid stainless steel flat stock bars, 4" x 3/8", mounted across rear and side walls.
    - 2) Locate guardrail line at 8" above car floor.
    - 3) Bolt rails through car walls from back and mount on 1½" deep solid round stainless steel standoff spacers no more than 18" O.C.
    - 4) Return guardrail ends to car walls.
    - 5) Pads and Buttons: 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.
  - n. Cab Flooring:
    - 1) Seamless resilient non-slip rubber or vinyl with sealed as selected by the Owner.
- E. Freight Elevator Enclosure: Car weight to be verified prior to removal of interior cab finishes/cab enclosure. Post modernization weight not to exceed code allowable limits. Provide the following features:
- 1. Enclosure Walls: Reinforced 10-gauge furniture steel formed panels no more than 20" wide with light-proof joints.
    - a. Baked enamel finish as selected.
    - b. Provide recess in car side wall for recessed mounting of car operating panel.
  - 2. Enclosure Canopy:
    - a. Reinforced 12-gauge furniture steel formed panels no more than 20" wide with light-proof joints and Hinged emergency exit.
    - b. Interior finish white reflective baked enamel.
    - c. Lighting: Recessed LED down lights with on/off switch in car operating panel. Recess mount fixture flush with inside surface of car top. Provide steel guard on car top over fixture.
    - d. Bumper Rails: Two rows of 2" x 12" oak or maple bumpers mounted on both sides and rear of the car.
      - 1) Locate bottom rail at floor level and top rail at 36" above the car floor.
      - 2) Bolt rails through car walls with bolt and captive nuts on exterior of wall panel sections on 18" centers.
      - 3) Finish both upper and lower top edges with a 45-degree chamfered edge to eliminate collection of trash.
      - 4) Finish ends of upper and lower bumpers on side walls to 45° chamfer to eliminate carts and people from hitting blunt ends.
      - 5) Flooring: Provide cab flooring which is 1/8" aluminum diamond plate.

**DIVISION 14**

**SECTION 14 24 23**

**TECHNICAL SPECIFICATIONS FOR**

**TWO (2) ELEVATORS**

**AT**

**WSU - PARKING STRUCTURE 5**

**5501 ANTHONY WAYNE DRIVE**

**DETROIT, MI**

**ADDENDUM #2**

DATE: February 26, 2024

VDA No. 69963/BM

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## DIVISION 14 – CONVEYING SYSTEMS

### 14 00 00 Conveying Equipment

#### 14 24 00 – Hydraulic Elevators

##### 14 24 23 – Hydraulic Passenger Elevators

## PART 1 - GENERAL

### 1.1 SUMMARY AND DEFINITIONS

#### A. Related Documents

1. Division 01 - Supplementary General Conditions
2. 14 24 23 - Hydraulic Passenger Elevators
3. Request for Proposal

#### B. Intent

1. This section includes:
  - a. Hydraulic passenger
2. The following outlines the scope of work covered in this Section:
  - a. Comprehensive “Turn-key” modernization of two (2) 3,000 lb. capacity hydraulic passenger elevators operating at 150 fpm.
  - b. Completion of Related Work identified herein Item 1.5.A.
  - c. This is a "TURN-KEY" project with the Elevator Contractor designated the "PRIME CONTRACTOR" for all related and non-related work specified and required unless specifically excluded or referenced to be done by others.

As this is a “Turn-Key” project, with the Elevator Contractor being the “Prime” Contractor, it is the Elevator Contractor’s responsibility to perform a detailed survey of the existing jobsite conditions to determine applicability and detailed scope for related work completion.

The Elevator Contractor is required to retain the services of trade sub-contractors that are either experienced in working as subcontractors on elevator modernization projects or that have relevant experience on similar projects. The trade sub-contractors shall be required to complete a detailed survey of related work / building conditions at this location(s) alongside the Elevator Contractor as a requirement to provide cost proposals for the related scope of work. At a minimum, trade sub-contractors that are required to be included on the Elevator Contractors project team should include:

Electrical Contractor

## Mechanical Contractor

## Fire / Life Safety Contractor

The Elevator Contractor is required to identify in their proposal the Trade sub-contractors utilized to compile their cost estimates included in their Base Bid.

It is the intent of this specification that the Elevator Contractor include in their Base Bid the cost to complete all elevator and related work that will be required to return each of the units to public use with no Code violations or punch-list items identified by the local Authority Having Jurisdiction (AHJ) as remaining to be completed. As such, the items Identified in Section 1.5.A of the Technical Specifications are intended to be as accurate a listing as can be compiled at the time of preparation of these documents.

However, should other related building work items be necessary to be completed to meet the requirements of the AHJ for issuance of permanent elevator operating certificates / permits, it will be the responsibility of the Elevator Contractor to complete the additional items under the scope of their Base Bid amount, with no additional costs to the Owner.

3. Related equipment shall be designed, constructed, installed and adjusted to produce the highest results with respect to smooth, quiet, convenient and efficient operation, durability, economy of maintenance, and the highest standard of safety.
4. It is not the intent of these specifications to detail the construction and design of all parts of the equipment, but it is expected that the type, materials, design, quality of work and construction of each part shall be adequate for the service required, durable, properly coordinated with all other parts, and in accordance with the best commercial standards applicable and of the highest commercial efficiency possible.
5. Electric and magnetic circuits and related parts shall be of proper size, design and material to avoid heating and arcing, and all other objectionable effects which may reduce the efficiency of operation, economy of maintenance and/or net-useful life of the apparatus.
6. Minimum requirements for design, materials, etc., are for certain parts of the equipment. Equivalent requirements approved by the Consultant shall apply to such parts as are of special design, construction or material and to which the specified requirements are not directly applicable. These minimum requirements as a whole shall be considered as establishing proportionate general minimum standards for all parts of the equipment.
7. The Consultant may permit variations from the requirement of these specifications to permit use of the Contractor's standard equipment, provided such standard equipment is in every way adequate for the intended use and meets the full intent of these specifications. All such variations proposed by the manufacturer shall be called to the attention of the Consultant and shall only be made if approved in writing prior to the award of the contract.
8. General requirements for design, materials and construction are intended primarily to apply to the heavy-duty and important parts of the equipment specifically mentioned and to other parts of similar duty and importance. Less important and light-duty parts may be of the standard design, materials and construction provided that, in the opinion of the Consultant, such standards are in accordance with the best commercial practice and are fully adequate for the purpose of use. All such variations shall be made only on the Consultant's written approval.

9. All equipment and component parts installed, supplied or provided under this contract shall be manufactured and distributed by a third-party, non-installer company servicing the vertical transportation industry.
  - a. Apparatus shall conform to the design and construction standards referenced herein and shall be rated the best commercial grade suitable for this application.
  - b. Equipment and component systems shall not employ any experimental devices or proprietary designs that could hamper and/or otherwise prohibit subsequent maintenance repairs or adjustments by all qualified contractors.
  - c. Manufacturers of the apparatus shall provide technical support and parts replacements for their equipment and component systems for a minimum of twenty (20) years and issue such guarantee of support to the purchaser with written certification naming the final Owner of their product(s) to ensure the apparatus or systems remain maintainable regardless of who may be selected for future service.
10. All equipment provided shall be factory and field tested with a history of design reliability and net-useful life established.
  - a. Contractor must be able to demonstrate the apparatus to be installed has been used successfully in a substantially similar manner under comparable conditions.
  - b. If the apparatus proposed differs substantially in construction, material composition, design, size, capacity, duty or other such rating from the equipment previously used for the same purpose by the manufacturer, the Consultant may reject the apparatus or require the vendor test and demonstrate the adequacy and suitability for this particular situation. Any necessary tests shall be performed at the sole expense of the Contractor with no prior guarantee of acceptance after the testing procedure.
11. The Contractor shall not use as part of the permanent equipment any experimental devices, proprietary design, components, construction of materials which have not been fully tried out in at least substantially similar or under comparable service, except as may be especially approved by the Consultant. If any important equipment or devices to be used on this installation differ substantially in construction, materials, design, size, capacity or duty from corresponding items previously used for the same purpose by the manufacturer, they shall pass such tests as the Consultant may require to fully show their adequacy and suitability. These tests shall be in addition to tests herein specified and shall be made at the expense of the Contractor.
12. Certain design limitations, tests, etc., are herein specified as a partial check of the adequacy of design, construction and materials used. These requirements do not cover all features necessary to ensure satisfactory and approved operation, etc., of the equipment.
13. It is understood, the entire system shall be designed, fabricated, modified and/or upgraded in full compliance with applicable local laws and code standards. The absence of a particular item or requirement shall not relieve the Contractor of the full and sole responsibility for such equipment, features and/or procedures.
14. With the exception of only those items specifically identified as being performed by others, the Specifications are intended to include all engineering, material, labor, testing, and inspections needed to achieve work specified by the Contract Documents. Inasmuch as it is understood that any incidental work necessary to complete the project is also covered by the Specifications, bidders are cautioned to familiarize themselves with the existing job site conditions. Additional charges for material or labor shall not be permitted subsequent to execution of the Contract.

15. Bidders must report discrepancies or ambiguities occurring in the Specifications to the Consultant for resolution prior to the bidding deadline, otherwise the Specifications shall be deemed acceptable in their existing form.
16. Fixtures, Operating Devices and Signage Survey
  - a. Upon award of the Contract, Contractor shall perform a survey of the existing elevator operating fixtures and devices, including signage, and present a report to the Building Management. The report shall include photographs of the following existing items:
    - 1) Hall call push buttons
    - 2) "You are Here" signage if integral with the hall call fixture cover plate
    - 3) Floor identification / Braille signage in entrance jambs
    - 4) Lobby directional lanterns at all floors
    - 5) Applicable wall surfaces
  - b. The Contractor shall submit, as part of the report, pictures or catalog cuts of the new devices intended to be installed under the modernization project at the various locations including any additional signage either new or replacing existing.

C. Abbreviations and Symbols

1. The following abbreviations, Associations, Institutions, and Societies may appear in the Project Manual or Contract Documents:

ADA	Americans with Disabilities Act
AHJ	Authority Having Jurisdiction
AIA	American Institute of Architects
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
IBC	International Building Code
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
OSHA	Occupational Safety and Health Act

D. Codes and Ordinances / Regulatory Agencies

1. Work specified by the Contract Documents shall be performed in compliance with applicable Federal, State, and municipal codes and ordinances in effect at the time of Contract execution. Regulations of the Authority Having Jurisdiction shall be fulfilled by the Contractor and Subcontractors. The entire installation, when completed, shall conform with all applicable regulations set forth in the latest editions of:
  - a. Local and/or State laws applicable for logistical area of project work.
  - b. Building Code applicable to the AHJ.
  - c. Elevator Code applicable to the AHJ.

- d. Safety Code for Elevators and Escalators, ASME A17.1 and all supplements as modified and adopted by the AHJ.
  - e. Safety Code for Elevators and Escalators, A17.1S supplement to A17.1 as modified and adopted by the AHJ for Machine Room Less installations (MRL).
  - f. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2.
  - g. Safety Code for Existing Elevators and Escalators, ASME A17.3 as modified and adopted by the AHJ.
  - h. Guide for emergency evacuation of passengers from elevators, ASME A17.4.
  - i. National Electrical Code (ANSI/NFPA 70).
  - j. American with Disabilities Act - Accessibility Guidelines for Building and Facilities and/or A117.1 Accessibility as may be applicable to the AHJ.
  - k. ASME A17.5/CSA-B44.1 - Elevator and escalator electrical equipment.
  - l. ECC (Energy Conservation Code) as may be applicable to the AHJ.
- 2. The Contractor shall advise the Owner's Representative of pending code changes that could be applicable to this project and provide quotations for compliance with related costs.

#### E. Reference Standards

- 1. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
- 2. ANSI/AWS D1.1 - Structural Welding Code, Steel.
- 3. ANSI/NFPA 80 - Fire Doors and Windows.
- 4. ANSI/UL 10B - Fire Tests of Door Assemblies.
- 5. [ASTM D1785 - PVC Pipe.]
- 6. [ASTM D2466 - PVC Pipe Fittings.]
- 7. [ASTM D2564 - Cement for PVC Pipe and Fittings.]
- 8. ANSI/IEEE - 519-Latest Edition.
- 9. ANSI/IEEE - Guide for Surge Withstand Capability (SWC) Tests.
- 10. ANSI Z97.1 - Laminated/Safety Tempered Glass.

#### F. Definitions

- 1. Defective Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
- 2. Provide: Where used in this document, provide shall mean to install new device, apparatus, system, equipment or feature as specified in this document.
- 3. Definitions in ASME A17.1 as amended or modified by the AHJ apply to work of this Section.

### 1.2 PERMITS AND SUBMITTALS

#### A. Permits

- 1. Prior to commencing work specified by the Contract Documents, the Contractor shall, at its own expense, obtain all permits or variances as may be required by the AHJ and provide

- satisfactory evidence of having obtained said permits and variances to both the Owner's Representative and Consultant.
2. File necessary drawings for approval of all Authorities Having Jurisdiction.
  3. The Elevator Contractor shall undertake the necessary review and search procedure to identify open applications and/or outstanding violations for this property; and close-out such applications and/or expunge such violations relative to the project scope as required for final acceptance by the AHJ.
  4. Outstanding applications and violations must be indicated on the request for permit filing for this procedure to ensure such applications and/or violations are dismissed accordingly.
- B. All relative costs shall be included in the base bid proposal with the understanding that corrective actions are covered under the specified scope of work.
- C. Submittals
1. Prior to beginning the work, the Contractor shall submit and have approved copies of layout drawings, shop drawings and standard cuts. These items shall include:
    - a. A plan and section view of the hoistway, pit and machine room.
    - b. Machine assembly, controller, door equipment, signal fixtures Door panels, car and counterweight guides, travel cable, and cab enclosures/ interiors.
    - c. All specified additional accessories.
  2. The Consultant and the Owner's Representative shall pass on the submittals with reasonable promptness and the Contractor shall be responsible to ensure that there will be no delay in their work or that of any other trade involved.
  3. Approved filing and submittal requirements must be completed before equipment and related materials are ordered.
  4. Copies of Department of Buildings' permits and/or governing authority's documents will be posted at the job site with copies issued to the Owner's Agent, Owner's Representative and Consultant.
  5. Samples of wood, metal, plastic, paint or other architectural finish material applicable to this project shall be submitted for approval by the Owner's designee.
  6. It shall be understood that approval of the drawings and cuts by Owner's designee, Architect and/or Consultant shall be for general arrangement only and does not include measurements which are the Contractor's responsibility or approval of variations from the contract documents required by the AHJ.
  7. The Contractor shall prepare a record log and maintain all submittals, shop drawings, catalog cuts and samples.
- D. Measurements and Drawings
1. Drawings or measurements included with the bidding material shall be for the convenience of the bidders only and full responsibility for detailed dimensions lies with the Contractor.
  2. In the execution of the work on the job, the Contractor shall verify all dimensions with the actual conditions.
  3. Where the work of the Elevator Contractor is to join other trades, the shop drawings shall show the actual dimensions and the method of joining the work of the various trades.
- E. Substitutions

1. Requests for substitutions will be considered under the following time limitations and situations:
  - a. Not less than ten (10) calendar days before bids are due.
  - b. Work or equipment specified becomes unavailable through unforeseen events such as strikes, loss of manufacturer's plant through fire, flood, or bankruptcy.
2. Requested substitutions will be reviewed and adjudged. Failure of the Owner to raise objection shall not constitute a waiver of any of the requirements of the Contract Documents.
3. Request for substitutions shall include complete data with drawings and samples as required, including the following:
  - a. Quality Comparison - Proposed substitution versus the specified product.
  - b. Changes required in other work because of the substitution.
  - c. Effect on the construction schedule.
  - d. Cost Data - Resulting from the proposed substitution versus the specified product. The Contractor shall certify that the cost data presented is complete and includes all related costs under this Contract.
  - e. Safety Comparison – Proposed substitution shall provide equivalent or greater safety, with certification data provided where relevant.
4. When proposing a substitution, the Contractor represents that:
  - a. They have investigated the proposed substitution and have determined that it is equal to or better than the product specified.
  - b. They will guarantee the substitution in the same manner as the product specified.
  - c. They will coordinate and make other changes as required in the work as a result of the substitution.
  - d. They waive all claims for additional costs as a result of the substitution, with the exception of those identified above under "cost data".
5. The Owner will be sole judge of the acceptability of the proposed substitution.
6. The Owner and Consultant will have authority to approve or reject substitutions or to change the specified standards of quality. However, neither this authority to act under this provision nor any decision made in good faith, either to exercise or not to exercise this authority, shall give rise to any duty or responsibility of the Owner to the Contractor, any Subcontractor, any Sub-Subcontractor, any of their agents or employees or any other persons performing the work or offering to perform the work.

F. Changes in Scope and Extra Work

1. The Owner may at any time make changes in the specifications, plans and drawings, omit work, and require additional work to be performed by the Contractor.
  - a. Each such addition or deletion to the Contract shall require the Owner and the Contractor to negotiate a mutually acceptable adjustment in the contract price, and, for the Contractor to issue a change order describing the nature of the change and the amount of price adjustment.

- b. The Contractor shall make no additions, changes, alterations or omissions or perform extra work except on written authorization of the Owner.
- c. Each change order shall be executed by the Contractor, Owner, and the Consultant.

G. Keys

- 1. Upon the initial acceptance of work specified by the Contract Documents on each unit, the Contractor shall deliver to the Owner, six (6) keys for each general key-operated device that is provided under these specifications in accordance with ASME A17.1, Part 8 standards as may be adopted and modified by the AHJ.
- 2. All other keying of access or operation of equipment shall be provided in accordance with ASME A17.1 Part 8 as may be adopted and modified by the AHJ.

H. Diagnostic Tools

- 1. Prior to seeking final acceptance of the project, the Contractor shall deliver to the Owner any specialized tools required to perform diagnostic evaluations, adjustments, and/or programming changes on any microprocessor-based control equipment installed by the Contractor. All such tools shall become the property of the Owner.
  - a. Owner's diagnostic tools shall be configured to perform all levels of diagnostics, systems adjustment and software program changes which are available to the Contractor.
  - b. Owner's diagnostic tools that require periodic re-calibration and/or re-initiation shall be performed by the Contractor at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the project.
  - c. The Contractor shall provide a temporary replacement, at no additional cost to the Owner, during those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation or repair.
- 2. Contractor shall deliver to the Owner, printed instructions, access codes, passwords or other proprietary information necessary to interface with the microprocessor-control equipment.

I. Service Support Requirements / Spare Parts

- 1. Software / Firmware Updates
  - a. During the life of the equipment and subject to the term of the maintenance agreement, where revisions to firmware and/or software are issued by the control manufacturer or manufacturer of solid state and microprocessor-based subsystems subsequent to the beneficial use of the equipment, updates shall be provided so that the installation and spare circuit boards are current with respect to software and firmware versions.

J. Wiring Diagrams, Operating Manuals and Maintenance Data

- 1. Deliver to the Owner two (2) identical volumes of printed information organized into neatly bound manuals prior to seeking final acceptance of the project.

2. The manuals shall also be submitted in electronic format on non-volatile media, incorporating raw 'CAD' and/or Acrobat 'PDF' file formats. Electronic manuals shall be properly indexed, bookmarked, and searchable.
3. Manuals, as well as electronic copies, shall contain the following:
  - a. Step-by-step adjusting, programming and troubleshooting procedures that pertain to the solid-state microprocessor-control and motor drive equipment.
  - b. Passwords or identification codes required to gain access to each software program in order to perform diagnostics or program changes.
  - c. A composite listing of the individual settings chosen for variable software parameters stored in the software programs of both the motion and dispatch controllers.
  - d. Method of control and operation.
4. Provide two (2) sets of "AS INSTALLED" straight-line wiring diagrams in both hard and electronic format in accordance with the following requirements:
  - a. Displaying name and symbol of each relay, switch or other electrical component utilized including identification of each wiring terminal.
  - b. Electrical circuits depicted shall include all those which are hard wired in both the machine room and hoistway.
  - c. Supplemental wiring changes performed in the field shall be incorporated into the diagrams in order to accurately replicate the completed installation.
5. Furnish two (2) sets of bound instructions and recommendations for maintenance, with special reference to lubrication and lubricants along with the full Maintenance Control Program as required Part 8 of ASME A17.1.
6. Manuals or photographs showing controller replacement parts with part numbers listed.

K. Training

1. Prior to seeking final acceptance of the project, the Contractor shall conduct a two (2) hour training program on-site with building personnel selected by the Owner.
2. The focus of the session shall include:
  - a. Instructions on proper safety procedures and who to contact for the purpose of assisting passengers that may become entrapped inside an elevator car.
  - b. Explain each control feature and its correct sequence of operation.
3. Control features covered shall include but not be limited to:
  - a. Independent Service Operation.
  - b. Emergency Fire Recall Operation - Phase I.
  - c. Emergency In-car Operation - Phase II.
  - d. Emergency Power Operation.
  - e. Emergency Communications Equipment.
  - f. Security Operating Features.
  - g. Interactive Systems Management.
  - h. Remote Monitoring/Controls.

L. Patents

1. Patent licenses which may be required to perform work specified by the Contract Documents shall be obtained by the Contractor at its own expense.
2. The Contractor agrees to defend and save harmless the Owner, Consultant and agents, servants, and employees thereof from any liability resulting from the manufacture or use of any patented invention, process or article of appliance in performing work specified in the Contract Documents.

M. Advertising

1. Advertising privileges shall be retained by the Owner.
2. It shall be the responsibility of the Contractor to keep the job site free of posters, signs, and/or decorations.
3. Contractor's logo shall not appear on faceplates or entrance sills without the approval of the Owner.

1.3 QUALITY ASSURANCE

A. Materials and Quality of Work

1. All materials are to be new and of the best quality of the kind specified.
2. Installation of such materials shall be accomplished in a neat manner and be of the highest quality.
  - a. Should the Contractor receive written notification from the Owner stating the presence of inferior, improper, or unsound materials or quality of installation, the Contractor shall, within twenty-four (24) hours, remove such work or materials and make good all other work or materials damaged.
  - b. Should the Owner permit said work or materials to remain, the Owner shall be allowed the difference in value or shall, at its election, have the right to have said work or materials repaired or replaced as well as the damage caused thereby, at the expense of the Contractor, at any time within one (1) year after the completion of the work; and neither payment made to the Contractor, nor any other acts of the Owner shall be construed as evidence of acceptance and waiver.

B. Electrical Design Requirements (General)

1. The following typical requirements shall apply to all parts of the work and are supplementary to other requirements noted under the respective headings.
  - a. The design and construction of the motors shall conform to the requirements of these specifications and to the ASME Standards for Rotating Electrical Machinery with revisions issued to the first day when the work of this Contract was advertised.
    - 1) Motors shall operate successfully under all loads and speeds and during acceleration and deceleration.
    - 2) Motors shall be designed for quiet operation without excessive heat.

- 3) Insulation on motor coils and windings and on all insulated switch, relay, brake and other coils shall conform to the requirements of minimum Class "F" insulation, as defined in ANSI Standards for Rotating Electrical Machinery. All motors shall be impregnated twice.
- 4) Switches, relays, etc., on controller, starter and signal panels and similar items on other parts of the equipment shall be the latest improved type for the condition of use. They shall function properly in full accordance with the requirements of the machines controlled and with the specified operating requirements of the elevator. Any of these parts showing wear or other injurious effects during the guarantee period to the extent that abnormal maintenance is required or indicated shall be replaced with proper and adequate parts by the Contractor.
- 5) Contacts in elevator motor circuits which are intended to be opened by governors or other safety devices shall be copper to carbon or other approved non-fusing type.
- 6) Where required, controllers and other component parts of the installation shall be labeled in accordance with the latest codes and standards as adopted and/or otherwise modified by the AHJ.
- 7) Electrical equipment, motors, controllers, etc., installed under this contract shall have necessary CSA/US or UL/US listing as may be required by the AHJ. Equipment shall be labeled or tagged accordingly.

#### C. Materials, Painting and Finishes

1. Two (2) coats of rust inhibiting machinery enamel shall be applied to exposed ferrous metal surfaces in the pit that do not have a galvanized, anodized, baked enamel, or special architectural finishes.
2. Two (2) coats of rust inhibiting enamel paint to the machinery located within the machine room and secondary level (where applicable) as well as to the machine room floors.
3. Architectural metal surfaces of bronze or similar non-ferrous materials which are specified to be refinished, re clad and/or provided new, shall be sufficiently clear coated so as to resist tarnishing during normal usage for a period of not less than twelve (12) months after final acceptance by the Owner.
4. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalomania or stencil type.
5. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by Code at intervals not exceeding 7'-0". The color of paint used shall contrast with the color of the surface to which it is applied.

#### D. Accessibility Requirements

1. Locate door reopening devices at 5" and 29" above the finish floor when individual contact projection apparatus is employed.
2. Locate the alarm button and emergency stop switch at 35", and floor and control buttons not more than 48" above the finished floor. The alarm button shall illuminate when pressed for visual acknowledgement to user.

3. Provide raised markings in the panel to the left of the car call and other control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons and cover plate.
4. The centerline of new hall push button shall be 42" above the finished floor.
5. The hall arrival lanterns, or cab direction lantern provided shall sound once for the "up" direction and twice for the "down" direction. Design and locate fixtures per Federal standards.
6. Provide floor designations at each entrance on both sides of jamb at a height of 60" above the floor.
  - a. Use cast metal plates and polished numbers secured with tamper-proof hardware.
  - b. Designations shall be 2" high, raised .03" on a contrasting color background as selected by the Owner.
7. Provide an audible signal within the elevator to tell passenger that the car is stopping or passing a floor served by the elevator.
8. Where elevators operate at a speed greater than 200 fpm, provide a verbal annunciator to announce the floor at which the elevator is stopping where required by the AHJ.
9. Provide signal control timing for passenger entry/exit transitions per Federal and/or Local standards.
10. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
11. Provide visual call acknowledgment signal for car emergency intercommunication device.

E. Qualifications

1. The work shall be performed by a company specialized in the business of manufacturing, installing and servicing conveying systems of the type and character required by these specifications with a minimum of ten (10) years of experience.
2. Prior written acceptance is required for manufacturers other than those listed, before quoting this project. Requests for acceptance will not be considered unless they are submitted before bid date and are accompanied by the following information:
  - a. List of five (5) similar installations having exact equipment being proposed for this project arranged to show name of project, system description and date of completed installation. The list shall include the names, position and resumes of the construction team and field supervisor of the installations.
  - b. Complete literature, performance and technical data describing the proposed equipment. Include the names, position and resumes of the proposed construction team and field supervisor.
  - c. List of ten (10) service accounts by building name, building manager or owner, including phone numbers.
  - d. Location of closest service office from which conveying system will be maintained.
  - e. Location of closest parts inventory for this installation.
  - f. List of the names, positions and resumes of the construction teams and field supervisor for the installation.

F. Structural, Mechanical and Electrical Design Parameters

1. The mechanical and electrical systems and the building structure have been designed for the following design loads:

a. Structural Loads

1.4 DELIVERY / STORAGE / HANDLING / COORDINATION

A. Delivery and Storage of Material and Tools

1. Comply with the requirements of Division 01.
2. Delivery, Storage, and Handling:
  - a. Deliver materials to the site ready for use in the accepted manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name. Delivered materials shall be identical to accepted samples.
  - b. Store materials under cover in a dry and clean location, off the ground.
  - c. Remove delivered materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
3. The Owner shall bear no responsibility for the materials, equipment or tools of the Contractor and shall not be liable for any loss thereof or damage thereto.
4. The Contractor shall confine storage of materials on the job site to the limits and locations designated by the Owner and shall not unnecessarily encumber the premises or overload any portion with materials to a greater extent than the structural design load of the Facility.

B. Work with Other Trades / Coordination

1. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are embedded in concrete or masonry for the applicable equipment. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
2. Coordinate sequence of installation with other work to avoid delaying the Work.
3. Coordinate locations and dimensions of other work relating to the equipment scheduled for installation including pit ladders, sumps, and floor drains in pits; entrance subsills; machine beams; and electrical service, electrical outlets, lights, and switches in pits and machine rooms, secondary levels, overhead sheave rooms and hoistways as it relates to the specific equipment.

C. Removal of Rubbish and Existing Equipment

1. On a scheduled basis, the Contractor shall remove all rubbish generated in performing work specified in the Contract Documents from the job site.
2. Any component of the existing elevator plant that is not reused under the scope of work specified in the Contract Documents shall become property of the Contractor and, as such, shall be removed from the premises at the Contractor's sole expense.
3. The Contractor agrees to dispose of the aforementioned equipment and rubbish in accordance with any and all applicable Federal, State, and municipal environmental regulations, and further accepts all liability that may result from handling and/or disposing of said material.

D. Protection of Work and Property

1. The Contractor shall continuously maintain adequate protection of all their work from damage and shall protect the Owner's property from injury or loss arising out of this contract.
2. The Contractor shall make good any such damages, injury or loss, except such as may be directly caused by agents or employees of the Owner.
3. The Contractor shall provide all barricades required to protect open hoistways or shafts per OSHA regulations. Such protection shall include any necessary guards or other barricades for employee protections during and after the modernization procedure.

## 1.5 RELATED WORK

### A. Work by Elevator Contractor Included in the Base Bid

1. The following requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.
  - a. Provide hoist rope guards at the car and counterweight drop side of the hoisting machine sheave to prevent accidental contact with the hoisting ropes. The guard shall extend from the point where the hoisting ropes penetrate the machine room floor slab to a point beyond where the ropes contact the traction and deflector sheaves. The guards shall be constructed so as to conceal pinch-points between ropes and sheave grooves.
  - b. The top surface of any setback or projection in the hoistway that measures 2" or more in width shall be beveled at an angle of not less than seventy-five (75) degrees from horizontal. Each bevel plate shall be constructed from prime painted 14-gauge cold-rolled steel and installed so as to conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
  - c. Provide the following signage, plates and tags:
    - 1) Provide each walk-in pit entrance door with a sign reading "Danger Elevator Pit" or the equivalent thereof. Letters shall be not less than 2" high.
    - 2) In addition to (1) above, walk-in pits with pit door stop switches shall be provided with a sign that reads "WARNING – Opening the Pit Door Will Stop the Elevator".
    - 3) Provide access doors to each electrical control room, secondary or machinery space with signs that read "ELEVATOR MACHINE ROOM". Letters shall be not less than 2" high.
    - 4) Provide all required manufacturer data plates and installation-specific tags and signs of the types and styles containing information as required by applicable Codes and Standards as adopted and/or modified by the AHJ.
  - d. Provide a standard railing conforming to Code on the outside perimeter of the car top on all sides where the perpendicular distance between the edges of the car top and the adjacent hoistway enclosure exceeds 300 mm (12 in.) horizontal clearance or as otherwise required by the Authority Having Jurisdiction.
  - e. Provide necessary patching, repairing and installation of masonry and/or dry wall for smooth and legal elevator hoistways.
  - f. Provide any required repair of smoke holes with subway grating covers in the machine rooms and/or secondary levels where applicable. All smoke ventilation

provisions, including duct work, dampers, fans, fire control interfaces, in accordance with local codes, shall be reviewed for proper operation.

- g. Subsequent to the contract execution, the Contractor shall perform the following procedures and engineering tasks relative to balance loading of system and cab work included under base specification requirements and alternative/optional upgrades:
  - 1) Perform balance load testing to determine existing conditions and requirements applicable to new/modified equipment.
  - 2) Provide data for Purchaser and/or their agents to evaluate any limitations that may be placed on design/finish options due to prevailing conditions or total suspended loading.
- h. Subsequent to the contract execution, the Contractor shall perform a Violation search and review of all open Applications in conjunction with the filing procedure. Subsequently, any and all outstanding Violations and/or open Applications shall be indicated on the Request for Permit; and such outstanding Violations shall be expunged, and open Applications closed out as part of this filing procedure.
  - 1) If requirements and/or work necessary to satisfy outstanding Violation or Applications are not included in the contracted scope of work, the Elevator Contractor shall prepare an itemized listing with relative extra costs to cure the condition(s) and expunge and/or close out the Violation or Application for the Owners' and Consultants' review/approval prior to executing such work procedures.

B. Work by Others

- 1. The following requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.
  - a. Installation of new fully enclosed, externally operated, fused main line and/or auxiliary disconnect switch, with 4<sup>th</sup> wire ground, properly located in accordance with local law that can be locked in the open (off) position.
  - b. Installation of new electrical conduit and power feeders between the load side of new main line disconnect switches and new elevator control equipment.
  - c. Where there is an increase in HP of the elevator pump motor, Contractor shall conduct an investigation to determine if existing feeder wires and conduit / piping to the elevator machine room are adequate in size to supply the new pump motor. Where they are not adequate in size, or where power supply from the building distribution panel is not large enough for feeder size / motor HP rating, Contractor shall include in their Base Bid proposal the cost to provide new building distribution electrical distribution supply connections, feeder wires and conduit / piping to elevator machine room.
  - d. Installation of battery lowering control interface provisions to interlock the mainline disconnect to prevent application of battery lowering operation when disconnect switch is turned to the "off" position. Provide auxiliary contacts and associated wiring and hardware in the existing or new mainline disconnect switch enclosure as required per Code.

- e. Provide auxiliary power feeds with required distribution load center (circuit breaker panel) for intercommunication, CCTV systems, cab lighting or other specialty devices existing or to be provided by the Elevator Contractor.
  - 1) Voltage shall be 120 VAC with one 15 Amp circuit breaker or fuse for lighting of each individual elevator car enclosure.
  - 2) Voltage shall be 120 VAC with one 20 Amp circuit breaker or fuse for battery power lowering system.
  - 3) Circuit breakers and/or fused disconnects shall be lockable in the “OFF” position in accordance with applicable code.
- f. The top surface of any setback or projection in the hoistway that measures 2” or more in width shall be beveled at an angle of not less than seventy-five (75) degrees from horizontal, constructed from prime painted 14 gauge cold-rolled steel and installed so as to conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
- g. Installation of new permanent dual lamp LED lighting fixtures with protective guards and 110-volt duplex GFI receptacles inside the machine room. Illumination shall be no less than thirty (30) foot-candles at floor level. A light control switch shall be provided immediately adjacent to the machine room entrance door. Provide necessary receptacles as required by Elevator Contractor to supply power to auxiliary elevator equipment and/or remotely located monitors.
- h. Provide machinery spaces of the secondary level directly below the machine room with permanent lighting fixtures having protective guards and a duplex GFI receptacle. Illumination shall be no less than nineteen (19) foot-candles at floor level. A light control switch shall be provided immediately adjacent to the secondary level entrance door/ladder in accordance with code.
- i. Provide each elevator pit with a 110-volt GFI duplex receptacle and a permanent dual lamp LED lighting fixture equipped with protective guard. Illumination shall be no less than ten (10) foot-candles at pit floor level. A light control switch shall be provided and so positioned as to be readily accessible from the pit entrance door or ladder.
- j. Installation of hoistway and machine room smoke relief provisions in accordance with local laws.
- k. Provide each machine room, secondary space and pit with a self-closing, self-locking, fire-labeled access door. Locking means shall be spring-type arranged to permit the doors to be opened from the inside without a key.
- l. Provide a smoke detector system meeting the requirements of A17.1 and/or the Local Governing Authority.
- m. Installation of fire emergency control interface provisions for automatic recall of the elevator(s) through operation of the fire detection system. Provisions shall be made for alternate designated fire recall landing with connection contingent on Codes recognized by the local governing authority. The interfacing contacts shall be wired to an electrical junction box located inside each elevator machine room for connection to the elevator control systems by the Elevator Contractor. Each wire shall be clearly labeled with its control function. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.
- n. Installation of new or modification of existing fire emergency control interface provisions for automatic recall of the elevator(s) through operation of the fire detection system. Provisions shall be made for primary, alternate and third-zone

(Fire-Hat) designated fire recall landing with connection contingent on Codes recognized by the local governing authority. The interfacing contacts shall be wired to an electrical junction box located inside each elevator machine room for connection to the elevator control systems by the Elevator Contractor. Each wire shall be clearly labeled with its control function. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.

- 1) Installation of heat / smoke detecting devices in the elevator machine room, elevator lobbies, top of shaft and / or pit as required for elevator fire recall operation to meet current requirements of A17.1 and/or the local Governing Authority. Connection and programming of these new devices to existing building fire alarm control panel.
  - 2) Modification of existing fire alarm control panel and interface / wiring to panel as required to accommodate new heat / smoke detecting devices or new elevator fire recall zones, including installation of expansion panel and new power supply(s) (if required) to existing FACP.
  - 3) Software modifications as required to the existing fire alarm control panel as required to accommodate new smoke / heat detecting devices, new elevator fire recall zones, or expansion panel (if required).
  - 4) All wiring, piping, coring, cutting, patching, as required for new ducts / conduits to connect new or modified components of the fire alarm control system to operate elevator fire recall to meet current requirements of ASME A.17.1 and/or the local Governing Authority.
- o. Where sprinkler fire protective systems are provided inside any elevator hoistway, machine room or associated machinery space, provisions shall be made for the disconnecting of the main line power supply from the affected elevator prior to activation. This means of disconnect shall be manually reset in accordance with code.
- p. Installation of HVAC provisions inside the machine room so as to maintain ambient temperature and humidity levels that are within the range specified by the microprocessor-control equipment manufacturers.
- q. Provide a class "ABC" fire extinguisher in electrical machinery and control spaces. Locate the extinguisher in close proximity to the access door.
- r. Provide necessary telephone wiring with connection to local telephone service for remote elevator monitoring and/or two-way voice emergency communications systems.
- 1) Terminate the telephone wiring in junction boxes or standard phone jack terminals in the machine room.
  - 2) Coordinate the quantity and termination method of individual phone connections with the Elevator Contractor.
  - 3) Identify each phone line for connection by the Elevator Contractor to the appropriate elevator device(s).
  - 4) Telephone wiring, where required by applicable codes, shall be installed in conduit.
- s. Sumps in pits where provided, shall be covered. The cover shall be level with the pit floor so as not to produce a tripping hazard.

- t. Where the pit extends more than three (3) feet below the sill of the pit access door, provide a permanent fixed metal ladder.
  - 1) Ladder shall extend no less than 48" above the sill of the access door. Handgrips shall extend from the ladder to a point no less than 48" above the sill of the access door where the ladder does not comply.
  - 2) The rungs shall be a minimum of 12" wide. Where prevailing conditions prevent a 12" wide rung, the rung may be reduced to no less than 9".
  - 3) The rungs shall be spaced 12" on center.
  - 4) A clear distance of no less than 4-1/2" from the centerline of the rungs and handgrips to the nearest permanent object in back of the ladder shall be provided.
- u. Provide Ethernet connection terminals in elevator machine rooms and location of elevator monitoring system.

## 1.6 WARRANTY / MAINTENANCE SERVICES

### A. Contract Close-Out, Guarantee and Warranties

- 1. The Contractor agrees to certify that work performed in accordance with the Contract Documents shall remain free of defects in materials and quality of work for a period of one (1) year after final acceptance of the completed project, or acceptance thereof by beneficial use on a unit-by-unit basis, whichever occurs first.
- 2. The sole duty of the Contractor under this warranty is to correct any non-conformance or defect and all damages caused by such defect without any additional cost to the Owner and within fifteen (15) days of notification.
- 3. The express warranty contained herein is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.
- 4. In the event the Contractor fails to fulfill its obligations defined herein, the Owner shall have the express right to perform the Contractor's obligations and to charge the Contractor the cost of such performance or deduct an equal amount from any monies due the Contractor.

### B. Maintenance Coverage

- 1. The following maintenance coverage apply:
  - a. Interim Maintenance
    - 1) Provide full protective maintenance services and equipment coverage for one (1) month prior to the commencement of work, and during the work implementation procedure, until final acceptance of the finished project.
    - 2) Interim full comprehensive maintenance services shall be provided in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.
    - 3) Costs related to interim maintenance shall be included in the base bid quotation indicated on the bid form provided with a deduction for unit(s) out of service for upgrading.

b. Guarantee Maintenance

- 1) Provide full comprehensive preventative maintenance services for a period of twelve (12) months after the final completion and acceptance of the project.
- 2) Guarantee maintenance and related services shall be provided in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.
- 3) Costs related to guarantee maintenance shall be included in the base bid quotation indicated on the bid form in the space provided.

c. Long-Term Maintenance

- 1) Long-term full comprehensive maintenance and related services shall be returned to the incumbent provider in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.

1.7 AUXILIARY SYSTEMS / TESTING PROCEDURES (New)

A. Smoke Detector System (New)

1. The Elevator Contractor shall provide a complete smoke detector system for elevator recall to comply with the governing authority's requirements and ASME A17.1 as approved or modified under local law.
  - a. Smoke detectors shall be installed in the elevator lobby at each floor, top of hoistway, in pit areas, and associated elevator machine room in accordance with NFPA and/or other applicable codes and standards of the authority having jurisdiction.
  - b. The activation of a smoke detector in any elevator lobby or associated elevator machine room other than the designated level (1st Floor) shall cause all cars in all groups that serve that lobby to return non-stop to the designated level (1st Floor).
  - c. The activation of a smoke detector at the designated level (1st Floor) shall cause the cars to return to an alternate level as required and/or allowed by applicable code unless the Phase I key-operated switch is in the "firemen service" position.
  - d. Smoke detectors and/or smoke detector system shall not be self-resetting.
  - e. Elevator Recall System shall incorporate a minimum number of zones as follows:
    - 1) Zone 1, First Floor
    - 2) Zone 2, Alternate Floor
    - 3) Zone 3, Machine Room
    - 4) Zone 4, Top of Shaftway
    - 5) Zone 5, Pit
    - 6) Zone 6, Spare
    - 7) Zone 7 to All Typical Landings serviced
  - f. The system shall be independent of the existing building systems and shall contain the following:

- 1) Modular LED control panel/annunciator, located at the 1st Floor Lobby in a specially designed tamperproof station, shall be custom designed for each individual system and location.
  - 2) Smoke detectors shall be photoelectric type or approved equal.
  - 3) Primary power supply shall be provided by Elevator Contractor.
  - 4) Minimum twenty-four (24) hour emergency power failure battery back-up with automatic recharging apparatus and signal status indicators.
- g. Elevator Contractor shall provide all wiring, conduit and make final connections. Conduit may run in elevator hoistway as part of elevator control signal systems provided such circuitry is installed per local code requirements.

## 1.8 ALTERNATES AND VALUE ENGINEERING:

The following alternatives are elective upgrades which constitute changes to the base scope of work specified. Pricing for each alternate upgrade is requested from the bidder with costs indicated in the appropriate space in the Request for Proposal (RFP). Contractor shall take into consideration, as part of the alternative pricing, alternate work that is required either in lieu of, or in addition to, work specified in the base scope and shall not duplicate costs.

### A. Contractor's Value Engineering Options

1. This alternative is provided for individual contractors to propose optional equipment or otherwise offer cost saving suggestions that will provide the same desired results or further enhance the safety, durability or performance of the elevator systems.
2. Each suggestion must be fully detailed on the contractor's own letterhead with the associated price change specified on the form of proposal provided.

## PART 2 - PRODUCTS

### 2.1 GENERAL DESCRIPTION

### 2.2 Hydraulic Elevator

#### A. WSU 5501 Anthony Wayne Drive, Detroit, MI 48202 US - Hydraulic Elevator PE1-PE2

1.	Quantity	Two (2)
2.	Type	Hydraulic Elevator Passenger
3.	Capacity (lbs)	3000
4.	Speed (fpm)	150
5.	Travel in Feet	Existing
6.	Number of Landings	Four (4)
7.	Number of Openings	Four (4)
8.	Front Openings	Four (4)
9.	Rear Openings	None (0)
10.	Side Openings	None (0)

11.	Operation	Automatic Group Duplex / Selective Collective Operation
12.	Controller	Control Equipment (New); Controller / Group Dispatcher (New)
13.	Machine Room, Secondary, Pit	New
	Lighting and GFI	
14.	Machine Type	Submersible
15.	Power Drive	Solid-State
16.	Machine Location	Adjacent
17.	Power Unit	New
18.	Hydraulic Jack / Cylinder	Jack Unit (Reuse)
19.	Hydraulic Piping	New
20.	Scavenger Pump	N/A
21.	Rescuvator	Hydraulic Auto Lowering
22.	Governor	N/A
23.	Car Platform / Frame / Safety	Car Platform (Reuse); Car Frame (Reuse)
24.	Counterweight	Reuse
25.	Counterweight Safety	N/A
26.	Guide Rails	Reuse
27.	Guides	Roller Guides (New)
28.	Buffers	Car Buffers (New)
29.	Buffer Ladder / Platform	New
30.	Car Door Type	
	a. Front Door	Single Speed Center Opening
	b. Rear Door	N/A
	c. Side Door	N/A
31.	Car Door Size	
	a. Front Door	42" wide x 84" height
	b. Rear Door	N/A
	c. Side Door	N/A
32.	Hoistway Door Type	Single Speed Center Opening
33.	Hoistway Door Size	42" wide x 84" height
34.	Master Door Operator	Car Door Zone Lock Restrictor (New)
35.	Hoistway Entrance Sills	Retain/Recondition
36.	Sill Finish	Aluminum
37.	Hoistway Entrances	Reuse
38.	Tracks / Hangers / Interlocks / Closers	Interlocks / Unlocking Devices (New); Tracks / Hangers / Closers / Related Equipment (New)
39.	Emergency Access Doors	N/A
40.	Emergency Exits / Top and Side	New
41.	Keyed Access	N/A
42.	Pit Ladder	New
43.	Power Supply	480V-3-60 (field verify)
44.	Electrical Conduit / Wiring / Traveling Cable	New
45.	CCTV	New
46.	Card Reader	New
47.	Floor Lockout Feature	N/A
48.	Number of Push Button Risers	One (1)

49.	Inconspicuous Riser	None (0)
50.	Car Operating Fixtures	New
51.	Emergency Communication	New
52.	Door Reopening Device	Door Reopening Device (New)
53.	Emergency Cab Lighting	New
54.	Car Ventilation	New
55.	Elevator Cab Enclosure	Remodel
56.		
57.	Car Doors / Gate Panels	Car Door Panel(s) (New)
58.	Car Flooring	New
59.	Car Sill	New
60.	Platform Size	Retain (field verify)
61.	Door Operation	Power Car / Slide Hoistway (New)
62.	Emergency Access Doors	New
63.	Intercom / Central Exchange	New

## 2.3 MANUFACTURERS

### A. Pre-Approved Equipment Manufacturers

1. The following manufacturer's equipment and materials have been pre-approved by Wayne State University for use on all their traction and hydraulic elevator modernization project.
2. Other equipment not specifically mentioned shall be considered for approval on an individual basis.
  - a. Controller - GAL (GALaxy), Elevator Controls Corporation, Smartrise
  - b. Tracks, Hangers, Interlocks and Door Operators - G.A.L., ECI.
  - c. Fixtures - Innovation, PTL, MAD.
  - d. Door Protective Device - Janus, T.L. Jones, Tri-Tronics.
  - e. Cabs and Entrances/Entrance Door Panels - Tyler, Velis, Gunderlin, Columbia Elevator Products, United Cabs.
  - f. Cab interiors refurbish/remodel – Architectural Metals, A better Elevator Co., Weir inc.
  - g. Machines - Hollister-Whitney, Titan, Imperial, Torin.
  - h. Motors - Imperial Electric, General Electric, Baldor, Reuland Electric.
  - i. SCR Power Drives - MagneTek, KEB, Nidec.
  - j. VVVF Power Drives - Mitsubishi, MagneTek, Yaskawa, TorqMax.
  - k. Guide Rails - AFD Industries, Savera, Monteferro.
  - l. Electrical Traveling Cables - Draka, James Monroe.
  - m. Hydraulic Systems/Components - Canton, Elevator Equipment Corporation, MEI, Schumacher.
  - n. Freight Doors and Systems - Courion, EMS Group, Peelle.
  - o. Guide Shoes/Rollers – ELSCO, G.A.L.
  - p. Wire Ropes - Paulsen, Bethlehem, Wayland, Draka.
  - q. Intercommunications/Telephones -K-Tec, Rath Microtec, Wurtec, Janus, Kings three.
  - r. Compensation Chains - Draka
  - s. Compensation Chain Guides - Draka

- t. All specialized tools, equipment, software, and passwords, required to maintain, repair, adjust the operation, and perform code mandated inspections are provided to the Owner as part of the base installation.
    - 1) Updates to these items shall be available via the parts supply facility referenced above.
  - u. Technical support of the product(s) shall be available to the Owner's elevator service provider.
3. Original Equipment Manufacturers are not accepted.

## 2.4 CONTROL FEATURES / OPERATION (New)

### A. Cross Cancellation (New)

- 1. A temporary dispatch signal control interface shall be provided during the interim modernization period between the existing dispatching control panel and the new microprocessor supervisory control system.
- 2. The overlay interface shall allow either system to cross cancel corridor calls registered in both systems and maintain an acceptable level of group dispatching operations.
- 3. The existing equipment that is retained on a temporary basis shall undergo a complete maintenance restoration to ensure improved reliability and performance during the primary work implementation period.

### B. Cross Registration (New)

- 1. In conjunction with the installation of the first new controller, the new dispatcher shall be installed and interfaced with the existing dispatcher to allow controlled cross registration of hall calls in both systems.
  - a. The existing temporary apparatus that is retained shall undergo a complete preventive maintenance restoration to ensure improved reliability and performance during the primary work period.
- 2. Registered hall calls shall be immediately registered in the new dispatcher and assigned to the modernized elevator(s) for response.
  - a. The new dispatcher shall continuously calculate the ETA (Estimated Time of Arrival) of the modernized elevator(s) response to the registered calls.
  - b. Should the calculated ETA exceed the pre-determined time limit, (field adjustable from 0 to 199 seconds), the registered calls with excessive wait times shall be transferred from the new dispatcher to the original dispatcher for assignment to the existing elevator(s).
  - c. Registered hall calls assigned to the original dispatcher shall be returned to the new dispatcher should excessive wait times occur in the original system.
  - d. Hall call demands shall not be dumped, deleted or ignored for any long-hall call scenario in either the new or old dispatching systems.

3. Initial long-wait timer values shall be adjusted at a low setting when less than thirty-three percent (33%) of the total group is modernized and shall be increased as additional modernized elevators are added to the group.
4. Timer values shall be manipulated to achieve the best group performance based on the ratio of both modernized and existing elevators.

C. Motion Control (New)

1. Smooth stepless acceleration and deceleration of the elevator car shall be provided in either direction of travel during both single and multiple floor runs.
2. Use digital logic to calculate optimum acceleration and deceleration patterns during each run.
3. Acceleration, deceleration, jerk, maximum velocity, leveling accuracy and elapsed flight time, for a typical elevator one (1) floor run, shall not exceed values as further specified.

D. Automatic Group Duplex / Selective Collective Operation (New)

1. Provide duplex selective collective operation with the two cars arranged to operate from a single riser of hall push buttons.
2. When there is no demand for elevator service, park one car at the Lobby Floor and the other shall be a "free car", parking at the floor last served.
  - a. Park both cars with doors closed.
  - b. The "free car" shall normally respond to any registered hall call except:
    - 1) A hall call registered at the Lobby Floor shall be answered by the car parked at the Lobby Floor.
    - 2) A hall call registered below the Lobby Floor shall be answered by the car parked at the Lobby Floor.
3. When the car parked at the Lobby Floor responds to a registered call for a floor above the Lobby Floor, the "free car" shall be dispatched automatically to the Lobby Floor and shall become the assigned Lobby Floor parking car.
4. When the "free car" is responding to registered calls, the Lobby Floor parking car shall automatically dispatch from the Lobby Floor under any of the following conditions:
  - a. Registration of hall call below the "free car" while it is traveling in the up direction.
  - b. Registration of hall call above the "free car" while it is traveling in the down direction.
  - c. Inability of the "free car" to move in response to a registered hall call within a predetermined time.
5. When both cars are responding to registered car and hall calls, the first car to complete its calls shall become the assigned Lobby Floor parking car and shall be dispatched automatically to the Lobby Floor.
6. If either car is removed from service, the other car shall respond to all registered hall calls and its own car calls.
7. When a car arrives at its last stop and reverses direction of travel, all previously registered car calls shall be automatically cancelled.

8. When a car has responded to the highest or lowest call, and hall calls are registered for the opposite direction, the car shall reverse direction automatically and respond to those registered calls.
9. When a car arrives at a landing where both up and down hall calls are registered, it will answer the call in the direction of travel.
  - a. If no car call is registered, the car shall be assigned to respond to call registered for the opposite direction. The car doors shall immediately close and re-open to respond to the call in the opposite direction.
  - b. Hall lantern operation shall always correspond to direction of service.
10. When an empty car reverses direction at a landing with no hall calls, the doors shall not open, and the hall lantern shall not operate.
11. If a car has no car calls registered and arrives at a floor where both up and down hall calls have been registered, the car shall respond to the hall call corresponding to the direction of car travel.
12. If, after making its stop, a car call is not registered and no other hall calls exist ahead of the car corresponding to its original direction of travel, the doors shall close and immediately reopen in response to the hall call for the opposite direction.
13. The car shall maintain its original direction at each stop until the doors are fully closed to permit a passenger to register a car call before the car reverses its direction of travel.
14. In the event that any car is delayed for more than a predetermined time interval after it received a start signal, the system shall automatically permit the remaining car in the two-car group to respond to signals and be dispatched in the specified manner.
15. Coincident calls: The dispatching system shall be designed with a twenty (20) second parameter whereby an elevator with a car call will receive priority to answer a corresponding corridor call if it can do so within twenty (20) seconds. If it cannot answer the call within the prescribed time, the first available car shall be assigned. A continuous reassessment of calls shall be made, with the processor having the capability of reassessing five (5) times per second.
16. In the event the supervisory control system should malfunction so that neither elevator is assigned calls within a predetermined interval and in accordance with the conditions of the operating strategy in effect, the system shall automatically assume a back-up mode of operation whereby the elevators shall be arranged to provide continuous service to each landing in a predetermined pattern without regard to actual corridor call demands.

E. Automatic Group Operation / Conventional Dispatch (New)

1. Provide a microprocessor-based group supervisory control system for the operation of the elevators.
2. Elevators shall be arranged to operate with or without attendants as an automatic group.
  - a. The group shall remain capable of sustaining balanced service and continuing operation with one (1) or more cars removed from the system.
  - b. Elevators shall operate from pushbutton panels located inside each car and from a riser of corridor pushbutton fixtures located on each landing served.
3. Elevators shall automatically travel to landings for which a call demand exists.

- a. Stops in response to calls that are registered at either the car or hall push button stations shall occur in the natural order of progression in which the floors are encountered, depending on the direction of car travel, and irrespective of the order in which calls are registered.
4. Call acknowledgment lights provided in both the car and hall push button fixtures shall become extinguished as the car responding to a particular call begins its slowdown approach to the corresponding landing.
5. In the event no demand for elevator service exists, the first car to satisfy its assigned calls shall be dispatched to park at the main landing.
  - a. In the event additional cars should also complete their call assignments, those cars shall be individually dispatched to previously designated parking floors.
  - b. Parking assignments shall be accomplished without door operation.
  - c. Should the elevator parked at the main landing receive a call assignment, another free car in the group shall immediately assume that parking assignment.
  - d. The number of elevators assigned to park at any particular landing shall be programmable.
6. The group supervisory controller shall, through a dispatching algorithm along with artificial intelligence parameters, continuously scan the system in order to determine the load each car is transporting and to monitor the number of corridor calls registered, the duration of each call, and the intended direction of travel, the number of loaded lifts, etc.
  - a. Based upon that data, the supervisory system shall automatically devise a strategy for call assignment with preference given to calls registered in the following order:
    - 1) lobby demand.
    - 2) long waiting times – down.
    - 3) long waiting times – up.
    - 4) up calls.
  - b. Long wait calls shall be considered those which have remained unanswered for at least forty (40) seconds. The long wait call threshold time shall be programmable.
7. If a car with no car calls arrives at a landing where both up and down hall calls are registered, it will answer the call in the direction of travel.
  - a. If no car call is registered, the car shall be assigned to respond to the call registered for opposite direction.
  - b. The doors shall close and immediately re-open when responding to this call.
  - c. Hall lantern operation shall always correspond to direction of service.
8. In the event that any car is delayed for more than a predetermined time interval after it received a start signal, the system shall automatically permit the remaining cars in the group to respond to signals and be dispatched in the specified manner.
9. In the event the group dispatching, or supervisory system should malfunction so that elevators are not assigned to calls within a predetermined interval and in accordance with the conditions of the operating strategy in effect, the system shall automatically assume a back-up mode of operation whereby the elevators shall be arranged to provide continuous

service to each landing in a predetermined pattern without regard to actual corridor demand.

- a. Failure of the automatic dispatching system will be indicated by an illuminated signal in the Lobby Elevator Control Panel or Elevator Information and Management System where applicable.
10. In the event of failure of the landing call button circuit, provide a means to enable the elevators to service each floor without registration of a call within the elevators.
    - a. When emergency operation is in effect, provide an illuminated signal in the Lobby Elevator Control Panel or Elevator Information and Management System where applicable.
  11. When a car arrives at its last stop and reverses direction of travel, all previously registered car calls shall be automatically cancelled.
  12. When a car has responded to the highest or lowest call, and hall calls are registered for the opposite direction, the car shall reverse direction automatically and respond to those registered calls.
  13. When an empty car reverses direction at a landing with no hall calls, doors shall not open, and the hall lantern shall not operate.
  14. Main Lobby Operation:
    - a. Only the “Next” designated car shall have its hall lantern illuminated and its doors open.
    - b. When a “down” traveling car which is not designated “Next” arrives at the main lobby with a lobby car call registered, it will open its door to discharge the passengers, close the doors, and shall not illuminate its lantern.
    - c. When a “down” traveling car with no car calls arrives at the main lobby and is not designated “Next”, it shall park without opening its doors.
  15. Coincident Calls:
    - a. The dispatching system shall be designed with a twenty (20) second parameter whereby an elevator with a car call will receive priority to answer a corresponding corridor call if it can do so within twenty (20) seconds.
    - b. If the elevator cannot answer the call within the prescribed time, the first available car shall be assigned.
    - c. A continuous reassessment of calls shall be made.

F. Independent Service Operation (New)

1. The car operating station shall be equipped with a key-operated switch labeled “IND SER”.
2. Locate the switch in the locked service compartment.
3. When placed in the “on” position the following shall occur:
  - a. Group elevator - the elevator shall bypass corridor calls and travel directly to any floor chosen by registration of a car call. Hall calls shall remain registered for service by another elevator in the group.

- b. Simplex elevator - existing hall call registrations shall extinguish and hall buttons shall remain inoperative as an indication to passengers that there is no elevator service.
- 4. During Independent Service Operation, the elevator doors shall remain open at any landing until the door close or a car call push button is pressed and maintained until the doors are fully closed.
- 5. If more than one (1) car call is registered, all registered car calls shall extinguish when the elevator stops in response to the first call.
- 6. Fire Emergency Recall shall automatically override Independent Service Operation and engage Phase I - Fire Emergency Recall Operation following a period of approximately forty-five (45) seconds.

G. Inspection Service Operation (New)

- 1. Provide a key operated switch in the main car operating panel locked service panel that, when turned to the 'ON' position, shall cause the elevator to be removed from service and placed in Inspection Service Operation.
- 2. Limited operation of the car shall be provided through pressing the Attendant Service up and down push buttons (if provided) or the highest or lowest car call push buttons (if up and down buttons are not provided) in the main car operating panel only.
- 3. The car shall move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with both the hall and car door panels in the closed and locked position.
- 4. The Inspection Service switch shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
- 5. The top of the elevator car shall be equipped with a control for limited operation of the car during repairs, maintenance and inspection conducted in the hoistway. The transfer of control to the top of car operating device shall cause that device to be the sole means of control for the elevator.
  - a. Visual and audible indication shall be provided on the top of the car when Firefighters' Emergency Operation is initiated.
- 6. Power door operating equipment shall be rendered inoperative while the car is being operated in the Inspection Service mode with the exception of power closing of the door. The control system shall maintain closing power on the door while the elevator is moving under Inspection Service Operation.
- 7. The in-car Inspection Service switch shall be rendered ineffective when the top of car inspection control is activated.
- 8. Machine Room Inspection Operation and Inspection Operation with open door circuits shall be provided in accordance with A17.1 Safety Code, as modified and adopted, where required or allowed by the AHJ.

H. Hoistway Access Operation (New)

- 1. Provisions shall be made to allow access to the hoistway through the use of hoistway access switches.

2. Operating the access switch shall permit the car to move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with the hall and car doors in the open position to obtain access to the top of the car or climb-in pit.
3. The car shall automatically stop motion when the car top is level with the hoistway door sill for access to top of car.
4. The access key switch(es) shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. Access operation shall be disabled when top of car inspection operation is in effect.

I. Anti-Nuisance Operation (New)

1. In the event car loading is not commensurate with the number of car calls registered, all car calls shall be canceled.
  - a. The system shall monitor the door protection device to determine if passenger transfer has occurred.
  - b. If after the third (3<sup>rd</sup>) stop a passenger transfer has not occurred, the system shall cancel all remaining registered car calls and respond to assigned hall call demand.
  - c. The number of calls registered with no passenger transfer that will trigger anti-nuisance shall be adjustable and initially set to three (3) calls.

J. Out-of-Service Control Operation (New)

1. Provide an unidentified key-operated switch, engraved with “ON” and “OFF” only, that shall remove the elevator from service when placed in the “ON” position and the car is not in motion. Locate the switch in the service cabinet of the car operating panel.
  - a. When the key-switch is turned to the “ON” position while the elevator is in motion, the car shall proceed to the next call and be removed from service after leveling operations are completed and the doors have opened.
  - b. When engaged, the Out-of-Service Control feature shall cause the car door to remain open and the car call buttons rendered inoperative.
  - c. The elevator shall not respond to hall call assignments from dispatching systems when the Out-of-Service Control feature is active.
2. Firefighters’ Emergency Operation shall override this feature.

K. Firefighters’ Emergency Operation / National (New)

1. Phase I Emergency Recall Operation shall be provided for each car in accordance with ASME A17.1 code as modified under the applicable local or State law.
2. Each main or auxiliary car operating station shall be provided with an indicator light and warning buzzer, each of which shall become activated whenever Phase I Operation is engaged.
  - a. The warning buzzer shall cease to function once the car has completed the recall sequence and is positioned at the designated recall landing.
  - b. The indicator light shall remain illuminated as long as Phase I Operation is activated.

3. A three-position, key-operated switch shall be provided on the designated recall landing to manually activate Phase I Operation.
  - a. When activated, Phase I Operation shall be arranged so that in order to reset normal service, all cars must first be returned to the designated recall landing, after which the Phase I key-switch must be turned to the “OFF” position.
4. A standardized Fire Recall Key shall be used where required by the codes and standards applicable to the AHJ.
5. A “Standardized Fire Recall Key” shall be used in accordance with the applicable Chapter of the Public Law. This key shall be a FEKO1.
  - a. Multiple elevators within a group or building that are not affected by the scope of work specified herein, shall be upgraded to the “Standardized Fire Recall Key”.
  - b. The “Standardized Fire Recall Key” shall apply to both Phase I and Phase II Operation.
6. Phase II Emergency Recall In-Car Operation shall be provided for each car in accordance with ASME A17.1 code as modified under local or State law.
7. Locate controls required for Phase II In-Car Operation in a locked access cabinet in the main car operating panel.
  - a. The cover of the locked access panel shall be engraved as required by local or State law.
  - b. The locked access panel shall contain:
    - 1) Phase II key switch.
    - 2) Fire indicator light.
    - 3) Call cancel push button.
    - 4) Door open push button.
    - 5) Door close push button.
    - 6) Run/Stop switch.
    - 7) Other devices as may be required by local law.
  - c. Engrave the Firefighters’ Service operating Instructions on the inside of the locked cabinet door.

L. Low Oil Protection and Protective Device (New)

1. Provide low oil protection operation and appropriate device(s) that will discontinue operation of the hydraulic elevator pump when:
  - a. The elevator stalls due to a low oil condition.
  - b. Fails to reach the landing in the up direction.
2. Pressure Switch:
  - a. Where the top of the cylinder head is above the top of the tank, provide a pressure switch between the cylinder and the valve which shall be activated by the loss of

pressure at the top of the cylinder, and control the operation of the elevator as required by Code.

3. Provide an additional protective device that shall automatically return the elevator to the bottom landing, open the door and shut down the system.
4. The protective device shall be an integral part of the control system.

M. Hydraulic Auto Lowering (New)

1. Provide automatic battery powered lowering feature for the hydraulic elevator.
  - a. In the case of normal power outage, the elevator shall be automatically lowered to the Main Lobby level.
  - b. The door shall open automatically to discharge passengers.
  - c. The elevator shall remain parked with its door closed and door open button operative until normal power is restored.
2. The control panel shall be located in the machine room or be an integral part of the control system.
  - a. It shall include necessary batteries, solid-state controls, charger, monitor lights and a test button.
  - b. It shall be fed by a 120-volt, 20 Ampere branch circuit from the emergency power source, provided by Others.
3. Provide necessary circuitry within the controller to determine the difference between an “intentional” loss of power and an “actual” loss of power in order to prevent operation of the auto lowering unit when the main line disconnect has been opened for elevator servicing.
4. Provide necessary terminals for connection to an auxiliary switch in main line disconnect provided by others.

N. Door Operation (New)

1. Car and hoistway doors shall be arranged to operate in unison without excessive noise or slamming in either direction of travel.
  - a. Door opening speeds of two (2) feet per second shall be provided in conjunction with closing speeds of one (1) foot per second in accordance with governing code.
  - b. Door operation shall commence as the car stops level at the floor and the machine brake is applied. Pre-door opening shall not be permitted.
2. Where the hoistway door and the car door are mechanically coupled, the kinetic energy of the closing door system shall be based upon the sum of the hoistway and the car door weights, as well as all parts rigidly connected thereto, including the rotational inertia effects of the door operator and the connecting transmission to the door panels.
3. The force necessary to prevent closing of the car and hoistway door from rest shall not exceed thirty (30) lbf. This force shall be measured on the leading edge of the door with the door at any point between one-third and two-thirds of its travel.

4. Door open and door close time shall be measured between the moment car door operation in either direction begins and the instant at which that cycle is completed.
5. When responding to either a car or corridor call, the amount of time that the elevator door remains stationary in the open position shall be adjustable up to sixty (60) seconds.
  - a. Door open dwell time for a corridor call shall be separate of that for a car call, and in both cases, dwell time shall be canceled whenever the car door protection device is momentarily interrupted by passenger transfers, followed by a reduced door open dwell time of approximately one (1) second (adjustable) after the door protection device is cleared of obstructions.
6. The operation of the door protective device by interruption of one or more infrared light beams (dual or multi-beam non-contact) during the close cycle shall cause the immediate reversing of the doors to the full open position.
7. The door closing cycle shall be arranged so that, in the event the door protective devices become continually obstructed after the normal door open dwell time has expired and following a time interval of approximately thirty (30) seconds (adjustable), a warning tone shall sound and the door closing cycle shall commence at reduced speed and torque per applicable Code requirements.
8. Each car operating station shall be provided with a “door open” and “door close” push button.
  - a. Pressure on the “door open” button shall cause doors in the full open position to remain so, and doors engaged in the close cycle to reverse direction and assume the full open position so long as pressure remains applied to the button.
  - b. The “door open” buttons shall also control the open cycle during Phase II - Emergency In-car Operation.
  - c. The “door close” push button shall function on Independent Service, Attendant Service and Phase II - Emergency In-car Operation as well as during normal automatic operations.
9. Repeated attempts by the power door operator to open or close the door at any landing shall be monitored by the control system.
  - a. In the event the door fails to cycle properly after a preset (adjustable) number of attempts, the car shall either travel to the next stop or remove itself from service, depending upon whether the malfunction is in the open or close cycle.
10. Each hoistway door shall be provided with an automatic self-closing mechanism arranged so that the door shall close and lock if the car should leave the landing while the hoistway door is unlocked.
11. Car doors shall be arranged to prevent their being manually opened from inside the car unless the elevator is positioned within a floor landing zone.

## 2.5 MACHINE ROOM / SECONDARY EQUIPMENT

### A. Control Equipment (New)

1. Provide a microprocessor-based elevator control system.

2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.
3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
4. System operating software shall be stored in non-volatile memory.
  - a. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, circuit boards, static motor drive units, wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.
  - b. The motor drive may be located in its own cabinet where the physical size of the drive prohibits installation within the elevator signal controller cabinet.
  - c. Solid-state electronic soft-start pump motor starters shall be provided.
  - d. Mechanical ventilation of the cabinet shall be provided and shall be adequate to dispose of the full load heat losses without exceeding 40° C (104° F) ambient temperature.
    - 1) Control equipment cabinets shall be provided with forced air ventilation to prevent overheating of the electrical components housed therein.
  - e. All electrical wiring inside the control equipment cabinet shall be performed in a neat manner with field wiring terminated at stud blocks provided inside the control cabinet.
  - f. Each wiring terminal shall be clearly identified according to the nomenclature used on the “as built” wiring diagrams. No more than two (2) field wires may be connected to any single terminal stud.
  - g. Spare wires shall be tagged according to their point of termination, bundled, and placed at the bottom of the control equipment cabinet.
  - h. Each electrical component within the cabinet shall be permanently identified with symbols identical to those used on the “as-built” wiring diagrams.
  - i. A data plate that indicates the edition of the Code in effect at the time of installation and/or alteration shall be provided in accordance with applicable code and requirements of ASME A17.1 Code. The data plate shall be in plain view and securely attached on the mainline disconnect or on the controller.
  - j. Control equipment shall comply with requirements of all applicable Sections of the ASME A17.1 Code as approved and adopted by the AHJ.
  - k. The manufacturer’s standard on-board “LCD” display shall be incorporated on the main processor board and/or otherwise incorporated in the controller cabinet. The “LCD” shall be capable of providing alpha-numeric characters to view the operational status of the elevator and/or group functions depending on the application. The display shall provide the user with necessary information for troubleshooting and reprogramming of the basic system parameters.
    - 1) Where the “LCD” is not an integral part of the controller and troubleshooting/reprogramming requires the use of a separate tool, the tool shall be maintained in the machine room and accessible to service personnel. This tool, along with all technical documentation for the correct use of the tool, shall remain the property of the Owner.
    - 2) Password protection of critical programming features is required to prevent accidental changes to life-safety and other non-typical control settings.

- 3) Where a separate dispatch or group control panel is provided, a separate “LCD” display shall be provided to view group functions.

B. Controller / Dispatcher (New)

1. The elevators shall have a generic microprocessor-based controller/dispatchers.
2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.
3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
4. System operating software shall be stored in non-volatile memory.
5. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, electronic circuit boards, microprocessors, static motor drive units, wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.
  - a. Provide natural or mechanical ventilation for the controller cabinets.
  - b. Equip the vent openings and exhaust fans with filters.
6. Mount equipment to moisture-resistant, noncombustible panels supported from the steel frame.
7. Provide "noise filter" between hoistway wiring and controller/dispatchers to eliminate interference.
8. Optically isolate communication cables between components.
9. Provide a solid-state starter for the pump motor.
10. Wiring: Wiring on the units, whether factory or field wiring, shall be done in neat order, and all connections shall be made to studs and/or terminals by means of grommets, solderless lugs or similar connections. All wiring shall be copper.
11. Terminal Blocks: Provide terminal blocks with identifying studs on units for connection of board wiring and external wiring.
12. Marking: Identifying symbols or letters shall be permanently marked on or adjacent to each device on the unit, and the marking shall be identical with marking used on the wiring diagrams. In addition to the identifying marks, the ampere rating shall be marked adjacent to all fuse holders.
13. The manufacturer's standard on-board “LCD” display shall be incorporated on the main processor board and/or otherwise incorporated in the controller cabinet. The “LCD” shall be capable of providing alpha-numeric characters to view the operational status of the elevator and/or group functions depending on the application. The display shall provide the user with necessary information for troubleshooting and reprogramming of the basic system parameters.
  - a. Where the “LCD” is not an integral part of the controller and troubleshooting/reprogramming requires the use of a separate tool, the tool shall be maintained in the machine room and accessible to service personnel. This tool, along with all technical documentation for the correct use of the tool, shall remain the property of the Owner.
  - b. Password protection of critical programming features is required to prevent accidental changes to life-safety and other non-typical control settings.
  - c. Where a separate dispatch or group control panel is provided, a separate “LCD” display shall be provided to view group functions.

14. In the event diagnostics and monitoring is accomplished via Field Service Tools, provide the required Field Service Tools with related control system appurtenances for diagnostic evaluations, system monitoring and field adjustments.
- a. Provide instructions for proper use of such diagnostic tools and/or equipment with all coding and other operational requirements.
  - b. Maintain and calibrate the diagnostic tools and update the associated instructions and other related documents under the service agreement.
    - 1) Should the agreement be cancelled for any reason by either party, maintenance and updating of diagnostic tools shall be provided to the Owner at the Contractor's cost without the need to purchase or lease additional diagnostic devices, special tools or instructions from the original equipment provider.
    - 2) The Owner may request field and technical instructions be provided by the original installation contractor or manufacturer for proper servicing by other qualified elevator company personnel.
    - 3) The established cost-plus profit, as previously specified, shall be applicable for the life of the system.
      - a) 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.
      - b) Such device shall be in possession of and become property of the Owner.
15. Microprocessor Documentation
- a. Provide and/or obtain complete information on systems' design, component parts, installation and/or modification procedures, adjusting procedures and associated computer conceptual logic circuitry and field connection.
  - b. Provide microprocessor upgrading and/or modifications to programs that have been assigned to enhance the operation of the equipment for a period of ten (10) years after project approval.

C. Equipment Isolation (New)

- 1. Provide sound reducing vibration isolation elements at all support points of elevator controller, solid-state motor drives, isolation transformers, reactance units, hoisting motors and machines. and pump unit.
- 2. The elements for controllers, solid-state motor drives and isolation transformers shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries, Type ND, with 0.35" static deflection under design load ratings.
- 3. All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.

D. Hydraulic Pump Motor (New)

1. Provide an alternating current induction motor having a maximum speed of 1800 RPM, designed to operate at 120 starts-per-hour and a continuous rated fifty (50) degrees C temperature rise.

E. Hydraulic Power Unit / Motor (New)

1. Provide a self-contained power unit which includes:
  - a. Structural steel outer base.
  - b. Tank support.
  - c. Oil tight drip pan.
  - d. Floating inner base to prevent metallic contact for mounting the motor pump assembly.
  - e. Sound isolation panels to enclose the unit and reduce airborne noise.
2. Provide a reinforced overhead oil reservoir with a tight-fitting tank over the oil control unit which includes:
  - a. An oil fill strainer with air filter.
  - b. An oil level gauge assembly.
  - c. A self-cleaning strainer in the suction line.
3. The pump shall be for oil hydraulic elevator service with positive displacement screw type design for steady discharge with minimum vibration.
4. The drive shall be by multiple V-Belts and sheaves or directly driven by a submersible pump depending on the HP requirements of the system.
  - a. The use of submersible pumps having more than a 40 HP motor is unacceptable.
5. Pump drive motor control shall utilize solid state motor starter circuitry to provide reduced current starting and maximum protection of the motor.
6. The oil control unit shall be of the manufacturer's own design but shall include relief, safety check, start and slow down valves.
  - a. Use lowering and leveling valves for drop away speed, lowering speed, leveling speed and stopping speed to ensure smooth down starts and stops.
  - b. Provide a valve for manual lowering of the elevator car in event of power failure and for use in servicing and adjusting the elevator mechanism.
  - c. Design the tank shut-off valve for isolating oil in the power unit tank to ensure servicing and adjusting the elevator mechanism without removing oil from the tank.
  - d. All valves shall be accessible for adjustment without removing the assembly from the oil line.
7. Manufacture the unit to operate under 600 psi (for dry units) / 700 psi (for submersible units) working pressure.
8. When the oil reservoir thermostat registers fifty (50) degrees F, the car shall "exercise" until the oil temperature reaches seventy-five (75) degrees F.

F. Hydraulic Piping (New)

1. Provide all necessary pipes and fittings to connect the power unit to the jack.
  - a. Use minimum Schedule 80 steel pipe.
  - b. Provide a shut off valve in the machine room for maintenance service.
2. For remote machine rooms, run the hydraulic pipe in a trench provided by others.
  - a. The pipe shall be welded and wrapped with a protective tape coat.
  - b. Enclose the pipe in a schedule 40 PVC sleeve which shall run from the machine room to the hoistway.
3. The oil pipe and conduit shall be overhead above suspended ceiling.
  - a. Exact location must be coordinated with other trades.
  - b. For pipe hangers use spring hangers Type 30 of Mason Industries, Inc. or approved equal.
  - c. Provide neoprene isolation pads between the pipe and the hangers.
4. Adequately support the full run of pipe with isolation type support.
5. Where flexible hose and fitting assemblies, and flexible couplings are used for hydraulic connections, flexible hose and fitting assemblies shall:
  - a. Not be installed within the hoistway, nor project into or through any wall.
  - b. Installation shall be accomplished without introducing twist in the hose and shall conform with the minimum bending radius of SAE 100 R2 type, high pressure, steel wire reinforced, rubber covered hydraulic hose specified in SAE J517.
  - c. Have a bursting strength sufficient to withstand not less than ten (10) times the working pressure.
  - d. Be permanently marked indicating:
    - 1) Manufacturer of the hose and fittings.
    - 2) Type of hose and fitting.
    - 3) Minimum factory test pressure.
    - 4) Minimum bending radius of the hose.
    - 5) Date of installation.
    - 6) Inspection procedure.
    - 7) Name of elevator contractor.

G. Hydraulic Mainline Oil Strainer (New)

1. Provide a mainline hydraulic oil strainer of the self-cleaning, compact type, equipped with a 40-mesh element and installed in the oil line.
2. Design the strainer for maximum system working pressure.

## 2.6 HOISTWAY EQUIPMENT

A. Guide Rails / Inserts / Brackets (Reuse)

1. Car guide rails, fishplates, rail brackets, backing support and related attachments shall be inspected to determine if unfavorable conditions exist that diminish the structural integrity of any component.
  - a. In the event substandard conditions are disclosed by means of this inspection, the Contractor shall immediately inform the Consultant as to the exact nature of said problems and then undertake whatever repairs and/or replacements the Consultant may deem appropriate to remedy the situation.
2. Each stack of guide rails shall be individually examined to determine if excessive compression has occurred from building settlement.
  - a. In the event such conditions are found to exist, each affected stack shall be cut off enough to relieve pressure.
  - b. Jacking bolts shall be provided underneath each stack of both car and counterweight guide rails.
3. Each stack of guide rails shall be realigned so that total deviation from plumb in any direction does not exceed 1/8" over the entire length of the hoistway and that DBG measurements never vary more than .030".
4. As required, car guide rails joints shall be individually filled, filed and sanded in order to eliminate minor variations in adjoining machined surfaces.

**B. Roller Guides (New)**

1. Provide roller guide shoes with adjustable mounting base, rigidly bolted to the top and bottom of each side of the car and counterweight frame.
  - a. Roller guides shall consist of a set of sound reducing polyurethane wheels in precision bearings held in contact with the three (3) finished rail surfaces by adjustable stabilizing springs.
  - b. The bearings shall be sealed or provided with grease fittings for lubrication.
  - c. Equip roller guides with adjustable stops to control postwise float.
  - d. Fit the top car roller guides with galvanized, painted or powder coated steel guards.
2. Approved applications and manufacturers:
  - a. ELSCO Model B for car roller guides

**C. Electrical Conduit / Wiring / Traveling Cable (New)**

1. Electrical wiring shall be provided.
  - a. All wiring shall be stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
  - b. Electrical wiring provided for hoistway interlock shall be of a flame-retardant type, capable of withstanding temperatures of at least 392 degrees Fahrenheit. Conductors shall be Type SF or equivalent.

- c. Each run of electrical conduit or duct shall contain no less than ten percent (10%) spare wires and, in any case, no fewer than two (2) spare wires.
  - d. Crimp-on type wire terminals shall be used where possible.
2. Traveling cable shall be provided.
- a. Each traveling cable shall be provided with a flame- and water-resistant polyvinyl chloride jacket.
  - b. Electrical wiring shall consist of stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
  - c. Each traveling cable shall contain no less than ten percent (10%) spare wires.
  - d. Traveling cable exceeding 100' in length shall be provided with a steel wire rope support strand from which the cable shall be suspended.
  - e. Traveling cable must be contained within an approved electrical conduit to within 6' of the final suspension point in the hoistway.
  - f. Each traveling cable shall be arranged to provide no fewer than six (6) individually shielded pairs of 20-gauge wire and arranged to contain no less than one (1) coaxial cable for CCTV remote monitoring.
  - g. Traveling cable conductors that terminate at a hoistway center box shall be connected to stud blocks provided for that purpose.
    - 1) Each wiring terminal shall be clearly identified by its nomenclature as shown on the "as built" wiring diagrams and solderless, crimp-on type wire terminals shall be used where possible.
  - h. The attachment of a traveling cable to the underside of the elevator car shall be performed so that a minimum loop diameter of thirty times (30x) the cable diameter is provided.
  - i. Pre-hang the cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting during operation.
3. Rigidly supported EMT conduit, flexible metal conduit and galvanized steel trough shall be utilized throughout the hoistway.
- a. Both EMT and flexible conduit shall be connected on either end by use of compression fittings and secured in place with metal clamps sized in accordance with the diameter of conduit utilized.
    - 1) Wire or plastic wire ty-raps shall not constitute an acceptable means of fastening.
  - b. The use of flexible metal conduit shall be limited to runs not greater than three feet (3') in length.
  - c. All abandoned or unused electrical conduit shall be removed from the hoistway.
  - d. Existing conduit and wiring duct may be reused if suitable for the application.
    - 1) Reuse of existing conduit/duct shall be at the discretion of the Consultant.

D. Normal and Final Terminal Stopping Devices (New)

1. Provide normal terminal stopping devices to stop the car automatically from any speed obtained under normal operation within the top and bottom overtravel, independent of the operating devices, final terminal stopping device and the buffers.
2. Provide final terminal stopping devices to stop the car automatically from the speed specified within the top clearance and bottom overtravel.
3. The terminal stopping devices shall have rollers with rubber or other approved composition tread to provide silent operation when actuated by the cam fixed to the top of the car.
  - a. Terminal stopping devices that are not mechanically operated (i.e.: magnetic proximity) shall be provided by the manufacturer of the control equipment, intended for use as a terminal limit, and designed for reliable operation in the hoistway environment.
4. Final terminal limits shall be pinned so as to prevent movement after final adjustment where required by the AHJ.

2.7 PIT EQUIPMENT

A. Car Buffer (Reuse)

1. Existing car buffers shall be reused.
  - a. Pit channels, related supports and fastenings shall be inspected for damage and to determine if the structural integrity of any component is diminished by the effects of rust or other unfavorable conditions.
    - 1) In the event defects are found, the Contractor shall immediately inform the Consultant and undertake whatever repair and/or replacement the Consultant may deem appropriate.
  - b. Surface rust shall be removed from all reused components.
  - c. Where hydraulic buffers are used:
    - 1) Buffer plunger shall be honed free of all surface rust and blemishes and provided with a protective coating of machinist bluing.
    - 2) The hydraulic fluid reservoir on each buffer shall be drained, flushed and refilled with fresh oil. The grade and amount of fluid added to each buffer shall conform to O.E.M. specification.
  - d. Provide a permanent buffer marking plate which indicates the manufacturer's name, identification number, rated impact speed and stroke.
  - e. Provide a permanent data plate in the vicinity of the counterweight buffer indicating the maximum designed counterweight runby in accordance with ASME A17.1 as may be modified by, and/or in addition to codes and standards accepted by the AHJ.
  - f. The buffer shall undergo testing in accordance with ASME A17.1 Code as modified by, and/or in addition to codes and standards accepted by the AHJ.

B. Inspection Platforms, Ladders, Guard Rails, Screens and Guards (New)

1. Provide the following secondary metal work in the pit, hoistway and in elevator machine room in accordance with bid documents.
  - a. Wire mesh separator screen between two (2) adjacent elevator pits located at different elevations.
  - b. Counterweight shall be guarded by means of a fixed screen from the pit floor to a position of at least 2450 mm (96") above pit floor.
  - c. Pit access ladders.
  - d. Buffer inspection platforms and ladders.
  - e. Guard rails and sixty (60) degree ships ladders in machine room.
  - f. Guard around machine, ropes and rope holes.
2. Submit detailed shop drawings of all miscellaneous metal items for Consultant's approval.
3. Provide painted sheet steel covers for all dead-end hitches.
4. The pit ladder shall have continuous steel flat bar side rails 12 mm (1/2") x 75 mm (3"), with eased edges, spaced a minimum of 400 mm (16") apart. Rungs shall be steel bars 18 mm (3/4") in diameter, spaced 300 mm (12") apart with top to have a non-slip surface. Rungs shall be located along centerline of side rails, located not less than 180 mm (7") from the nearest permanent object or structure. Plug weld and grind smooth on outer rails faces. Support each ladder at top and bottom and at intermediate points spaced not more than 1500 mm (60"). Extend side rails 1200 mm (48") above top rung.
5. Prime paint and apply two (2) coats of rust inhibiting machinery enamel to metal work specified above as approved by the Consultant.

C. Jack Unit (Reuse)

1. The existing jack shall be reused.
2. The jack shall undergo the following work:
  - a. Check plunger for smooth surface and eliminate burrs where necessary.
  - b. Verify plunger sections are securely attached with minimum seam.
  - c. Check stop-ring for proper fit.
  - d. Renew internal babbitt-lined, guide bearing, packing or seals where necessary.
  - e. Clean drip ring around cylinder top to provide adequate drainage.
  - f. Check mounting hardware and welds where applicable.
  - g. Check secure attachment of head.
  - h. Remove rust and apply rust inhibiting paint.
3. Perform static load test of the jack unit to determine if there are any failures of the cylinder wall.
4. Where double-walled cylinders are not provided, and where prevailing conditions allow, install a plunger gripper to prevent freefall of the elevator in the event of a catastrophic failure of the hydraulic jack.

D. Hydraulic Check Valve (New)

1. A check valve shall be provided and installed so that it will hold the elevator with rated load at any point when the pump stops, and the down valves are closed, or the maintained pressure drops below the minimum operating pressure.
- E. Overspeed (Rupture) Valve (New)
1. Where required by Code, an overspeed valve shall be provided and installed so that it will cause the flow of oil from the hydraulic jack through the pressure piping to cease when such flow exceeds a preset value relative to car speed in accordance with applicable codes.
- F. Pit Stop Switch (New)
1. Where pit depth does not exceed 67", each elevator pit shall be provided with a push/pull or toggle switch that is conspicuously designated "EMERGENCY STOP" and located so as to be readily accessible from the hoistway entrance on the lowest landing served at a height of approximately 18" above the floor.
    - a. This switch shall be arranged to prevent the application of power to the hoist motor and machine brake when placed in the "OFF" position.
  2. Where climb-in pit depth exceeds 67", each pit shall be provided with two (2) push/pull or toggle switches conspicuously designated "EMERGENCY STOP".
    - a. Both of these stop switches shall be located immediately adjacent to the pit access ladder.
      - 1) Place one stop switch approximately 47" above the pit floor.
      - 2) Place the second stop switch 18" above the hoistway entrance sill on the lowest landing served.
      - 3) These switches shall be arranged so as to prevent the application of power to the hoist motor or machine brake when either one is placed in the "OFF" position.
  3. Where a walk-in pit exists, each elevator shall be provided with a push/pull or toggle switch that is conspicuously numbered and designated "EMERGENCY STOP".
    - a. The location of this stop switch shall be approximately 47" above the pit floor at the nearest point of pit entry from the access door.
    - b. This switch shall be arranged so as to prevent the application of power to the hoist motor and machine brake when placed in the "OFF" position.
  4. Provide an electric contact safety switch for the pit access door if any equipment attached to the car extends within the space of the hoistway pit when the car is level at the bottom terminal landing.
    - a. Opening the pit access door shall cause the electric contact switch to stop the elevator by interrupting electric power to the driving machine and brake.
    - b. Provide a sign on the pit door "**WARNING – OPENING OF PIT DOOR WILL STOP ELEVATOR**" using lettering a minimum of two (2) inches high.

5. Existing stop and/or pit door switch conforming to the requirements set forth herein may be refurbished to as new condition and reused subject to approval of the Consultant.

## 2.8 HOISTWAY ENTRANCES

### A. Hoistway Entrances (Reuse)

1. Hoistway entrance sills, sill supports, entrance frames, headers and header supports shall be reused and refurbished.
  - a. Hoistway entrances that have become distorted or bent shall be straightened, plumbed, reset to the proper width dimension and reinforced, as necessary.
  - b. Provide 14-gauge steel fascia plates that extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
    - 1) Reinforce fascia to allow not more than ½" of deflection.
    - 2) Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.
  - c. Provide 14-gauge steel toe guards that extend 12" below any sill not protected by fascia.
    - 1) The toe guards shall extend the full width of the door and shall return to the hoistway wall at a fifteen (15) degree angle and be firmly fastened.
  - d. Remove oil, dirt and impurities on new and existing apparatus and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.

### B. Slide Type Hoistway Door / New in Existing Frame (New)

1. Provide a new elevator hoistway entrance door reusing existing entrance frame.
2. Each new door shall be as follows:
  - a. Hollow metal construction.
  - b. 1-1/2-hour fire-rated test approved with required label.
  - c. Manufactured of cold rolled furniture steel.
  - d. Flush design both sides.
  - e. Rigidly reinforced.
  - f. Sound deadened.
3. Where conditions warrant, and where otherwise required by code, equip all hoistway landing doors with one (1) piece full height non-vision wings of material and finish to match hall side of door panels.
4. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in existing sill grooves with a minimum clearance.

- a. The guide mounting shall permit their replacement without removing the door from the hangers.
  - b. A steel fire stop shall be enclosed in each guide.
- 5. Provide the meeting edge of center opening doors with necessary new continuous rubber astragal bumper strips.
  - a. Astragal shall be relatively inconspicuous when the doors are closed.
  - b. Provide rubber bumpers at the top and bottom of each section of door to stop them at their limit of travel in the opening direction.
- 6. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
- 7. Provide a special key so that an authorized person can open any landing door when the car is elsewhere.
  - a. The keyhole shall be not less than 3/8" in diameter and shall be fitted with a stainless steel or bronze ferrule to match related equipment.
- 8. Finish all door panels to match elevator entrances or stainless-steel No.4 finish as selected by Owner.
- 9. Where conditions require, provide necessary new masonry around existing entrance frames to maintain fire rating. Painting or other wall surface decorating will be by Others.

C. Tracks / Hangers / Closers / Related Equipment (New)

- 1. Formed or extruded steel landing door hanger tracks shall be provided.
- 2. Each landing door panel shall be suspended from a pair of door hanger assemblies that are compatible with the hanger tracks.
  - a. Hanger assemblies shall be directly mounted to the door panel using 3/8" diameter or better hardware.
  - b. Solid steel blocks shall be used where job-site conditions dictate the use of spacers between hanger assemblies and the landing door panel.
  - c. Hanger assemblies shall be adjusted or shimmed so that door panels are suspended in a plumb manner with no more than 3/8" vertical clearance to the cab entrance threshold.
  - d. Upthrust rollers shall be adjusted for minimal operating clearance against the bottom edge of the hanger track.
  - e. Means shall be provided to prevent hangers from jumping the track.
  - f. Blocks shall be provided to prevent rollers from overrunning the end of the track.
- 3. Each set of center opening landing doors shall be provided with a cable driven relating mechanism which is compatible for use with the door hanger assemblies.
  - a. The relating mechanism shall be properly tensioned and adjusted so as to equalize the relationship between the door panels and the hoistway entrance.
- 4. Each set of multi-speed center opening, or side slide landing doors shall be provided with a sill-mounted spring closing mechanism with necessary door panel relating hardware.

5. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
6. Each set of single speed side slide landing doors shall be provided with a sill-mounted spring closing mechanism.
  - a. Spirator-type spring closers shall be acceptable should prevailing sill depth or runby clearance conditions require their use.
7. Where applicable, each hoistway door interlock assembly shall be provided with an emergency release mechanism utilizing manufacturers' standard type access key at all landings served.
  - a. Drill each hoistway door to accommodate manufacturers standard lock release key and install escutcheon.
    - 1) Escutcheon shall be brushed stainless steel to match door panels where required.
    - 2) Aluminum shall be provided at all other typical floors.
8. Where multi-speed side slide door panels exist, provide a secondary interlocking device that will prevent separation of the panels should the sill closer or relating cable(s) fail.

D. Interlocks / Unlocking Devices (New)

1. Each set of landing doors shall be provided with a complete electromechanical interlock assembly.
  - a. Each interlock assembly shall consist of:
    - 1) A switch housing with contacts.
    - 2) Lock keeper.
    - 3) Clutch engagement/release subassembly.
    - 4) Associated linkages.
  - b. Arrange the lock so that individual leading door panels (side slide or center opening) are locked when in the closed position.
2. Non-typical mounting arrangements for interlocks and/or related mechanisms must receive prior approval from the Consultant.
3. Each hoistway door interlock assembly shall be provided with an emergency release mechanism utilizing a drop-leaf type access key at all landings served.
  - a. Each hoistway door shall accommodate manufacturers standard lock release key with escutcheon.
    - 1) The keyhole shall be fitted with a metal ferrule that matches the door finish.
    - 2) Abandoned keyholes shall be plugged.
    - 3) Drilling key holes in the field will not be accepted.

E. Hoistway Door Bottom Guides / Safety Retainers (New)

1. The bottom of each side sliding type hoistway door panel shall be equipped with a minimum of two (2) guiding members.
  - a. Metal mounting angles shall be secured to the integral panel frame structure; and when conditions warrant, additional external metal support plates or angles shall be installed to ensure the integrity of the panel frame is not compromised.
  - b. Guides shall be manufactured of low friction non-metal material with sufficient strength to withstand forces placed on door panels per ASME A17.1 Standards.
  - c. Each guide assembly shall incorporate a steel wear indicator and be so designed to permit sliding member replacements without removal of door panel(s) from top hanger devices.
  - d. Panels shall be hung with a maximum vertical clearance of 3/8 inch between top of sill and bottom of panel and the guide shall engage the sill groove by not less than 1/4 inch.
2. The bottom of each side sliding type hoistway door panel shall be equipped with a guiding member safety retainer to prevent displacement in the event of primary guide means failure.
  - a. A metal reinforcement (12 gauge stainless or galvanized steel) shall be installed between the two (2) primary guiding members (a.k.a. "Z" bracket).
  - b. The reinforcement shall be designed with a minimum length of eight (8) inches or the maximum possible length that will fit between the primary members and a minimum overall height of two and one-half (2.5) inches secured on the internal face of the door panel. (Hoistway side)
  - c. The retainer shall be set with the supplemental safety angle 3/8 inch into the corresponding sill groove; and be capable of preventing displacement of the panel no more than 3/4 inch with an applied force of 1125 lbf at right angles over an area twelve (12) inches x twelve (12) inches at the approximate center of the door panel.
  - d. Stationary panel/transom arm shall incorporate a self-centering latching device so the slide and swing sections may be jointly opened.
  - e. Stationary panel/transom shall be arranged so they cannot be opened prior to opening of the hoistway door.
  - f. New interlock switch to be properly connected to existing hoistway circuitry.

## 2.9 CAR EQUIPMENT / FRAME

### A. Car Frame (Reuse)

1. The existing car frame assembly shall be refurbished to as new condition and reused.
2. Individual car frame members, platform isolation framework, door operator support structure, related bracing and hardware shall be inspected for any indication of damage or distortion.
  - a. Where damage is detected, the Contractor shall immediately inform the Consultant and then undertake corrective action deemed appropriate by the Consultant to remedy the condition.

3. Provide new elastomer isolation pads for all existing platforms where pads are presently installed.
4. The car frame, door operator support and related bracing shall be modified or reconfigured as necessary in order to accommodate new cab enclosure and/or master door operating equipment specified herein.
5. The elevator car shall undergo static balancing upon substantial completion of all work described in the project specifications and subsequent to any car interior refinishing or cab replacement work performed in conjunction with the project.

B. Car Platform (Reuse)

1. The existing platform shall be modified to accommodate the new apparatus specified herein.
  - a. Where necessary, the underside of platform shall be refurbished and treated with fire-rated material.
  - b. Where necessary, provide a new safety access hole ring and cover assembly to match selected cab finishes.
  - c. At Contractor's option or when conditions warrant, provide a totally new platform in lieu of repairs, modifications and upgraded specified above.

C. Automatic Leveling / Releveling / Positioning Device (New)

1. Equip the elevator with a floor leveling device which shall automatically bring the car to a stop within 1/4" of any floor for which a stop has been initiated regardless of load or direction of travel.
2. This device shall also provide for releveling which shall be arranged to automatically return the elevator to the floor in the event the elevator should move below or above floor level in excess of 1/4".
3. This device shall be operative at all floors served and whether the hoistway or car door is open or closed provided there is no interruption of power to the elevator.
4. A positioning device shall be part of the controller microprocessor systems.
  - a. Position determination in the hoistway may be through fixed tape in the hoistway or by sensors fitted on each driving machine to encode and store car movement.
  - b. Design the mechanical features and electrical circuits to permit accurate control and rapid acceleration and retardation without discomfort.
5. Where there are consecutive floors/stops that are short stops, the system shall be capable of distinguishing between the two (2) landing zones without error.
6. All equipment and logic required for leveling system to properly function with short stops shall be included.

D. Top-of-Car Inspection Operating Station (New)

1. An inspection operating station shall be provided on top of the elevator car.
2. This station shall be installed so that the controls are plainly visible and readily accessible from the hoistway entrance without stepping on the car.
3. When the station is operational, all operating devices in the car shall be inoperative.
4. Provide the following control devices and features:

- a. A push/pull or toggle switch designated “EMERGENCY STOP” shall be arranged so as to prevent the application of power to the hoist motor or machine brake when in the “off” position.
- b. A toggle switch designated “INSPECTION” and “NORMAL” to activate the top of car Inspection Service Operation.
- c. Push button designated “Up”, “Down” and “Enable” to operate the elevator on Inspection Service (the “Enable” button shall be arranged to operate in conjunction with either the “Up” or “Down” button).
- d. An indicator light and warning buzzer that are subject to activation under Phase I - Fire Emergency Recall Operation.

E. Car Enclosure Work Light / Receptacle (New)

- 1. The top and bottom of each car shall be provided with a permanent lighting fixture and 110-volt GFI receptacle.
- 2. Light control switches shall be located for easy accessibility from the hoistway entrance.
- 3. Where sufficient overhead clearance exists, the car top lighting fixture shall be extended no less than 24” above the crosshead member of the car frame.
- 4. Light bulbs shall be guarded so as to prevent breakage or accidental contact.

F. Emergency Exits / Top (New)

- 1. Ensure they operate as per code and have proper electrical contacts and mechanical locks on the exterior of the cab enclosure.
- 2. No other key to the building shall unlock the emergency exit lock except access switch keys which may be keyed alike.
  - a. Keys shall be assigned in accordance with ASME A17.1 Group 1 Security requirements.

G. Car Door Zone Lock Restrictor (New)

- 1. Retrofit the existing car door operator to incorporate a car door zone lock restrictor.
- 2. In case of interruption or failure of electric power from any cause, the door operating mechanism shall permit emergency manual operation of both the car door and the hoistway door within the floor landing zone.
  - a. The hoistway door shall continue to be self-locking and self-closing.
  - b. The door operator shall operate in conjunction with or be equipped with all gate switches and safety contacts required by ASME A17.1 Code.

H. Car Door Hangers / Tracks / Gate Switch (New)

- 1. Provide sheave type two-point suspension hangers and track for each car door.
  - a. Sheaves shall be hardened steel, not less than 3-1/4 inches in diameter with sealed grease packed precision ball bearings.
  - b. The upthrust shall be taken by a roller mounted on the hanger and arranged to ride on the underside of the track.

2. The track shall be of formed cold rolled steel or cold drawn steel and shall be rounded on the track surface to receive the hanger sheaves.
    - a. The track shall be removable and shall not be integral with the header.
  3. Provide a gate switch that mounts directly to the car door track.
    - a. The gate switch shall prevent movement of the elevator until such time as it signals the control equipment that the car door has physically closed.
- I. Car Door Gate Switch (New)
1. Provide a car door electrical safety (gate) switch that connects directly to the car door track.
    - a. The gate switch shall prevent movement of the elevator until such time as it signals the control equipment that the car door has physically closed.
- J. Car Door Panel(s) (New)
1. Provide standard 1" thick, 14-gauge hollow metal flush construction panel(s), reinforced for power operation and insulated for sound deadening.
  2. Paint the hoistway side of each panel black and face the cab side with 16-gauge sheet steel matching the existing returns or in selected material and finish as otherwise directed by Owner/Architect.
  3. The panels shall have no binder angles and welds shall be continuous, ground smooth and invisible.
  4. Drill and reinforce panels for installation of door operator hardware, door protective device, door gibs, etc.
    - a. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in the sill grooves with minimum clearance.
    - b. The guide mounting shall permit their replacement without removing the door from the hangers.
  5. Provide the meeting edge of center opening doors with necessary continuous rubber astragal bumper strips.
    - a. These strips shall be relatively inconspicuous when the doors are closed.
- K. Door Reopening Device (New)
1. Provide an infrared curtain door protection system.
  2. The door shall be prevented from closing and reopen when closing if a person interrupts any one of the light rays.
  3. The door shall start to close when the protection system is free of any obstruction.
  4. The infrared curtain protective system shall provide:
    - a. Protective field not less than 71" above the sill.
    - b. Where a horizontal infrared light beam system is used:

- 1) A minimum of forty-seven (47) light beams.
- 2) Accurately positioned infrared lights to conform to the requirements of the applicable handicapped code.
- c. Modular design to permit on board test operation and replacement of all circuit boards without removing the complete unit.
- d. Controls to shut down the elevator when the unit fails to operate properly.
5. Existing infrared door protection systems, designed in accordance with the criteria specified herein, may be retained and refurbished for new subject to the Consultant's review and approval.

## 2.10 FINISH / MATERIALS / SIGNAGE

### A. Material, Finishes and Painting

#### 1. General

- a. Cold-rolled Sheet Steel Sections: ASTM A366, commercial steel, Type B
- b. Rolled Steel Floor Plate: ASTM A786
- c. Steel Supports and Reinforcement: ASTM A36
- d. Aluminum-alloy Rolled Tread Plate: ASTM B632
- e. Aluminum Plate: ASTM B209
- f. Stainless Steel: ASTM A167 Type 302, 304 or 316
- g. Stainless Steel Bars and Shapes: ASTM A276
- h. Stainless Steel Tubes: ASTM A269
- i. Aluminum Extrusions: ASTM B221
- j. Nickel Silver Extrusions: ASTM B155
- k. Bronze Sheet: ASTM B36(36M) alloy UNS No. C2800 (Muntz Metal)
- l. Structural Tubing: ASTM A500
- m. Bolts, Nuts and Washers: ASTM A325 and A490
- n. Laminated / Safety Tempered Glass: ANSI Z97.1

#### 2. Finishes

- a. Stainless Steel
  - 1) Satin Finish: No. 4 satin, long grain.
  - 2) Mirror Finish: No. 8 non-directional mirror polished.
- b. Sheet Steel:
  - 1) Shop Prime: Factory-applied baked on coat of mineral filler and primer.
  - 2) Finish Paint: Two (2) coats of low sheen baked enamel; color as selected by the Architect.
  - 3) Steel Equipment: Two (2) coats of manufacturer's standard rust-inhibiting paint to exposed ferrous metal surfaces in both the hoistway and pit that do not have galvanized, anodized, baked enamel, or special architectural finishes.

### 3. Painting

- a. Apply two (2) coats of paint to the machine room floor.
- b. Apply two (2) coats of clear lacquer to bronze or similar non-ferrous materials to prevent tarnishing during a period of not less than twelve (12) months after initial acceptance by the Owner or Agent.
- c. Identify all equipment including buffers, car apron, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
- d. Paint or provide decal-type floor designation not less than four (4) inches high on hoistway doors (hoistway side), fascias and/or walls as required by A17.1 as may be adopted and/or modified by the AHJ. The color of paint used shall contrast with the color of the surface to which it is applied.

### B. Car Interior Finishes

1. Car interior finishes shall be as selected by Owner.
2. Contractor shall provide samples of finishes as required for approval prior to fabrication.
3. Refer to specifications for other design requirements where provided.
4. Special attention shall be given to flooring materials and suitability for intended duty.

### C. Designation and Data Plates, Labeling and Signage.

1. Provide an elevator identification plate on or adjacent to each entrance frame where required by the AHJ.
  - a. The designation numeral shall be a minimum of 3" in height.
2. Provide floor designation cast plates at each elevator entrance, on both sides of the jamb at a height of sixty (60) inches to the baseline of floor indication.
  - a. Floor number designations and Braille shall be 2" high, 0.03" raised and stud mounted.
3. Identify the designated medical emergency services elevator with 3" high international symbol at each elevator entrance on both sides of the jamb.
4. Provide raised designations and Braille markings to the left of the car call and control buttons of the car operating panel(s).
5. Provide elevators with data and marking plates, labels, signages and refuge space markings complying with A17.1 Elevator Safety Code as may be adopted and/or otherwise modified by the AHJ.
6. Owner shall select the designation and data plates from manufacturer's premium line of plates.

## 2.11 FIXTURES / SIGNAL EQUIPMENT (New)

### A. General - Design and Finish

1. The design and location of the hall and car operating and signaling fixtures shall comply with the ADAAG and local requirements of the AHJ.
2. The operating fixtures shall be selected from the manufacturer's premium line of fixtures.
3. Custom designed operating and signaling fixtures shall be as shown on the drawings or as approved by the Owner .
4. The layout of the fixtures including all associated signage and engraving shall be as approved by the Owner .
5. Where no special design is shown on the drawings, the buttons shall be as follows:
  - a. Stainless steel round type as selected by the Owner / Consultant from the manufacturer's premium line of push buttons.
  - b. The button shall have a collar round indicator around the button with LED call registered light.
6. Where no special design is shown on the drawings, the faceplates shall be as follows:
  - a. Passenger Elevators
    - 1) Ground Floor: stainless-steel faceplate with No4 finish.
    - 2) Typical Floors: 1/8" thick stainless-steel faceplate with No. 4 finish.
7. Mount passenger elevator fixtures with tamperproof fasteners and service elevator fixtures with tamperproof screws. The screw/fastener and key switch cylinder finishes shall match faceplate finish.
8. Where key-operated switch and or key operated cylinder locks are furnished in conjunction with any component of the installation, four (4) keys for each individual switch or lock shall be furnished, stamped or permanently tagged to indicate function.
9. All caution signs, pictographs, code mandated instructions and directives shall be engraved and filled with epoxy in code required colors.

**B. Main Car Operating Panel (New)**

1. Provide a main car operating push button panel on the inside front return panel of the car
2. Car operating panel shall be flush mounted with swing type, one (1) piece faceplate with heavy-duty concealed hinges.
  - a. Mount all key switches that are required to operate and maintain the elevators exposed on the car station except those specified within a locked service cabinet.
3. The push buttons shall become individually illuminated as they are pressed and shall extinguish as the calls are answered.
4. The operating panel shall include:
  - a. A call button for each floor served, located not more than 48" above the cab floor.
  - b. "Door open" / "Door close".
  - c. "Alarm" button, interfaced with emergency alarm. The alarm button shall illuminate when pressed.
  - d. "Emergency Stop" switch per local law located at 35" above the cab floor.
  - e. Self-dialing, hands-free emergency communication system actuation button with call acknowledging feature and ASME A17.1. design provisions.

- f. Three (3) position firefighter key operated switch, call cancel button and illuminated visual/audible signal system with mandated signage engraved per ASME A 17.1 Standards as modified by the AHJ.
    - 1) The “City-Wide Standard Fire Department Standard Key” (FEKO1) shall be used for all Fire Emergency operating devices.
- 5. Locked Firemen’s Service cabinet, keyed in accordance with local Code, containing required devices and signals in accordance with ASME A17.1 Standards.
  - a. Automatic opening of the locked cabinet door may be provided with signals initiated by the fire detection and alarm system where approved by the Authority Having Jurisdiction.
- 6. Provide a locked service cabinet flush mounted and containing the key switches required to operate and maintain the elevator, including, but not limited to:
  - a. Independent service switch.
  - b. Light switch.
  - c. Fan switch.
  - d. G. F. I. duplex receptacle.
  - e. Emergency light test button and indicator.
  - f. Inspection Service Operation key switch.
  - g. Port for hand-held service tool where applicable.
  - h. Dimmer for cab interior lighting.
- 7. Car operating panel shall incorporate:
  - a. An integral (no separate faceplate) digital L.E.D. floor position indicator.
  - b. Black-filled engraved unit I.D. number or other nomenclature, as approved by Owner.
  - c. A “No Smoking” advisory.
  - d. The rated passenger load capacity in pounds.
- 8. Equip the main car operating panel with security car call proximity card reader to disconnect the corresponding floor push button.
  - a. Security system shall be overridden by Phase II Firefighter’s Emergency Operations in accordance with code.
- 9. Where posting of an advisory is permitted by the Governing Authority in lieu of the inspection certificate, engrave the following advisory on the hinged cover of the service cabinet, or where otherwise directed by the Owner.
- 10. Post Inspection Certificate behind an opening in the car operating panel that is fitted with a flush-mounted clear Plexiglas without a frame.

C. Car Position Indicator (New)

- 1. The position of the car in the hoistway shall be indicated by the illumination of the position indicator numeral corresponding to the floor at which the car has stopped or is passing.

- a. Provide 2" high, ten (10) segment LED type position indicator with direction arrows, integral with the car operating panel.
- b. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
- c. Provide audible floor passing signal per ADA standards where not provided by the elevator signal control.
- d. Flush mount fixture with cover to match selected car front or car operating panel finish as directed by the Owner.

D. Car Direction Lantern (New)

- 1. Provide a car riding lantern with visual and audible signal in the edge of the strike and/or return post.
- 2. The lens shall project a minimum of 1/4" and shall be of solid Plexiglas.
- 3. Use tamperproof screws fasteners with surface mount faceplate for flush faceplate with hairline joint.
- 4. Car lantern shall indicate the direction of travel when doors are 3/4 open.
- 5. The unit shall sound once for the "up" direction and twice for the "down" direction.
  - a. Provide an electronic chime with adjustable sound volume.

E. Signal Annunciator System (New)

- 1. Provide a single / double indication, surface-mounted, manually reset signal annunciator.
  - a. Annunciator cover shall have all necessary mounting plates and brackets.
  - b. Provide multi-conductor signal traveling cable and properly connect same to the annunciator and shaft wiring.
  - c. Provide new single / double hall push buttons at each landing served.
  - d. Provide new low-voltage hoistway wiring installed in a method required by the AHJ.
  - e. Provide new transformer to supply low voltage power.

F. Corridor Push Button Stations / Reuse Back Boxes

- 1. Push button signal fixtures shall be provided on each landing.
- 2. Each signal fixture shall consist of:
  - a. Up and down illuminating push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
  - b. A recessed mounting box, electrical conduit and wiring.
- 3. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
- 4. Include firefighter key switch in the main lobby level station or other designated recall landing.
- 5. Where existing fixtures are located greater than 48" above the floor:
  - a. The existing back boxes shall be retained and used to attach the oversized fixture faceplate to locate the new buttons with a centerline of 42" above the finished floor.

- 1) The Contractor has the option of providing a single oversized back box in lieu of retaining existing for faceplate attachment.
  - b. Standardize the new centerline distance on all floors.
  6. All cutting, patching, grouting and/or plastering of masonry walls resulting from the removal or installation of corridor fixtures shall be performed by the Contractor so as to maintain the fire rating of the hoistway.
    - a. Finished painting or decorating of wall surfaces shall be by Others.
  7. All faceplates shall be engraved with fire logo and “In Case of Fire Use Stairs” to help fill the void created by the use of oversized covers.
  8. Provide a digital floor position indicator with 1” high numerals at all landings served
- G. Floor Position Indicator (New)
1. Remove existing floor position indicator at each landing and provide new digital LED type unit.
  2. New plate shall completely cover the present cutout and provide 2” numerals located on center.
  3. Provide integral direction arrows that will indicate the direction in which the elevator is traveling.
- H. Hall Direction Lanterns (New)
1. Provide a visual and audible signal at each entrance to indicate the direction of travel and, where applicable, which car shall stop in response to the hall call.
    - a. Design the lantern with up and down indication at intermediate landings and a single indication at terminal landings.
    - b. Lanterns shall sound once for the up direction and twice for the down direction.
      - 1) Provide an electronic chime with adjustable sound volume.
    - c. Provide adjustable signal time (three [3] to ten [10] seconds, with one [1] second increments) to notify passengers which car shall answer the hall call and preset per ADAAG notification standards.
  2. Main Lobby fixture shall incorporate a 2” high LED floor position indicator in the hall lantern fixture with direction arrows located on both sides of the indicator.
  3. Locate the lantern above / adjacent to the corridor entrance.
- I. Lobby Control Panel
1. Provide a Lobby Control Panel for elevators adjacent to the Fire Command Center as directed by the Consultant.
  2. Provide stainless steel faceplate with tamperproof screws.
  3. The panel shall include:

- a. 2" high LCD car position and travel direction indicators.
- b. Master intercom station / telephone.
- c. Three (3) position (on/car to lobby/off) switches.
- d. Emergency power controls and indicators as per code requirements.
- e. "Car at the designated floor with its doors open" indicator.
- f. System trouble indications.
- g. Car call floor lockout switches.

J. Closed Circuit TV Security System (New)

- 1. Provide a corner mounted, high-resolution color camera with a wide angle for a Closed-Circuit Television (CCTV) security system.
- 2. The camera is to be mounted diagonally across from the strike plate of the elevator door and able to view the position indicator and passenger traffic.
- 3. The camera shall be of the wide-angle lens low light type.
- 4. Provide a fifteen (15) inch LCD color monitor in the Lobby or as otherwise directed by the Owner.
  - a. Monitor shall be capable of displaying all cameras on a split screen (via separate splitter) and switching to a single camera utilizing the entire screen.
- 5. The receiving monitor shall be a self-contained unit designed for wall or shelf mounting with all necessary brackets, hardware and fixture component accessories as required.
- 6. Provide a Digital Video Recorder (DVR) with CD/DVD burner capable of saving up to thirty (30) days of video and a six (6) month supply of applicable recordable media (DVD, Video CD).
- 7. Provide a lockable storage cabinet for the CCTV operating system to be located in a climate-controlled location as directed by the Owner.
- 8. The CCTV security system shall be energized by an independent source of current, other than the current supply to the main elevator operation to avoid the possibility of system failure due to an interrupted current supply to the elevator equipment.
- 9. Provide a battery back-up unit located at the DVR to provide a minimum of two (2) hours of back-up power in the event of building power loss.

K. Closed Circuit TV Security System (New)

- 1. Provide a complete Closed Circuit TV Security System, including all hardware and wiring as necessary, in accordance with specifications provided by the Owner / Architect attached and made part of this specification.

## 2.12 CAR ENCLOSURES

A. Elevator Car Enclosure(s) and the Five Percent (5%) Rule:

- 1. Please refer to matrix and appendix for approved materials and styles.
- 2. In accordance with A17.1, Section 8.7, as adopted and/or modified by the AHJ, entitled "Alterations", where a new or remodeled elevator car enclosure is included in the base scope of work, the Contractor shall, within thirty (30) days after execution of the contract,

- weigh the elevator, or one (1) elevator of each group of elevators included in the base scope of work, to determine the present deadweight of the platform/sling/cab assembly.
3. The Contractor shall, when necessary, weigh the interior materials of a single cab to better estimate the total existing weight of existing materials being removed as part of the alteration.
  4. The Contractor shall make every effort to provide accurate weight measurements while taking into consideration all weights that may present themselves at the time the measurement is taken
  5. The Contractor shall document and notify the Owner and Consultant of the results of the measurements taken and what weight, if any, can be added or needs to be removed from the cab in order to maintain compliance with the Five Percent (5%) Rule.
  6. The Contractor shall work diligently with the Owner and/or Owner's Representative as well as the manufacturer of the car enclosure to minimize additional weights of the new or remodeled car enclosure so as to maintain compliance with the 5% Rule.
  7. Contractor shall be responsible for proper static balance of the platform/sling/car enclosure, upon completion of the car interior work.
  8. Costs associated with this work shall be included in the base modernization price.
  9. Provide a new data tag on the crosshead of the elevator indicating the new deadweight, and the date of the alteration.

B. Elevator Cab Remodel

1. Refer to appendix A

C. Elevator Cab / Refurbish / Remodel

1. Please refer to matrix and appendix for approved materials and styles.
2. Replace finished top floor covering using a commercial grade floor tile over the existing sub floor.
3. Replace car door entrance saddle using a nickel silver sill with necessary cradle supports.
4. Install new high speed exhaust fan with security protection off-set grill.
  - a. Automatic operating controls to turn fan on/off when doors are in the open/closed position. Override keyed control switch to be incorporated in new car operating panel for full time operation and disconnect.
5. Install new low voltage, low heat, recessed down-lights in the cab dome to maximize inside floor-to-ceiling clearance.
  - a. Minimum of four (4) to six (6) lighting fixtures with clear Halo lens trim and Lexan shields.
6. Resurface walls and doors with a selected laminate finish, bindings, trim and feature strips.
7. Refinish interior ceiling with a white laminate and associated moldings.
8. Provisions for hidden security CCTV camera specified herein.
9. Installation of rear wall handrail thirty-two (32) inches above the finished floor with three (3) points of attachment designed for interior access servicing and support plates on the exterior of the enclosure.

10. Installation of protection pads for all walls and returns (floor to ceiling) using pad buttons permanently attached at top and ring or snap hardware at bottom to maintain hanging tension.

D. Elevator Cab Enclosure Fan (New)

1. Provide an exhaust type two (2) speed fan unit with cover grill, mounting accessories and necessary cab enclosure modifications.
  - a. Fan unit shall include self-lubricating motor with housing rubber mounted for sound vibration isolation.
2. Provide a key switch in the elevator cab enclosure for control of fan unit.
3. Provide necessary wiring and approved conduit to properly connect fan unit with power source and control key switch.

E. Elevator Cab Air Conditioning (New)

1. Provide an air conditioning unit on the top of each elevator cab capable of providing ventilation air to the car enclosure in accordance with Code.
  - a. The evaporator unit shall draw air from the hoistway and supply it to the car enclosure.
  - b. The condenser shall draw air from the hoistway and discharge it to the hoistway.
  - c. The unit shall be capable of operating with air entering at a maximum 103 deg F DB and 74 deg F WB while maintaining a car interior temperature at a maximum of 93 deg. F. DB when the outdoor ambient temperature is 93 deg. F DB.
  - d. The unit shall have an electric heater to maintain a cab temperature of 50 deg. F. during the winter months.
  - e. The unit shall be controlled by a thermostat located at the unit air return intake in the cab ceiling and shall switch the unit from cooling to heating mode or to fan only in accordance with the temperature of the air in the hoistway.
  - f. A condensate evaporator shall be provided to dispose of condensate during cooling mode operation. The condensate evaporator shall be provided with an overflow pipe discharging below the bottom of the cab.
2. The air conditioning unit and condensate evaporator shall be by Marvair, Airxcel Inc., Liftaire I - Model ELA07ACB (minimum 7,100 BTU capacity) or approved equal.
3. The electrical contractor shall provide a dedicated 115V, 20amp disconnect switch per elevator in the elevator machine room, with pipe and wiring terminating in a junction box at the elevator controllers. Electrical contractor shall provide the junction box and coordinate the location with the elevator contractor.
4. The elevator contractor shall provide all necessary wiring from the elevator controllers to the air conditioning units on the car top. The elevator contractor shall be responsible for all wiring from the dedicated air conditioning feeders to the AC unit located on top of each elevator car. Provide a separate traveling cable, as necessary to accommodate the required wiring.
5. Supply and return register locations shall be coordinated with the Architect and the manufacturer of the car enclosure and shown on the elevator contractors cab shop drawings.

F. Inspection Certificate and Frame (New)

1. Provide the mandated inspection card frame for posting the required certificate or an alternate plaque as directed by the Owner designee.
2. The alternate plaque shall indicate the location of the certificate within the building, including floor and/or room designation, where access is available during normal business hours.

2.13 EMERGENCY LIGHTING / COMMUNICATIONS / SIGNALING (New)

A. Battery Back Up Emergency Lighting Fixture and Alarm (New)

1. Provide a self-powered emergency light unit.
  - a. Arrange minimum of two (2) of the cab light fixtures to operate as the emergency light system.
  - b. Where cab lighting is utilized for emergency lighting, Contractor shall coordinate the battery back-up equipment so that it is compatible with the type of cab lighting specified by the Owner or Architect.
2. Provide a car-mounted battery unit including solid-state charger and testing means enclosed in common metal container.
  - a. The battery shall be rechargeable nickel cadmium with a ten (10) year minimum life expectancy. Mount the power pack on the top of the car.
  - b. Provide a 6" diameter alarm bell mounted directly to the battery/charger unit and connected to sound when any alarm push button or stop switch in the car enclosure is operated.
  - c. The bell shall be configured to operate from power supplied by the building emergency power generator. The bell shall produce a sound output of between 80-90 dBa (measured from a distance of 10') mounted on top of the elevator car.
    - 1) Activation of this bell shall be controlled by the stop switch and alarm button in the car operating station.
    - 2) The alarm button shall illuminate when pressed.
3. Where required by Code for the specific application, the unit shall provide mechanical ventilation for at least one (1) hour.
4. The operation shall be completely automatic upon failure of normal power supply.
5. Unit shall be connected to normal power supply for car lights and arranged to be energized at all times, so it automatically recharges battery after use.

B. Common Alarm Bell (New)

1. Provide a common alarm bell located in the elevator pit.
  - a. The bell shall be configured to operate when the alarm or stop switch of any elevator is activated, during both normal and battery back-up power conditions.

- b. Existing common alarm bells may be rehabilitated and reused providing they meet the intent of this section and applicable codes.

C. Emergency Voice Communication / Telephone (New)

1. A hands-free emergency voice communication system shall be furnished in each car mounted as an integral part of the car operating panel.
  - a. Necessary wires shall be included in the car traveling cable and shall consist of a minimum of one shielded pair of 20AWG conductors.
  - b. 120V power shall be provided to power the hands-free device.
2. The telephone shall be equipped with an auto-dialer and illuminating indicator which shall illuminate when a call has been placed and begin to flash when the call has been answered.
  - a. Engraving shall be provided next to the indicator which says, "When lit help is on the way".
3. In addition to the standard "Alarm" button, a separate activation button shall be provided on the car operating panel to initiate the emergency telephone and place a call.
  - a. The telephone must not shut off if the activating button is pushed more than once.
  - b. The telephone shall transmit a pre-recorded location message only when requested by the operator and be provided with an adjustable call time which can be extended on demand by the operator.
  - c. Once two-way communication has been established, voice prompts shall be provided which instruct the operator on how to activate these functions as well as alerting the operator when a call is being attempted from another elevator in the building.
4. The system shall be compatible with ring-down equipment and PBX switchboards.
5. The system shall be capable of serving as the audio output for an external voice annunciation system.
  - a. Conversation levels shall measure 60 dbA or higher and measure 10 dbA above ambient noise levels.
  - b. Each device shall be provided with a self-diagnostic capability in order to automatically alert building personnel should an operational problem be detected.
6. The phone shall be able to:
  - a. Receive incoming calls from any On-Site Rescue Station (when provided or required).
  - b. Receive incoming calls from other off-site locations via the public telephone system.
  - c. Acknowledge incoming calls and automatically establishing hands-free two-way communications.
    - 1) If no On-Site Rescue Station is provided, each hands-free device shall have built in line consolidation which will allow up to six (6) elevators to be called

individually from outside the building over a single telephone line and up to eighty (80) elevators if an On-Site Rescue Station is provided.

7. The emergency elevator communication system shall require a maximum of one (1) telephone line.
  - a. The system must provide line sharing capability to eliminate the need for a dedicated telephone line.
  - b. The line sharing function must ensure that the emergency telephones always receive dialing priority even if the line is in use and that the emergency telephones can be called into from an off-site location.
8. The system shall provide its own four (4) hour backup power supply in case of a loss of regular AC power.
9. The system must provide capability for building personnel to call into elevators and determine the charge state of any backup batteries provided for the emergency telephones.
10. Pushing the activation button in any of the elevator car stations will cause any on-site Rescue Station (where provided or required) or security telephone to ring.
  - a. If the on-site call is not picked up within thirty (30) seconds, the call will be automatically forwarded to a twenty-four (24) hour off-site monitoring service.
  - b. The arrangements and costs of the off-site monitoring and telephone line shall be by others.
11. All connections from the junction box to the telephone system shall be done by the Elevator Contractor where existing provisions can be reused.
12. New telephone lines, where required, shall be provided and interfaced by others.
13. All connections from the junction box to the security room's main telephone system shall be done by others.
14. All electrical work shall conform to Division 16 requirements.
15. Existing phone systems removed shall be returned to the Owners for installation by others in other areas.

D. Firefighters' Two-Way Telephone Communications System (New)

1. Provide a complete two-way telephone communications system for point-to-point communications between authorized personnel.
2. Provide firefighter telephone jack in a locked panel box in the main car operating panel in accordance with the requirements of the local authorities. The box shall be fitted with a flush mounted door having hairline joints.
3. Connection devices (jacks) and all associated wiring shall be provided by the elevator Contractor as part of the base bid.
4. The handsets shall be self-powered and not require an external power source for operation.
  - a. The firefighter phone shall be furnished under Division 16.

E. Life Safety System

1. Install Life Safety System speaker in each elevator cab.

2. Provide all necessary wiring and interfacing between the elevator system and the Life Safety System as required.
3. The Life Safety System speaker shall be furnished under Division 16.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Inspection

1. Study the Contract Documents with regard to the work as specified and required so as to ensure its completeness.
2. Examine surface and conditions to which this work is to be attached or applied and notify the Owner in writing if conditions or surfaces are detrimental to the proper and expeditious installation of the work. Starting the work shall imply acceptance of the surfaces and conditions to perform the work as specified.
3. Verify, by measurements at the job site, dimensions affecting the work. Bring field dimensions which are at variance with those on the accepted shop drawings to the attention of the Owner. Obtain the decision regarding corrective measures before the start of fabrication of items affected.
4. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

### 3.2 INSTALLATION / PROJECT PHASING

#### A. Installation

1. Modernize the elevators, using skilled personnel in strict accordance with the final accepted shop drawings and other submittals.
2. Comply with the code, manufacturer's instructions and recommendations.
3. Coordinate work with the work of other building functions for proper time and sequence to avoid delays and to ensure right-of-way of system. Use lines and levels to ensure dimensional coordination of the work.
4. Accurately and rigidly secure supporting elements within the shaftways to the encountered construction within the tolerance established.
5. Provide and install motor, switch, control, safety and maintenance and operating devices in strict accordance with the submitted wiring diagrams and applicable codes and regulations having jurisdiction.
6. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
7. Arrange door tracks and sheaves so that no metal-to-metal contact exists.
8. Reinforce hoistway fascias to allow not more than 1/2" of deflection.
9. Install elevator cab enclosure on platform plumb and align cab entrance with hoistway entrances.
10. Sound isolate cab enclosure from car structure. Allow no direct rigid connections between enclosure and car structure and between platform and car structure.
11. Isolate cab fan from canopy to minimize vibration and noise.

12. Remove oil, dirt and impurities and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.
13. Prehang traveling cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting after installation.
14. Pack openings around oil line with fire resistant, sound isolating glass or mineral wool.
15. Provide isolation pad between platen head and car structure.
16. Set jack unit plumb in waterproof hole and bolt it to mounting channels in the pit.
17. Sound isolate pump units and controllers from building structure.
18. After installation, touch up in the field, surfaces of shop primed elements which have become scratched or damaged.
19. Lubricate operating parts of system as recommended by the manufacturer.

B. Project Phasing

1. Phase I - Final design development and contractors' preliminary work procedures to be completed within four (4) weeks from date of contract award.
  - a. Prevailing conditions review and layout.
  - b. Selection meeting for aesthetic design and finishes with Owners' designee.
  - c. Filing for required permits or other governing authorities work procedure requirements.
2. Phase II - Submittal approvals and confirmations shall be completed within eight (8) weeks from date of contract award.
  - a. Selection confirmations.
  - b. Manufacturer's shop drawings applicable, i.e., fixtures, cab, machine room layouts, doors, etc.
  - c. Engineering data acknowledgment applicable, i.e., power, heat, structural loads.
  - d. Delivery dates for major component suppliers, i.e., controls, machinery, fixtures, cabs, etc.
  - e. Posting of permits or other governing agency authorizations to proceed.
  - f. Proposed work implementation schedule based on the aforementioned procedures/confirmations.
3. Phase III - Mobilization of Final Design Approvals
  - a. Revision confirmations. (Equipment, etc.)
  - b. Preliminary work procedures.
  - c. Schedule confirmations.
4. Contractor shall provide a project schedule as part of the Bid based on the following:
  - a. Include three (3) days of simulated operation, with or without door operation, while not allowing passenger use.
  - b. Consultant punch list inspection report shall be performed after acceptance testing by the AHJ for each individual elevator.

- c. Contractor shall complete all punch list items issued by both the AJH and the Consultant prior to turn-over for beneficial use by the Owner and removal of the next elevator for modernization.

C. Removal of Elevators

1. If extenuating circumstances (i.e., separating controller interconnections, inspection, testing, etc.), require that multiple cars of a single elevator group be removed from service simultaneously, the work shall be performed outside of the normal business hours at a time mutually agreed to by the Owner and Contractor.
2. A minimum of five (5) days advance written notice shall be given to the Owner and Elevator Consultant by the Contractor detailing the reasons for the simultaneous removal of the elevators from service along with the estimated out-of-service time.
3. The request shall be subject to review by the Elevator Consultant and approved by the Owner prior to the commencement of the work.
4. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

D. Transfer of Hall Button Risers

1. Transfer of the hall button riser(s) to the new signal control systems shall be performed on a not-to-interfere basis and shall not interrupt building operations or inconvenience building occupants.
2. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

### 3.3 FIELD QUALITY CONTROL

A. Inspection and Testing

1. Upon completion of each work phase or individual elevator specified herein, the Contractor shall, at its own expense, arrange and assist with inspection and testing as may be required by the A.H.J. in order to secure a Certificate of Operation.

B. Substantial Completion

1. The work shall be deemed "Substantially Complete" for an individual unit or group of units when, in the opinion of the Consultant, the unit is complete, such that there are no material and substantial variations from the Contract Documents, and the unit is fit for its intended purpose.
2. Governing authority testing shall be completed and approved in conjunction with inspection for operation of the unit; a certificate of operation or other required documentation issued; and remaining items mandated for final acceptance completion are limited to minor punch list work not incorporating any life safety deficiencies.
3. The issuance of a substantial completion notification shall not relieve the Contractor from its obligations hereunder to complete the work.
4. Final completion cannot be achieved until all deliverables, including but not limited to training, spare parts, manuals, and other documentation requirements, have been completed.

C. Contractor's Superintendent

1. The Contractor shall assign a competent project superintendent during the work progress and any necessary assistant, all satisfactory to the Owner. The superintendent shall represent the Contractor and all instructions given to him shall be as binding as if given to the Contractor.

3.4 PROTECTION / CLEANING

A. Protection and Cleaning

1. Adequately protect surfaces against accumulation of paint, mortar, mastic and disfiguration or discoloration and damage during shipment and installation.
2. Upon completion, remove protection from finished surfaces and thoroughly clean and polish surfaces with due regard to the type of material. Work shall be free from discoloration, scratches, dents and other surface defects.
3. The finished installation shall be free of defects.
4. Before final completion and acceptance, repair and/or replace defective work, to the satisfaction of the Owner, at no additional cost.
5. Remove tools, equipment and surplus materials from the site.

B. Barricades and Hoistway Screening

1. The Contractor shall provide barricades where necessary in order to maintain adequate protection of areas in which work specified by the Contract Documents is being performed, including open hoistway entrances. Fabrication and erection as all barricades shall be in compliance with applicable OSHA regulations.
2. As required, the Contractor shall provide temporary wire mesh screening in the hoistway and of any elevator undergoing work specified in the Contract Documents. This screening shall be installed in such a manner as to completely segregate the hoistway from that of adjacent elevators. Screening shall be constructed from .041" diameter wire in a pattern that rejects passage of a 1" diameter ball.

3.5 DEMONSTRATION

A. Performance and Operating Requirements

1. Passenger elevators shall be adjusted to meet the following performance requirements:
  - a. Speed within five percent (5%) of rated speed in the up direction under any loading condition.
  - b. Leveling: within  $\pm 1/4"$  as measured between the car entrance threshold and the landing sill on any given floor under any loading condition.
  - c. Typical Floor-to-Floor Time: (Recorded from the doors start to close on one (1) floor until they are 3/4 open at the next floor) under various loading conditions.

Hydraulic Passenger Elevators                      13.0 – 15.0 seconds.

d. Door Operating Times

Door Type	Opening	Closing
42" center opening	1.7 sec.	2.4 sec.
e. Door dwell time for hall calls:	4.0 sec with Advance lantern signals.	
f. Door dwell time for hall calls:	5.0 sec without Advance lantern signals.	
g. Door dwell time for car calls:	3.0 seconds.	
h. Reduced non-interference dwell time:	1.0 seconds.	

2. Maintain the following ride quality requirements for the passenger elevators:

a. Noise levels inside the car shall not exceed the following:

- 1) Car at rest with doors closed and fan off - 40 dba.
- 2) Car at rest with doors closed, fan running - 55 dba.
- 3) Car running at high speed, fan off - 50 dba.
- 4) Door in operation - 60 dba.

b. Vertical accelerations shall not exceed 14 milli-g and horizontal accelerations shall not exceed 20 milli-g.

- 1) The accelerometer used for this testing shall be capable of measuring and recording acceleration to nearest 0.01 m/s<sup>2</sup> (1 milli-g) in the range of 0-2 m/s<sup>2</sup> over a frequency range from 0-80 Hz with ISO 8041 filter weights applied. Accelerometer should provide contact with the floor similar to foot pressure, 60 kPa (8.7psi).

B. Acceptance Testing

1. Comply with the requirements of Division 01.
2. The Contractor shall provide at least five (5) days prior written notice to the Owner and Consultant regarding the exact date on which work specified in the Contract Documents will reach completion on any single unit of vertical transportation equipment.
3. In addition to conducting whatever testing procedures may be required by local inspecting authorities in order to gain approval of the completed work, and before seeking approval of said work by the Owner, the Contractor shall perform certain other tests in the presence of the Consultant.
4. The Contractor shall provide test instruments, test weights, and qualified field labor as required to safely operate the unit under load conditions that vary from empty to full rated load and, in so doing, to successfully demonstrate compliance with applicable performance standards set forth in the project specifications with regard to:
  - a. Operation of safety devices.
  - b. Sustained high-speed velocity of the elevator in either direction of travel.
  - c. Floor-to-floor time between adjacent floors.
  - d. Floor leveling accuracy.
  - e. Door opening/closing and dwell times.
  - f. Ride quality inside the elevator car.
  - g. Communication system.

5. Upon completion of work specified in the Contract Documents on the last car in any group of elevators, and in conjunction with the aforementioned testing procedures, the Contractor shall carry out additional testing of group dispatch/supervisory control features in the presence of the Consultant.
6. The Contractor shall provide test instruments and qualified field labor as required to successfully demonstrate:
  - a. The back-up operating mode for group dispatch failure.
  - b. Simulated and actual battery lowering operation.
  - c. Firefighter and independent service operations.
  - d. Restricted access security features and card reader controls.
  - e. Floor parking assignments.
  - f. Up/down peak operation.
7. Upon completion of the modernization of each individual elevator, emergency power testing shall be conducted by the Building Management after normal business hours and/or weekends.
8. After hour tests of systems such as emergency generators, fire service, and security systems shall be conducted at no extra cost to the Owner.

END OF SPECIFICATION

Appendix A						
Bldg. No.	WSU Bldg. ID	WSU Bldg. Address	WSU ID #	Elevator Type	Cab Flooring Material (per specifications)	Interior Wall Finishes (per specifications)
5	Science Hall	5045 Cass Avenue, Detroit, MI 48202	005 01	Traction	Seamless Resilient Rubber	5WL hanging panels ???
34	Student Center Center	5221 Gullen Mall Detroit, MI 48202	034 03	Traction	diamond plate	5WL hanging panels ???
36	Reuther Library	5401 Cass Avenue, Detroit, MI 48202	036 01	Hydraulic	Seamless Resilient Rubber	Plastic laminate panels
42	Alumni House	441 Gilmour Mall Detroit, MI 48202	042 01	Hydraulic	Porcelain tile	Wood Veneer panels
45	Parking Structure 5	5501 Anthony Wayne Drive, Detroit, MI 48202	045 01 045 02	Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
51	Parking Structure 1	450 West Palmer, Detroit, MI 48202	051 03 051 04	Traction Traction	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
71	5057 Woodward	5057 Woodward, Detroit, MI 48202	071 01 071 02 071 03 071 03 071 03	Traction Traction Traction Traction Traction	Seamless Resilient Rubber	Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels
88	Parking Structure 6	61 Putnam Avenue, Detroit, MI 48202	088 01 088 03 088 02	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels 5WL hanging panels
89	Biological Sciences	5047 Gullen Mall, Detroit, MI 48202	089 01 089 02	Traction Traction	Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels 5WL hanging panels
130	Faculty / Administration Building	656 West Kirby Avenue, Detroit, MI 48202	130 03 130 02 130 01	Hydraulic Hydraulic Hydraulic	Existing to remain	Plastic laminate panels Plastic laminate panels Plastic laminate panels
629	Elliman Clinical Research	421 East Canfield Avenue	629 01 629 02 629 03	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels Plastic laminate panels 5WL hanging panels

## APPENDIX A

### WAYNE STATE UNIVERSITY CAR ENCLOSURE AND INTERIOR FINISH STANDARDS

#### CAR ENCLOSURE AND INTERIOR FINISHES

- A. Passenger Elevator: Retain existing car enclosure and provide new interior finishes.
  - 1. Check and tighten all fastenings.
  - 2. Provide new interior finishes as specified herein.
  - 3. Modify car enclosure for application of new signal and pushbutton fixtures.
  - 4. Post modernization weight not to exceed code allowable limits.
  - 5. Provide the following features:
    - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
    - b. Stationary Return Panels: Retain.
    - c. Entrance Columns: Retain.
    - d. Transom: Retain.
    - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
    - f. Base: Stainless steel with concealed ventilation cutouts.
    - g. Interior Wall Finish:
      - 1) Removable panels, faced and edged, with color core plastic laminate. Plastic laminate (HPDL) shall meet or exceed NEMA Standard LDI-1964 for Type 1, 1/16" high pressure general purpose laminate.
      - 2) Color and finish as selected by Purchaser.
      - 3) 5WL hanging panels with #4 stainless steel reveals between panels.
    - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
    - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
    - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
    - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
    - l. Cab Flooring, provide floor covering per below:
      - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
      - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
      - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
      - 4) Seamless resilient non-slip rubber or vinyl with sealed edges

- 5) Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

B. Service Elevator: Retain existing car Shell enclosure and provide new interior finishes.

1. Check and tighten all fastenings.
2. Provide new interior finishes as specified herein.
3. Modify car enclosure for application of new signal and pushbutton fixtures.
4. Post modernization weight not to exceed code allowable limits.
5. Provide the following features:
  - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
  - b. Stationary Return Panels: Retain.
  - c. Entrance Columns: Retain.
  - d. Transom: Retain.
  - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - f. Base: Textured stainless steel with concealed ventilation cutouts.
  - g. Interior Wall Finish: Removable panels made of 5WL.
  - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
  - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - l. Cab Flooring: Provide a heavy vinyl cab floor covering as selected by the Purchaser.
  - m. Pads and Buttons: 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.

C. Passenger Elevator: New Car Enclosure and Interior Finishes.

1. Remove all existing interior finishes and shell components, weigh, and document.
2. Provide complete new car enclosure and interior finishes as specified herein.
3. Post modernization weight not to exceed code allowable limits.
4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel stainless steel formed panels Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - d. Entrance Columns: Reinforced 14 gauge satin finish stainless steel.
  - e. Transom: Reinforced 14 gauge satin finish stainless steel full width of enclosure.
  - f. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.

- g. Base: Stainless steel with concealed ventilation cutouts.
- h. Interior Wall Finish: Removable panels, faced and edged, with color core plastic laminate. Color and finish as selected by Architect/Purchaser.
- i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
- k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
- l. Subfloor; 5/8" thick marine grade plywood.
- m. Cab Flooring: Provide floor covering per below:
  - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
  - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
  - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
  - 4) Seamless resilient non-slip rubber or vinyl with sealed edges
- n. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
- o. Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

D. Service Elevator: New Car Enclosure and Interior Finishes.

- 1. Remove all existing interior finishes and shell components, weigh, and document.
- 2. Provide complete new car enclosure and interior finishes as specified herein.
- 3. Post modernization weight not to exceed code allowable limits.
- 4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel textured stainless steel formed panels with baked enamel interior finish as selected. Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Car Sill:
  - d. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - e. Entrance Columns: Reinforced 14 gauge textured satin finish stainless steel.
  - f. Transom: Reinforced 14 gauge textured satin finish stainless steel full width of enclosure.
  - g. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - h. Base: Textured stainless steel with concealed ventilation cutouts.
  - i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.

- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - l. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - m. Guardrails:
    - 1) Solid stainless steel flat stock bars, 4" x 3/8", mounted across rear and side walls.
    - 2) Locate guardrail line at 8" above car floor.
    - 3) Bolt rails through car walls from back and mount on 1½" deep solid round stainless steel standoff spacers no more than 18" O.C.
    - 4) Return guardrail ends to car walls.
    - 5) Pads and Buttons: 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.
  - n. Cab Flooring:
    - 1) Seamless resilient non-slip rubber or vinyl with sealed as selected by the Owner.
- E. Freight Elevator Enclosure: Car weight to be verified prior to removal of interior cab finishes/cab enclosure. Post modernization weight not to exceed code allowable limits. Provide the following features:
- 1. Enclosure Walls: Reinforced 10-gauge furniture steel formed panels no more than 20" wide with light-proof joints.
    - a. Baked enamel finish as selected.
    - b. Provide recess in car side wall for recessed mounting of car operating panel.
  - 2. Enclosure Canopy:
    - a. Reinforced 12-gauge furniture steel formed panels no more than 20" wide with light-proof joints and Hinged emergency exit.
    - b. Interior finish white reflective baked enamel.
    - c. Lighting: Recessed LED down lights with on/off switch in car operating panel. Recess mount fixture flush with inside surface of car top. Provide steel guard on car top over fixture.
    - d. Bumper Rails: Two rows of 2" x 12" oak or maple bumpers mounted on both sides and rear of the car.
      - 1) Locate bottom rail at floor level and top rail at 36" above the car floor.
      - 2) Bolt rails through car walls with bolt and captive nuts on exterior of wall panel sections on 18" centers.
      - 3) Finish both upper and lower top edges with a 45-degree chamfered edge to eliminate collection of trash.
      - 4) Finish ends of upper and lower bumpers on side walls to 45° chamfer to eliminate carts and people from hitting blunt ends.
      - 5) Flooring: Provide cab flooring which is 1/8" aluminum diamond plate.

**DIVISION 14**

**SECTION 14 21 23**

**TECHNICAL SPECIFICATIONS FOR**

**TWO (2) ELEVATORS**

**AT**

**WSU - PARKING STRUCTURE 1**

**450 WEST PALMER**

**DETROIT, MI**

**ADDENDUM #2**

DATE: February 26, 2024

VDA No. 69964/BM

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## DIVISION 14 – CONVEYING SYSTEMS

### 14 00 00 Conveying Equipment

### 14 21 00 – Traction Elevators

### 14 21 23 – Electric Traction Passenger Elevators

## PART 1 - GENERAL

### 1.1 SUMMARY AND DEFINITIONS

#### A. Related Documents

1. Division 01 - Supplementary General Conditions
2. 14 21 23 - Electric Traction Passenger Elevators
3. Request for Proposal

#### B. Intent

1. This section includes:
  - a. Electric traction passenger
2. The following outlines the scope of work covered in this Section:
  - a. Comprehensive “Turn-key” modernization of two (2) 2,000 lb. capacity traction passenger elevators operating at 200 fpm.
  - b. Completion of Related Work identified herein Item 1.5.A.
  - c. This is a "TURN-KEY" project with the Elevator Contractor designated the "PRIME CONTRACTOR" for all related and non-related work specified and required unless specifically excluded or referenced to be done by others.

As this is a “Turn-Key” project, with the Elevator Contractor being the “Prime” Contractor, it is the Elevator Contractor’s responsibility to perform a detailed survey of the existing jobsite conditions to determine applicability and detailed scope for related work completion.

The Elevator Contractor is required to retain the services of trade sub-contractors that are either experienced in working as subcontractors on elevator modernization projects or that have relevant experience on similar projects. The trade sub-contractors shall be required to complete a detailed survey of related work / building conditions at this location(s) alongside the Elevator Contractor as a requirement to provide cost proposals for the related scope of work. At a minimum, trade sub-contractors that are required to be included on the Elevator Contractors project team should include:

Electrical Contractor

## Mechanical Contractor

## Fire / Life Safety Contractor

The Elevator Contractor is required to identify in their proposal the Trade sub-contractors utilized to compile their cost estimates included in their Base Bid.

It is the intent of this specification that the Elevator Contractor include in their Base Bid the cost to complete all elevator and related work that will be required to return each of the units to public use with no Code violations or punch-list items identified by the local Authority Having Jurisdiction (AHJ) as remaining to be completed. As such, the items Identified in Section 1.5.A of the Technical Specifications are intended to be as accurate a listing as can be compiled at the time of preparation of these documents.

However, should other related building work items be necessary to be completed to meet the requirements of the AHJ for issuance of permanent elevator operating certificates / permits, it will be the responsibility of the Elevator Contractor to complete the additional items under the scope of their Base Bid amount, with no additional costs to the Owner.

3. Related equipment shall be designed, constructed, installed and adjusted to produce the highest results with respect to smooth, quiet, convenient and efficient operation, durability, economy of maintenance, and the highest standard of safety.
4. It is not the intent of these specifications to detail the construction and design of all parts of the equipment, but it is expected that the type, materials, design, quality of work and construction of each part shall be adequate for the service required, durable, properly coordinated with all other parts, and in accordance with the best commercial standards applicable and of the highest commercial efficiency possible.
5. Electric and magnetic circuits and related parts shall be of proper size, design and material to avoid heating and arcing, and all other objectionable effects which may reduce the efficiency of operation, economy of maintenance and/or net-useful life of the apparatus.
6. Minimum requirements for design, materials, etc., are for certain parts of the equipment. Equivalent requirements approved by the Consultant shall apply to such parts as are of special design, construction or material and to which the specified requirements are not directly applicable. These minimum requirements as a whole shall be considered as establishing proportionate general minimum standards for all parts of the equipment.
7. The Consultant may permit variations from the requirement of these specifications to permit use of the Contractor's standard equipment, provided such standard equipment is in every way adequate for the intended use and meets the full intent of these specifications. All such variations proposed by the manufacturer shall be called to the attention of the Consultant and shall only be made if approved in writing prior to the award of the contract.
8. General requirements for design, materials and construction are intended primarily to apply to the heavy-duty and important parts of the equipment specifically mentioned and to other parts of similar duty and importance. Less important and light-duty parts may be of the standard design, materials and construction provided that, in the opinion of the Consultant, such standards are in accordance with the best commercial practice and are fully adequate for the purpose of use. All such variations shall be made only on the Consultant's written approval.

9. All equipment and component parts installed, supplied or provided under this contract shall be manufactured and distributed by a third-party, non-installer company servicing the vertical transportation industry.
  - a. Apparatus shall conform to the design and construction standards referenced herein and shall be rated the best commercial grade suitable for this application.
  - b. Equipment and component systems shall not employ any experimental devices or proprietary designs that could hamper and/or otherwise prohibit subsequent maintenance repairs or adjustments by all qualified contractors.
  - c. Manufacturers of the apparatus shall provide technical support and parts replacements for their equipment and component systems for a minimum of twenty (20) years and issue such guarantee of support to the purchaser with written certification naming the final Owner of their product(s) to ensure the apparatus or systems remain maintainable regardless of who may be selected for future service.
10. All equipment provided shall be factory and field tested with a history of design reliability and net-useful life established.
  - a. Contractor must be able to demonstrate the apparatus to be installed has been used successfully in a substantially similar manner under comparable conditions.
  - b. If the apparatus proposed differs substantially in construction, material composition, design, size, capacity, duty or other such rating from the equipment previously used for the same purpose by the manufacturer, the Consultant may reject the apparatus or require the vendor test and demonstrate the adequacy and suitability for this particular situation. Any necessary tests shall be performed at the sole expense of the Contractor with no prior guarantee of acceptance after the testing procedure.
11. The Contractor shall not use as part of the permanent equipment any experimental devices, proprietary design, components, construction of materials which have not been fully tried out in at least substantially similar or under comparable service, except as may be especially approved by the Consultant. If any important equipment or devices to be used on this installation differ substantially in construction, materials, design, size, capacity or duty from corresponding items previously used for the same purpose by the manufacturer, they shall pass such tests as the Consultant may require to fully show their adequacy and suitability. These tests shall be in addition to tests herein specified and shall be made at the expense of the Contractor.
12. Certain design limitations, tests, etc., are herein specified as a partial check of the adequacy of design, construction and materials used. These requirements do not cover all features necessary to ensure satisfactory and approved operation, etc., of the equipment.
13. It is understood, the entire system shall be designed, fabricated, modified and/or upgraded in full compliance with applicable local laws and code standards. The absence of a particular item or requirement shall not relieve the Contractor of the full and sole responsibility for such equipment, features and/or procedures.
14. With the exception of only those items specifically identified as being performed by others, the Specifications are intended to include all engineering, material, labor, testing, and inspections needed to achieve work specified by the Contract Documents. Inasmuch as it is understood that any incidental work necessary to complete the project is also covered by the Specifications, bidders are cautioned to familiarize themselves with the existing job site conditions. Additional charges for material or labor shall not be permitted subsequent to execution of the Contract.

15. Bidders must report discrepancies or ambiguities occurring in the Specifications to the Consultant for resolution prior to the bidding deadline, otherwise the Specifications shall be deemed acceptable in their existing form.

C. Abbreviations and Symbols

1. The following abbreviations, Associations, Institutions, and Societies may appear in the Project Manual or Contract Documents:

ADA	Americans with Disabilities Act
AHJ	Authority Having Jurisdiction
AIA	American Institute of Architects
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
IBC	International Building Code
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
OSHA	Occupational Safety and Health Act

D. Codes and Ordinances / Regulatory Agencies

1. Work specified by the Contract Documents shall be performed in compliance with applicable Federal, State, and municipal codes and ordinances in effect at the time of Contract execution. Regulations of the Authority Having Jurisdiction shall be fulfilled by the Contractor and Subcontractors. The entire installation, when completed, shall conform with all applicable regulations set forth in the latest editions of:
  - a. Local and/or State laws applicable for logistical area of project work.
  - b. Building Code applicable to the AHJ.
  - c. Elevator Code applicable to the AHJ.
  - d. Safety Code for Elevators and Escalators, ASME A17.1 and all supplements as modified and adopted by the AHJ.
  - e. Safety Code for Elevators and Escalators, A17.1S supplement to A17.1 as modified and adopted by the AHJ for Machine Room Less installations (MRL).
  - f. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2.
  - g. Safety Code for Existing Elevators and Escalators, ASME A17.3 as modified and adopted by the AHJ.
  - h. Guide for emergency evacuation of passengers from elevators, ASME A17.4.
  - i. National Electrical Code (ANSI/NFPA 70).
  - j. American with Disabilities Act - Accessibility Guidelines for Building and Facilities and/or A117.1 Accessibility as may be applicable to the AHJ.
  - k. ASME A17.5/CSA-B44.1 - Elevator and escalator electrical equipment.
  - l. ECC (Energy Conservation Code) as may be applicable to the AHJ.
2. The Contractor shall advise the Owner's Representative of pending code changes that could be applicable to this project and provide quotations for compliance with related costs.

E. Reference Standards

1. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
2. ANSI/AWS D1.1 - Structural Welding Code, Steel.
3. ANSI/NFPA 80 - Fire Doors and Windows.
4. ANSI/UL 10B - Fire Tests of Door Assemblies.
5. ANSI/IEEE - 519-Latest Edition.
6. ANSI/IEEE - Guide for Surge Withstand Capability (SWC) Tests.
7. ANSI Z97.1 – Laminated/Safety Tempered Glass.

F. Definitions

1. Defective Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
2. Provide: Where used in this document, provide shall mean to install new device, apparatus, system, equipment or feature as specified in this document.
3. Definitions in ASME A17.1 as amended or modified by the AHJ apply to work of this Section.

1.2 PERMITS AND SUBMITTALS

A. Permits

1. Prior to commencing work specified by the Contract Documents, the Contractor shall, at its own expense, obtain all permits or variances as may be required by the AHJ and provide satisfactory evidence of having obtained said permits and variances to both the Owner's Representative and Consultant.
2. File necessary drawings for approval of all Authorities Having Jurisdiction.
3. The Elevator Contractor shall undertake the necessary review and search procedure to identify open applications and/or outstanding violations for this property; and close-out such applications and/or expunge such violations relative to the project scope as required for final acceptance by the AHJ.
4. Outstanding applications and violations must be indicated on the request for permit filing for this procedure to ensure such applications and/or violations are dismissed accordingly.

- B. All relative costs shall be included in the base bid proposal with the understanding that corrective actions are covered under the specified scope of work.

C. Submittals

1. Prior to beginning the work, the Contractor shall submit and have approved copies of layout drawings, shop drawings and standard cuts. These items shall include:
  - a. A plan and section view of the hoistway, pit and machine room
  - b. Machine assembly, controller, door equipment, signal fixtures Door panels, car and counterweight guides, travel cable, and cab enclosures/ interiors.

- c. All specified additional accessories.
- 2. The Consultant and the Owner's Representative shall pass on the submittals with reasonable promptness and the Contractor shall be responsible to ensure that there will be no delay in their work or that of any other trade involved.
- 3. Approved filing and submittal requirements must be completed before equipment and related materials are ordered.
- 4. Copies of Department of Buildings' permits and/or governing authority's documents will be posted at the job site with copies issued to the Owner's Agent, Owner's Representative and Consultant.
- 5. Samples of wood, metal, plastic, paint or other architectural finish material applicable to this project shall be submitted for approval by the Owner's designee.
- 6. It shall be understood that approval of the drawings and cuts by Owner's designee, Architect and/or Consultant shall be for general arrangement only and does not include measurements which are the Contractor's responsibility or approval of variations from the contract documents required by the AHJ.
- 7. The Contractor shall prepare a record log and maintain all submittals, shop drawings, catalog cuts and samples.

D. Measurements and Drawings

- 1. Drawings or measurements included with the bidding material shall be for the convenience of the bidders only and full responsibility for detailed dimensions lies with the Contractor.
- 2. In the execution of the work on the job, the Contractor shall verify all dimensions with the actual conditions.
- 3. Where the work of the Elevator Contractor is to join other trades, the shop drawings shall show the actual dimensions and the method of joining the work of the various trades.

E. Substitutions

- 1. Requests for substitutions will be considered under the following time limitations and situations:
  - a. Not less than ten (10) calendar days before bids are due.
  - b. Work or equipment specified becomes unavailable through unforeseen events such as strikes, loss of manufacturer's plant through fire, flood or bankruptcy.
- 2. Requested substitutions will be reviewed and adjudged. Failure of the Owner to raise objection shall not constitute a waiver of any of the requirements of the Contract Documents.
- 3. Request for substitutions shall include complete data with drawings and samples as required, including the following:
  - a. Quality Comparison - Proposed substitution versus the specified product.
  - b. Changes required in other work because of the substitution.
  - c. Effect on the construction schedule.
  - d. Cost Data - Resulting from the proposed substitution versus the specified product. The Contractor shall certify that the cost data presented is complete and includes all related costs under this Contract.

- e. Safety Comparison – Proposed substitution shall provide equivalent or greater safety, with certification data provided where relevant.
- 4. When proposing a substitution, the Contractor represents that:
  - a. They have investigated the proposed substitution and have determined that it is equal to or better than the product specified.
  - b. They will guarantee the substitution in the same manner as the product specified.
  - c. They will coordinate and make other changes as required in the work as a result of the substitution.
  - d. They waive all claims for additional costs as a result of the substitution, with the exception of those identified above under “cost data”.
- 5. The Owner will be sole judge of the acceptability of the proposed substitution.
- 6. The Owner and Consultant will have authority to approve or reject substitutions or to change the specified standards of quality. However, neither this authority to act under this provision nor any decision made in good faith, either to exercise or not to exercise this authority, shall give rise to any duty or responsibility of the Owner to the Contractor, any Subcontractor, any Sub-Subcontractor, any of their agents or employees or any other persons performing the work or offering to perform the work.

F. Changes in Scope and Extra Work

- 1. The Owner may at any time make changes in the specifications, plans and drawings, omit work, and require additional work to be performed by the Contractor.
  - a. Each such addition or deletion to the Contract shall require the Owner and the Contractor to negotiate a mutually acceptable adjustment in the contract price, and, for the Contractor to issue a change order describing the nature of the change and the amount of price adjustment.
  - b. The Contractor shall make no additions, changes, alterations or omissions or perform extra work except on written authorization of the Owner.
  - c. Each change order shall be executed by the Contractor, Owner, and the Consultant.

G. Keys

- 1. Upon the initial acceptance of work specified by the Contract Documents on each unit, the Contractor shall deliver to the Owner, six (6) keys for each general key-operated device that is provided under these specifications in accordance with ASME A17.1, Part 8 standards as may be adopted and modified by the AHJ.
- 2. All other keying of access or operation of equipment shall be provided in accordance with ASME A17.1 Part 8 as may be adopted and modified by the AHJ.

H. Diagnostic Tools

- 1. Prior to seeking final acceptance of the project, the Contractor shall deliver to the Owner any specialized tools required to perform diagnostic evaluations, adjustments, and/or programming changes on any microprocessor-based control equipment installed by the Contractor. All such tools shall become the property of the Owner.

- a. Owner's diagnostic tools shall be configured to perform all levels of diagnostics, systems adjustment and software program changes which are available to the Contractor.
    - b. Owner's diagnostic tools that require periodic re-calibration and/or re-initiation shall be performed by the Contractor at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the project.
    - c. The Contractor shall provide a temporary replacement, at no additional cost to the Owner, during those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation or repair.
  2. Contractor shall deliver to the Owner, printed instructions, access codes, passwords or other proprietary information necessary to interface with the microprocessor-control equipment.
- I. Service Support Requirements / Spare Parts
1. Software / Firmware Updates
    - a. During the life of the equipment and subject to the term of the maintenance agreement, where revisions to firmware and/or software are issued by the control manufacturer or manufacturer of solid state and microprocessor-based subsystems subsequent to the beneficial use of the equipment, updates shall be provided so that the installation and spare circuit boards are current with respect to software and firmware versions.
- J. Wiring Diagrams, Operating Manuals and Maintenance Data
1. Deliver to the Owner two (2) identical volumes of printed information organized into neatly bound manuals prior to seeking final acceptance of the project.
  2. The manuals shall also be submitted in electronic format on non-volatile media, incorporating raw 'CAD' and/or Acrobat 'PDF' file formats. Electronic manuals shall be properly indexed, bookmarked, and searchable.
  3. Manuals, as well as electronic copies, shall contain the following:
    - a. Step-by-step adjusting, programming and troubleshooting procedures that pertain to the solid-state microprocessor-control and motor drive equipment.
    - b. Passwords or identification codes required to gain access to each software program in order to perform diagnostics or program changes.
    - c. A composite listing of the individual settings chosen for variable software parameters stored in the software programs of both the motion and dispatch controllers.
    - d. Method of control and operation.
  4. Provide two (2) sets of "AS INSTALLED" straight-line wiring diagrams in both hard and electronic format in accordance with the following requirements:
    - a. Displaying name and symbol of each relay, switch or other electrical component utilized including identification of each wiring terminal.

- b. Electrical circuits depicted shall include all those which are hard wired in both the machine room and hoistway.
  - c. Supplemental wiring changes performed in the field shall be incorporated into the diagrams in order to accurately replicate the completed installation.
- 5. Furnish two (2) sets of bound instructions and recommendations for maintenance, with special reference to lubrication and lubricants along with the full Maintenance Control Program as required Part 8 of ASME A17.1.
- 6. Manuals or photographs showing controller replacement parts with part numbers listed.

K. Training

- 1. Prior to seeking final acceptance of the project, the Contractor shall conduct a two (2) hour training program on-site with building personnel selected by the Owner.
- 2. The focus of the session shall include:
  - a. Instructions on proper safety procedures and who to contact for the purpose of assisting passengers that may become entrapped inside an elevator car.
  - b. Explain each control feature and its correct sequence of operation.
- 3. Control features covered shall include but not be limited to:
  - a. Independent Service Operation.
  - b. Emergency Fire Recall Operation - Phase I.
  - c. Emergency In-car Operation - Phase II.
  - d. Emergency Power Operation.
  - e. Emergency Communications Equipment.
  - f. Security Operating Features.
  - g. Interactive Systems Management.
  - h. Remote Monitoring/Controls.

L. Patents

- 1. Patent licenses which may be required to perform work specified by the Contract Documents shall be obtained by the Contractor at its own expense.
- 2. The Contractor agrees to defend and save harmless the Owner, Consultant and agents, servants, and employees thereof from any liability resulting from the manufacture or use of any patented invention, process or article of appliance in performing work specified in the Contract Documents.

M. Advertising

- 1. Advertising privileges shall be retained by the Owner.
- 2. It shall be the responsibility of the Contractor to keep the job site free of posters, signs, and/or decorations.
- 3. Contractor's logo shall not appear on faceplates or entrance sills without the approval of the Owner.

### 1.3 QUALITY ASSURANCE

#### A. Materials and Quality of Work

1. All materials are to be new and of the best quality of the kind specified.
2. Installation of such materials shall be accomplished in a neat manner and be of the highest quality.
  - a. Should the Contractor receive written notification from the Owner stating the presence of inferior, improper, or unsound materials or quality of installation, the Contractor shall, within twenty-four (24) hours, remove such work or materials and make good all other work or materials damaged.
  - b. Should the Owner permit said work or materials to remain, the Owner shall be allowed the difference in value or shall, at its election, have the right to have said work or materials repaired or replaced as well as the damage caused thereby, at the expense of the Contractor, at any time within one (1) year after the completion of the work; and neither payment made to the Contractor, nor any other acts of the Owner shall be construed as evidence of acceptance and waiver.

#### B. Electrical Design Requirements (General)

1. The following typical requirements shall apply to all parts of the work and are supplementary to other requirements noted under the respective headings.
  - a. The design and construction of the motors shall conform to the requirements of these specifications and to the ASME Standards for Rotating Electrical Machinery with revisions issued to the first day when the work of this Contract was advertised.
    - 1) Motors shall operate successfully under all loads and speeds and during acceleration and deceleration.
    - 2) Motors shall be designed for quiet operation without excessive heat.
    - 3) Insulation on motor coils and windings and on all insulated switch, relay, brake and other coils shall conform to the requirements of minimum Class "F" insulation, as defined in ANSI Standards for Rotating Electrical Machinery. All motors shall be impregnated twice.
    - 4) Switches, relays, etc., on controller, starter and signal panels and similar items on other parts of the equipment shall be the latest improved type for the condition of use. They shall function properly in full accordance with the requirements of the machines controlled and with the specified operating requirements of the elevator. Any of these parts showing wear or other injurious effects during the guarantee period to the extent that abnormal maintenance is required or indicated shall be replaced with proper and adequate parts by the Contractor.
    - 5) Contacts in elevator motor circuits which are intended to be opened by governors or other safety devices shall be copper to carbon or other approved non-fusing type.
    - 6) Where required, controllers and other component parts of the installation shall be labeled in accordance with the latest codes and standards as adopted and/or otherwise modified by the AHJ.

- 7) Electrical equipment, motors, controllers, etc., installed under this contract shall have necessary CSA/US or UL/US listing as may be required by the AHJ. Equipment shall be labeled or tagged accordingly.

C. Energy Conservation Code

1. The Contractor shall comply with the requirements set forth in the Energy Conservation Code as may be applicable to the AHJ.
2. Except for equipment or systems under the purview of other disciplines, elevator and escalator equipment provided by the Contractor requiring compliance shall include, but not be limited to:
  - a. Gear ratio efficiencies in geared machines
  - b. Energy efficiencies of geared and gearless motors
  - c. Absorption of regenerated power for elevators
  - d. Energy efficiencies of car interior lighting and ventilation
  - e. Automatic operation of car interior lighting and ventilation through the individual car controller

D. Materials, Painting and Finishes

1. Two (2) coats of rust inhibiting machinery enamel shall be applied to exposed ferrous metal surfaces in the pit that do not have a galvanized, anodized, baked enamel, or special architectural finishes.
2. Two (2) coats of rust inhibiting enamel paint to the machinery located within the machine room and secondary level (where applicable) as well as to the machine room floors.
3. Architectural metal surfaces of bronze or similar non-ferrous materials which are specified to be refinished, re clad and/or provided new, shall be sufficiently clear coated so as to resist tarnishing during normal usage for a period of not less than twelve (12) months after final acceptance by the Owner.
4. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalomania or stencil type.
5. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by Code at intervals not exceeding 7'-0". The color of paint used shall contrast with the color of the surface to which it is applied.

E. Accessibility Requirements

1. Locate door reopening devices at 5" and 29" above the finish floor when individual contact projection apparatus is employed.
2. Locate the alarm button and emergency stop switch at 35", and floor and control buttons not more than 48" above the finished floor. The alarm button shall illuminate when pressed for visual acknowledgement to user.
3. Provide raised markings in the panel to the left of the car call and other control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons and cover plate.
4. The centerline of new hall push button shall be 42" above the finished floor.

5. The hall arrival lanterns, or cab direction lantern provided shall sound once for the “up” direction and twice for the “down” direction. Design and locate fixtures per Federal standards.
6. Provide floor designations at each entrance on both sides of jamb at a height of 60” above the floor.
  - a. Use cast metal plates and polished numbers secured with tamper-proof hardware.
  - b. Designations shall be 2” high, raised .03” on a contrasting color background as selected by the Owner.
7. Provide an audible signal within the elevator to tell passenger that the car is stopping or passing a floor served by the elevator.
8. Where elevators operate at a speed greater than 200 fpm, provide a verbal annunciator to announce the floor at which the elevator is stopping where required by the AHJ.
9. Provide signal control timing for passenger entry/exit transitions per Federal and/or Local standards.
10. Ensure sill-to-sill running clearances do not exceed 1-1/4” at all landings served.
11. Provide visual call acknowledgment signal for car emergency intercommunication device.

F. Qualifications

1. The work shall be performed by a company specialized in the business of manufacturing, installing and servicing conveying systems of the type and character required by these specifications with a minimum of ten (10) years of experience.
2. Prior written acceptance is required for manufacturers other than those listed, before quoting this project. Requests for acceptance will not be considered unless they are submitted before bid date and are accompanied by the following information:
  - a. List of five (5) similar installations having exact equipment being proposed for this project arranged to show name of project, system description and date of completed installation. The list shall include the names, position and resumes of the construction team and field supervisor of the installations.
  - b. Complete literature, performance and technical data describing the proposed equipment. Include the names, position and resumes of the proposed construction team and field supervisor.
  - c. List of ten (10) service accounts by building name, building manager or owner, including phone numbers.
  - d. Location of closest service office from which conveying system will be maintained.
  - e. Location of closest parts inventory for this installation.
  - f. List of the names, positions and resumes of the construction teams and field supervisor for the installation.

G. Structural, Mechanical and Electrical Design Parameters

1. The mechanical and electrical systems and the building structure have been designed for the following design loads:
  - a. Structural Loads:
    - 1) The pit, machine room, and rail loads are shown on the drawings.

2. Power supply: 208 / 460V-3PH-60Hz (EE to verify)
3. Electrical Loads: (EE to verify)
4. Heat Release: (EE to verify)
5. Submit a written statement with the bid that the above design loads and the clearance requirements shown on the Architectural drawings are acceptable for the proposed equipment. If not, specifically state the design variances.
6. After the award, if the type of equipment provided requires structure, mechanical and electrical system changes and/or revisions, the Elevator Contractor shall be responsible for all additional design and construction costs.
7. Electrical equipment, motors, controllers, etc., installed under this contract shall have necessary CSA/US or UL listing as may be required by the AHJ. Equipment shall be labeled or tagged accordingly.

#### 1.4 DELIVERY / STORAGE / HANDLING / COORDINATION

##### A. Delivery and Storage of Material and Tools

1. Comply with the requirements of Division 01.
2. Delivery, Storage and Handling:
  - a. Deliver materials to the site ready for use in the accepted manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name. Delivered materials shall be identical to accepted samples.
  - b. Store materials under cover in a dry and clean location, off the ground.
  - c. Remove delivered materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
3. The Owner shall bear no responsibility for the materials, equipment or tools of the Contractor and shall not be liable for any loss thereof or damage thereto.
4. The Contractor shall confine storage of materials on the job site to the limits and locations designated by the Owner and shall not unnecessarily encumber the premises or overload any portion with materials to a greater extent than the structural design load of the Facility.

##### B. Work with Other Trades / Coordination

1. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are embedded in concrete or masonry for the applicable equipment. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
2. Coordinate sequence of installation with other work to avoid delaying the Work.
3. Coordinate locations and dimensions of other work relating to the equipment scheduled for installation including pit ladders, sumps, and floor drains in pits; entrance subsills; machine beams; and electrical service, electrical outlets, lights, and switches in pits and machine rooms, secondary levels, overhead sheave rooms and hoistways as it relates to the specific equipment.

##### C. Removal of Rubbish and Existing Equipment

1. On a scheduled basis, the Contractor shall remove all rubbish generated in performing work specified in the Contract Documents from the job site.
2. Any component of the existing elevator plant that is not reused under the scope of work specified in the Contract Documents shall become property of the Contractor and, as such, shall be removed from the premises at the Contractor's sole expense.
3. The Contractor agrees to dispose of the aforementioned equipment and rubbish in accordance with any and all applicable Federal, State, and municipal environmental regulations, and further accepts all liability that may result from handling and/or disposing of said material.

D. Protection of Work and Property

1. The Contractor shall continuously maintain adequate protection of all their work from damage and shall protect the Owner's property from injury or loss arising out of this contract.
2. The Contractor shall make good any such damages, injury or loss, except such as may be directly caused by agents or employees of the Owner.
3. The Contractor shall provide all barricades required to protect open hoistways or shafts per OSHA regulations. Such protection shall include any necessary guards or other barricades for employee protections during and after the modernization procedure.

1.5 RELATED WORK

A. Work by Elevator Contractor Included in the Base Bid

1. The following requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.
  - a. Provide hoist rope guards at the car and counterweight drop side of the hoisting machine sheave to prevent accidental contact with the hoisting ropes. The guard shall extend from the point where the hoisting ropes penetrate the machine room floor slab to a point beyond where the ropes contact the traction and deflector sheaves. The guards shall be constructed so as to conceal pinch-points between ropes and sheave grooves.
  - b. The top surface of any setback or projection in the hoistway that measures 2" or more in width shall be beveled at an angle of not less than seventy-five (75) degrees from horizontal. Each bevel plate shall be constructed from prime painted 14-gauge cold-rolled steel and installed so as to conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
  - c. Provide the following signage, plates and tags:
    - 1) Provide each walk-in pit entrance door with a sign reading "Danger Elevator Pit" or the equivalent thereof. Letters shall be not less than 2" high.
    - 2) In addition to (1) above, walk-in pits with pit door stop switches shall be provided with a sign that reads "WARNING – Opening the Pit Door Will Stop the Elevator".
    - 3) Provide access doors to each electrical control room, secondary or machinery space with signs that read "ELEVATOR MACHINE ROOM". Letters shall be not less than 2" high.

- 4) Provide all required manufacturer data plates and installation-specific tags and signs of the types and styles containing information as required by applicable Codes and Standards as adopted and/or modified by the AHJ.
- d. Provide a standard railing conforming to Code on the outside perimeter of the car top on all sides where the perpendicular distance between the edges of the car top and the adjacent hoistway enclosure exceeds 300 mm (12 in.) horizontal clearance or as otherwise required by the Authority Having Jurisdiction.
- e. Provide necessary patching, repairing and installation of masonry and/or dry wall for smooth and legal elevator hoistways.
- f. Provide any required repair of smoke holes with subway grating covers in the machine rooms and/or secondary levels where applicable. All smoke ventilation provisions, including duct work, dampers, fans, fire control interfaces, in accordance with local codes, shall be reviewed for proper operation.
- g. Provide a smoke detector and/or smoke detector alarm system meeting the requirements of A17.1 and/or the Local Governing Authority as may be further specified.
- h. Subsequent to the contract execution, the Contractor shall perform the following procedures and engineering tasks relative to balance loading of system and cab work included under base specification requirements and alternative/optional upgrades:
  - 1) Perform balance load testing to determine existing conditions and requirements applicable to new/modified equipment.
  - 2) Provide data for Purchaser and/or their agents to evaluate any limitations that may be placed on design/finish options due to prevailing conditions or total suspended loading.
- i. Subsequent to the contract execution, the Contractor shall perform a Violation search and review of all open Applications in conjunction with the filing procedure. Subsequently, any and all outstanding Violations and/or open Applications shall be indicated on the Request for Permit; and such outstanding Violations shall be expunged, and open Applications closed out as part of this filing procedure.
  - 1) If requirements and/or work necessary to satisfy outstanding Violation or Applications are not included in the contracted scope of work, the Elevator Contractor shall prepare an itemized listing with relative extra costs to cure the condition(s) and expunge and/or close out the Violation or Application for the Owners' and Consultants' review/approval prior to executing such work procedures.

B. Work by Others

1. The following requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.
  - a. Installation of new main line power feed with related disconnect switch designed and located per local law requirements.
  - b. Provide remote/auxiliary disconnects where new or existing disconnect switches are not in line-of-sight of the controller.

- c. Installation of auxiliary power feed with related distribution panel(s) and disconnect(s) designed and located per local law requirements.
  - 1) Voltage shall be 110 VAC with one (1) 15-Amp circuit breaker or fuse for lighting of each individual elevator car enclosure.
  - 2) Circuit breakers and/or fused disconnects shall be lockable in the “OFF” position in accordance with applicable code.
- d. The top surface of any setback or projection in the hoistway that measures 2” or more in width shall be beveled at an angle of not less than seventy-five (75) degrees from horizontal, constructed from prime painted 14 gauge cold-rolled steel and installed so as to conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
- e. Installation of new permanent dual lamp LED lighting fixtures with protective guards and 110-volt duplex GFI receptacles inside the machine room. Illumination shall be no less than thirty (30) foot-candles at floor level. A light control switch shall be provided immediately adjacent to the machine room entrance door. Provide necessary receptacles as required by Elevator Contractor to supply power to auxiliary elevator equipment and/or remotely located monitors.
- f. Provide machinery spaces of the secondary level directly below the machine room with permanent dual lamp LED lighting fixtures having protective guards and a duplex GFI receptacle. Illumination shall be no less than nineteen (19) foot-candles at floor level. A light control switch shall be provided immediately adjacent to the secondary level entrance door/ladder in accordance with code.
- g. Provide each elevator pit with a 110-volt GFI duplex receptacle and a permanent dual lamp LED lighting fixture equipped with protective guard. Illumination shall be no less than ten (10) foot-candles at pit floor level. A light control switch shall be provided and so positioned as to be readily accessible from the pit entrance door or ladder.
- h. Installation of hoistway and machine room smoke relief provisions in accordance with local laws.
- i. Provide each machine room, secondary space and pit with a self-closing, self-locking, fire-labeled access door. Locking means shall be spring-type arranged to permit the doors to be opened from the inside without a key.
- j. Provide a smoke detector system meeting the requirements of A17.1 and/or the Local Governing Authority.
- k. Installation of fire emergency control interface provisions for automatic recall of the elevator(s) through operation of the fire detection system. Provisions shall be made for alternate designated fire recall landing with connection contingent on Codes recognized by the local governing authority. The interfacing contacts shall be wired to an electrical junction box located inside each elevator machine room for connection to the elevator control systems by the Elevator Contractor. Each wire shall be clearly labeled with its control function. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.
- l. Installation of new or modification of existing fire emergency control interface provisions for automatic recall of the elevator(s) through operation of the fire detection system. Provisions shall be made for primary, alternate and third-zone (Fire-Hat) designated fire recall landing with connection contingent on Codes recognized by the local governing authority. The interfacing contacts shall be wired to an electrical junction box located inside each elevator machine room for

connection to the elevator control systems by the Elevator Contractor. Each wire shall be clearly labeled with its control function. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.

- 1) Installation of heat / smoke detecting devices in the elevator machine room, elevator lobbies, top of shaft and / or pit as required for elevator fire recall operation to meet current requirements of A17.1 and/or the local Governing Authority. Connection and programming of these new devices to existing building fire alarm control panel.
  - 2) Modification of existing fire alarm control panel and interface / wiring to panel as required to accommodate new heat / smoke detecting devices or new elevator fire recall zones, including installation of expansion panel and new power supply(s) (if required) to existing FACP.
  - 3) Software modifications as required to the existing fire alarm control panel as required to accommodate new smoke / heat detecting devices, new elevator fire recall zones, or expansion panel (if required).
  - 4) All wiring, piping, coring, cutting, patching, as required for new ducts / conduits to connect new or modified components of the fire alarm control system to operate elevator fire recall to meet current requirements of ASME A.17.1 and/or the local Governing Authority.
- m. Where sprinkler fire protective systems are provided inside any elevator hoistway, machine room or associated machinery space, provisions shall be made for the disconnecting of the main line power supply from the affected elevator prior to activation. This means of disconnect shall be manually reset in accordance with code.
- n. Installation of emergency power control interface provisions to signal the elevator control apparatus of a transfer from normal (utility) power to the building emergency (generator) power supply. Also, provide additional control interface to give advanced notification to the elevator control apparatus that the power source will transfer from emergency (generator) power to normal (utility) power. Interfacing contacts shall be wired to an electrical junction box located inside each machine room for connection to the elevator control equipment by the Elevator Contractor. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.
- 1) On the line side of each main line disconnect switch, provide some means to absorb power that may be regenerated by the elevator hoist motor during emergency power operation.
  - 2) Normal Power/Emergency Power Control Signals consisting of two (2) dry contacts provided by others to function as follows:
    - a) One (1) dry contact normally open to make when Normal Power is available. (Logic state of dry contact is to be confirmed by the Manufacturer of the Elevator Control Equipment).
    - b) One (1) dry contact normally open to make when emergency power is available. (Logic state of dry contact is to be confirmed by the Manufacturer of the Elevator Control Equipment).

- o. Installation of HVAC provisions inside the machine room so as to maintain ambient temperature and humidity levels that are within the range specified by the microprocessor-control equipment manufacturers.
- p. Provide a class “ABC” fire extinguisher in electrical machinery and control spaces. Locate the extinguisher in close proximity to the access door.
- q. Provide necessary telephone wiring with connection to local telephone service for remote elevator monitoring and/or two-way voice emergency communications systems.
  - 1) Terminate the telephone wiring in junction boxes or standard phone jack terminals in the machine room.
  - 2) Coordinate the quantity and termination method of individual phone connections with the Elevator Contractor.
  - 3) Identify each phone line for connection by the Elevator Contractor to the appropriate elevator device(s).
  - 4) Telephone wiring, where required by applicable codes, shall be installed in conduit.
- r. Sumps in pits where provided, shall be covered. The cover shall be level with the pit floor so as not to produce a tripping hazard.
- s. Where the pit extends more than three (3) feet below the sill of the pit access door, provide a permanent fixed metal ladder.
  - 1) Ladder shall extend no less than 48” above the sill of the access door. Handgrips shall extend from the ladder to a point no less than 48” above the sill of the access door where the ladder does not comply.
  - 2) The rungs shall be a minimum of 12” wide. Where prevailing conditions prevent a 12” wide rung, the rung may be reduced to no less than 9”.
  - 3) The rungs shall be spaced 12” on center.
  - 4) A clear distance of no less than 4-½” from the centerline of the rungs and handgrips to the nearest permanent object in back of the ladder shall be provided.
- t. Provide Ethernet connection terminals in elevator machine rooms and location of elevator monitoring system.

## 1.6 WARRANTY / MAINTENANCE SERVICES

### A. Contract Close-Out, Guarantee and Warranties

- 1. The Contractor agrees to certify that work performed in accordance with the Contract Documents shall remain free of defects in materials and quality of work for a period of one (1) year after final acceptance of the completed project, or acceptance thereof by beneficial use on a unit-by-unit basis, whichever occurs first.
- 2. The sole duty of the Contractor under this warranty is to correct any non-conformance or defect and all damages caused by such defect without any additional cost to the Owner and within fifteen (15) days of notification.
- 3. The express warranty contained herein is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.

4. In the event the Contractor fails to fulfill its obligations defined herein, the Owner shall have the express right to perform the Contractor's obligations and to charge the Contractor the cost of such performance or deduct an equal amount from any monies due the Contractor.

B. Maintenance Coverage

1. The following maintenance coverage apply:

a. Interim Maintenance

- 1) Provide full protective maintenance services and equipment coverage for one (1) prior to the commencement of work, and during the work implementation procedure, until final acceptance of the finished project.
- 2) Interim full comprehensive maintenance services shall be provided in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.
- 3) Costs related to interim maintenance shall be included in the base bid quotation indicated on the bid form provided with a deduction for unit(s) out of service for upgrading.

b. Guarantee Maintenance

- 1) Provide full comprehensive preventative maintenance services for a period of twelve (12) months after the final completion and acceptance of the project.
- 2) Guarantee maintenance and related services shall be provided in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.
- 3) Costs related to guarantee maintenance shall be included in the base bid quotation indicated on the bid form in the space provided.

c. Long-Term Maintenance

- 1) Long-term full comprehensive maintenance and related services shall be returned to the incumbent provider in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.

1.7 AUXILIARY SYSTEMS / TESTING PROCEDURES

A. Smoke Detector System (New)

1. The Elevator Contractor shall provide a complete smoke detector system for elevator recall to comply with the governing authority's requirements and ASME A17.1 as approved or modified under local law.
  - a. Smoke detectors shall be installed in the elevator lobby at each floor, top of hoistway, in pit areas, and associated elevator machine room in accordance with

NFPA and/or other applicable codes and standards of the authority having jurisdiction.

- b. The activation of a smoke detector in any elevator lobby or associated elevator machine room other than the designated level (1st Floor) shall cause all cars in all groups that serve that lobby to return non-stop to the designated level (1st Floor).
- c. The activation of a smoke detector at the designated level (1st Floor) shall cause the cars to return to an alternate level as required and/or allowed by applicable code unless the Phase I key-operated switch is in the "firemen service" position.
- d. Smoke detectors and/or smoke detector system shall not be self-resetting.
- e. Elevator Recall System shall incorporate a minimum number of zones as follows:
  - 1) Zone 1, First Floor
  - 2) Zone 2, Alternate Floor
  - 3) Zone 3, Machine Room
  - 4) Zone 4, Top of Shaftway
  - 5) Zone 5, Pit
  - 6) Zone 6, Spare
  - 7) Zone 7 to All Typical Landings serviced
- f. The system shall be independent of the existing building systems and shall contain the following:
  - 1) Modular LED control panel/annunciator, located at the 1st Floor Lobby in a specially designed tamperproof station, shall be custom designed for each individual system and location.
  - 2) Smoke detectors shall be photoelectric type or approved equal.
  - 3) Primary power supply shall be provided by Elevator Contractor.
  - 4) Minimum twenty-four (24) hour emergency power failure battery back-up with automatic recharging apparatus and signal status indicators.
- g. Elevator Contractor shall provide all wiring, conduit and make final connections. Conduit may run in elevator hoistway as part of elevator control signal systems provided such circuitry is installed per local code requirements.

## 1.8 ALTERNATES AND VALUE ENGINEERING:

The following alternatives are elective upgrades which constitute changes to the base scope of work specified. Pricing for each alternate upgrade is requested from the bidder with costs indicated in the appropriate space in the Request for Proposal (RFP). Contractor shall take into consideration, as part of the alternative pricing, alternate work that is required either in lieu of, or in addition to, work specified in the base scope and shall not duplicate costs.

### A. Contractor's Value Engineering Options

- 1. This alternative is provided for individual contractors to propose optional equipment or otherwise offer cost saving suggestions that will provide the same desired results or further enhance the safety, durability or performance of the elevator systems.
- 2. Each suggestion must be fully detailed on the contractor's own letterhead with the associated price change specified on the form of proposal provided.

## PART 2 - PRODUCTS

### 2.1 GENERAL DESCRIPTION

### 2.2 Traction Elevator

#### A. WSU 450 W. Palmer, Detroit, MI 48202 US - Traction Elevator PE3/PE4

1.	Quantity	Two (2)
2.	Type	Traction Elevator Passenger
3.	Capacity (lbs)	2000
4.	Speed (fpm)	200
5.	Travel in Feet	Existing
a.	Roping\Hoisting	New
b.	Roping\Governor	New
c.	Roping\Compensating	Not Applicable
d.	Roping\Ropes	1:1
6.	Compensation Sheave	Not Applicable
7.	Compensation	
a.	Compensation Ropes	Not Applicable
b.	Compensation Chains	Not Applicable
8.	Number of Landings	Six (6)
9.	Number of Openings	Six (6)
10.	Front Openings	Six (6)
11.	Rear Openings	None (0)
12.	Side Openings	None (0)
13.	Operation	Automatic Group Duplex / Selective Collective Operation
14.	Controller	Control Equipment (New)
15.	Firemen's Service	General
16.	Machine Room, Secondary, Pit Lighting, and GFI	(New)
17.	Machine Type	Geared
18.	Power Drive	VVVF AC Motor Drive (Base Section)
19.	Machine Location	Basement
20.	Governor	New
21.	Car Platform / Frame / Safety	Car Frame (Reuse); Car Platform (Reuse)
22.	Counterweight	Counterweight Assembly (Reuse)
23.	Counterweight Safety	N/A
24.	Guide Rails	Reuse
25.	Guides	Roller Guides (Reuse)
26.	Buffers	Car and Counterweight Buffers (New)
27.	Buffer Ladder / Platform	Not Applicable
28.	Car Door Type	
a.	Front Door	Single Speed Center Opening
b.	Rear Door	N/A
c.	Side Door	N/A
29.	Car Door Size	

a.	Front Door	36" wide x 84" height
b.	Rear Door	N/A
c.	Side Door	N/A
30.	Hoistway Door Type	Single Speed Center Opening
31.	Hoistway Door Size	36" wide x 84" height
32.	Master Door Operator	Car Door Zone Lock Restrictor (New)
33.	Hoistway Entrance Sills	Reuse
34.	Sill Finish	Aluminum
35.	Hoistway Entrances	Reuse
36.	Tracks / Hangers / Interlocks / Closers	Interlocks / Unlocking Devices (New)
37.	Emergency Access Doors	N/A
38.	Emergency Exits / Top and Side	New
39.	Keyed Access	Not Applicable
40.	Pit Ladder	Not Applicable
41.	Power Supply	480V-3-60 (Field verify)
42.	Electrical Conduit / Wiring / Traveling	New
43.	CCTV	New
44.	Card Reader	New
45.	Floor Lockout Feature	Not Applicable
46.	Number of Push Button Risers	One (1)
47.	Inconspicuous Riser	None (0)
48.	Car Operating Fixtures	New
49.	Emergency Communication	New
50.	Door Reopening Device	Door Reopening Device (New)
51.	Emergency Cab Lighting	New - incorporated into ceiling
52.	Car Ventilation	New
53.	Elevator Cab Enclosure	Remodel
54.	Car Doors / Gate Panels	Car Door Panel(s) (New)
55.	Car Flooring	New
56.	Car Sill	New
57.	Platform Size	Reuse (field verify)
58.	Door Operation	Power Car / Slide Hoistway
59.	Emergency Access Doors	New
60.	Intercom / Central Exchange	New

## 2.3 MANUFACTURERS

### A. Pre-Approved Equipment Manufacturers

1. The following manufacturer's equipment and materials have been pre-approved by Wayne State University for use on all their traction and hydraulic elevator modernization project.
2. Other equipment not specifically mentioned shall be considered for approval on an individual basis.
  - a. Controller - GAL (GALaxy), Elevator Controls Corporation, Smartrise
  - b. Tracks, Hangers, Interlocks and Door Operators - G.A.L., ECI.
  - c. Fixtures - Innovation, PTL, MAD.
  - d. Door Protective Device - Janus, T.L. Jones, Tri-Tronics.

- e. Cabs and Entrances/Entrance Door Panels - Tyler, Velis, Gunderlin, Columbia Elevator Products, United Cabs.
  - f. Cab interiors refurbish/remodel – Architectural Metals, A better Elevator Co., Weir inc.
  - g. Machines - Hollister-Whitney, Titan, Imperial, Torin.
  - h. Motors - Imperial Electric, General Electric, Baldor, Reuland Electric.
  - i. SCR Power Drives - MagneTek, KEB, Nidec.
  - j. VVVF Power Drives - Mitsubishi, MagneTek, Yaskawa, TorqMax.
  - k. Guide Rails - AFD Industries, Savera, Monteferro.
  - l. Electrical Traveling Cables - Draka, James Monroe.
  - m. Hydraulic Systems/Components - Canton, Elevator Equipment Corporation, MEI, Schumacher.
  - n. Freight Doors and Systems - Courion, EMS Group, Peelle.
  - o. Guide Shoes/Rollers – ELSCO, G.A.L.
  - p. Wire Ropes - Paulsen, Bethlehem, Wayland, Draka.
  - q. Intercommunications/Telephones -K-Tec, Rath Microtec, Wurtec, Janus, Kings three.
  - r. Compensation Chains - Draka
  - s. Compensation Chain Guides - Draka
  - t. All specialized tools, equipment, software, and passwords, required to maintain, repair, adjust the operation, and perform code mandated inspections are provided to the Owner as part of the base installation.
- 1) Updates to these items shall be available via the parts supply facility referenced above.
- u. Technical support of the product(s) shall be available to the Owner’s elevator service provider.

3. Original Equipment Manufacturers are not accepted.

## 2.4 CONTROL FEATURES / OPERATION (New)

### A. Cross Cancellation (New)

- 1. A temporary dispatch signal control interface shall be provided during the interim modernization period between the existing dispatching control panel and the new microprocessor supervisory control system.
- 2. The overlay interface shall allow either system to cross cancel corridor calls registered in both systems and maintain an acceptable level of group dispatching operations.
- 3. The existing equipment that is retained on a temporary basis shall undergo a complete maintenance restoration to ensure improved reliability and performance during the primary work implementation period.

### B. Cross Registration (New)

- 1. In conjunction with the installation of the first new controller, the new dispatcher shall be installed and interfaced with the existing dispatcher to allow controlled cross registration of hall calls in both systems.

- a. The existing temporary apparatus that is retained shall undergo a complete preventive maintenance restoration to ensure improved reliability and performance during the primary work period.
2. Registered hall calls shall be immediately registered in the new dispatcher and assigned to the modernized elevator(s) for response.
  - a. The new dispatcher shall continuously calculate the ETA (Estimated Time of Arrival) of the modernized elevator(s) response to the registered calls.
  - b. Should the calculated ETA exceed the pre-determined time limit, (field adjustable from 0 to 199 seconds), the registered calls with excessive wait times shall be transferred from the new dispatcher to the original dispatcher for assignment to the existing elevator(s).
  - c. Registered hall calls assigned to the original dispatcher shall be returned to the new dispatcher should excessive wait times occur in the original system.
  - d. Hall call demands shall not be dumped, deleted or ignored for any long-hall call scenario in either the new or old dispatching systems.
3. Initial long-wait timer values shall be adjusted at a low setting when less than thirty-three percent (33%) of the total group is modernized and shall be increased as additional modernized elevators are added to the group.
4. Timer values shall be manipulated to achieve the best group performance based on the ratio of both modernized and existing elevators.

C. Motion Control (New)

1. Smooth stepless acceleration and deceleration of the elevator car shall be provided in either direction of travel during both single and multiple floor runs.
2. Use digital logic to calculate optimum acceleration and deceleration patterns during each run.
3. Acceleration, deceleration, jerk, maximum velocity, leveling accuracy and elapsed flight time, for a typical elevator one (1) floor run, shall not exceed values as further specified.

D. Automatic Group Duplex / Selective Collective Operation (New)

1. Provide duplex selective collective operation with the two (2) cars arranged to operate from a single riser of hall push buttons.
2. When there is no demand for elevator service, park one car at the Lobby Floor and the other shall be a "free car", parking at the floor last served.
  - a. Park both cars with doors closed.
  - b. The "free car" shall normally respond to any registered hall call except:
    - 1) A hall call registered at the Lobby Floor shall be answered by the car parked at the Lobby Floor.
    - 2) A hall call registered below the Lobby Floor shall be answered by the car parked at the Lobby Floor.

3. When the car parked at the Lobby Floor responds to a registered call for a floor above the Lobby Floor, the "free car" shall be dispatched automatically to the Lobby Floor and shall become the assigned Lobby Floor parking car.
4. When the "free car" is responding to registered calls, the Lobby Floor parking car shall automatically dispatch from the Lobby Floor under any of the following conditions:
  - a. Registration of hall call below the "free car" while it is traveling in the up direction.
  - b. Registration of hall call above the "free car" while it is traveling in the down direction.
  - c. Inability of the "free car" to move in response to a registered hall call within a predetermined time.
5. When both cars are responding to registered car and hall calls, the first car to complete its calls shall become the assigned Lobby Floor parking car and shall be dispatched automatically to the Lobby Floor.
6. If either car is removed from service, the other car shall respond to all registered hall calls and its own car calls.
7. When a car arrives at its last stop and reverses direction of travel, all previously registered car calls shall be automatically cancelled.
8. When a car has responded to the highest or lowest call, and hall calls are registered for the opposite direction, the car shall reverse direction automatically and respond to those registered calls.
9. When a car arrives at a landing where both up and down hall calls are registered, it will answer the call in the direction of travel.
  - a. If no car call is registered, the car shall be assigned to respond to call registered for the opposite direction. The car doors shall immediately close and re-open to respond to the call in the opposite direction.
  - b. Hall lantern operation shall always correspond to direction of service.
10. When an empty car reverses direction at a landing with no hall calls, the doors shall not open, and the hall lantern shall not operate.
11. If a car has no car calls registered and arrives at a floor where both up and down hall calls have been registered, the car shall respond to the hall call corresponding to the direction of car travel.
12. If, after making its stop, a car call is not registered and no other hall calls exist ahead of the car corresponding to its original direction of travel, the doors shall close and immediately reopen in response to the hall call for the opposite direction.
13. The car shall maintain its original direction at each stop until the doors are fully closed to permit a passenger to register a car call before the car reverses its direction of travel.
14. In the event that any car is delayed for more than a predetermined time interval after it received a start signal, the system shall automatically permit the remaining car in the two-car group to respond to signals and be dispatched in the specified manner.
15. Coincident calls: The dispatching system shall be designed with a twenty (20) second parameter whereby an elevator with a car call will receive priority to answer a corresponding corridor call if it can do so within twenty (20) seconds. If it cannot answer the call within the prescribed time, the first available car shall be assigned. A continuous reassessment of calls shall be made, with the processor having the capability of reassessing five (5) times per second.

16. In the event the supervisory control system should malfunction so that neither elevator is assigned calls within a predetermined interval and in accordance with the conditions of the operating strategy in effect, the system shall automatically assume a back-up mode of operation whereby the elevators shall be arranged to provide continuous service to each landing in a predetermined pattern without regard to actual corridor call demands.

E. Independent Service Operation (New)

1. The car operating station shall be equipped with a key-operated switch labeled “IND SER”.
2. Locate the switch in the locked service compartment.
3. When placed in the “on” position the following shall occur:
  - a. Group elevator - the elevator shall bypass corridor calls and travel directly to any floor chosen by registration of a car call. Hall calls shall remain registered for service by another elevator in the group.
  - b. Simplex elevator - existing hall call registrations shall extinguish and hall buttons shall remain inoperative as an indication to passengers that there is no elevator service.
4. During Independent Service Operation, the elevator doors shall remain open at any landing until the door close or a car call push button is pressed and maintained until the doors are fully closed.
5. If more than one (1) car call is registered, all registered car calls shall extinguish when the elevator stops in response to the first call.
6. Fire Emergency Recall shall automatically override Independent Service Operation and engage Phase I - Fire Emergency Recall Operation following a period of approximately forty-five (45) seconds.

F. Inspection Service Operation (New)

1. Provide a key operated switch in the main car operating panel behind a locked service panel that, when turned to the ‘ON’ position, shall cause the elevator to be removed from service and placed in Inspection Service Operation.
2. Limited operation of the car shall be provided through pressing the Attendant Service up and down push buttons (if provided) or the highest or lowest car call push buttons (if up and down buttons are not provided) in the main car operating panel only.
3. The car shall move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with both the hall and car door panels in the closed and locked position.
4. The Inspection Service switch shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. The top of the elevator car shall be equipped with a control for limited operation of the car during repairs, maintenance and inspection conducted in the hoistway. The transfer of control to the top of car operating device shall cause that device to be the sole means of control for the elevator.
  - a. Visual and audible indication shall be provided on the top of the car when Firefighters’ Emergency Operation is initiated.

6. Power door operating equipment shall be rendered inoperative while the car is being operated in the Inspection Service mode with the exception of power closing of the door. The control system shall maintain closing power on the door while the elevator is moving under Inspection Service Operation.
7. The in-car Inspection Service switch shall be rendered ineffective when the top of car inspection control is activated.
8. Machine Room Inspection Operation and Inspection Operation with open door circuits shall be provided in accordance with A17.1 Safety Code, as modified and adopted, where required or allowed by the AHJ.

G. Hoistway Access Operation (New)

1. Provisions shall be made to allow access to the hoistway through the use of hoistway access switches.
2. Operating the access switch shall permit the car to move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with the hall and car doors in the open position to obtain access to the top of the car or climb-in pit.
3. The car shall automatically stop motion when the car top is level with the hoistway door sill for access to top of car.
4. The access key switch(es) shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. Access operation shall be disabled when top of car inspection operation is in effect.

H. Load Weighing Operation (New)

1. A positive means shall be provided to continuously monitor the amount of load being transported by the elevator car.
2. The system shall be used to:
  - a. Preload static motor drives.
  - b. Activate control features that include:
    - 1) anti-nuisance operation.
    - 2) load dispatch operation.
    - 3) load dependent non-stop operation where applicable.
3. The anti-nuisance feature shall operate at loads not exceeding 200 lbs., whereas load dispatch and load non-stop shall be set to function at sixty-five percent (65%) of the rated loading capacity for the initial set up and adjustment procedure.

I. Anti-Nuisance Operation (New)

1. In the event car loading is not commensurate with the number of car calls registered, all car calls shall be canceled.
  - a. The system shall monitor the door protection device to determine if passenger transfer has occurred.
  - b. If after the third (3<sup>rd</sup>) stop a passenger transfer has not occurred, the system shall cancel all remaining registered car calls and respond to assigned hall call demand.

- c. The number of calls registered with no passenger transfer that will trigger anti-nuisance shall be adjustable and initially set to three (3) calls.

J. Out-of-Service Control Operation (New)

1. Provide an unidentified key-operated switch, engraved with “ON” and “OFF” only, that shall remove the elevator from service when placed in the “ON” position and the car is not in motion. Locate the switch in the service cabinet of the car operating panel.
  - a. When the key-switch is turned to the “ON” position while the elevator is in motion, the car shall proceed to the next call and be removed from service after leveling operations are completed and the doors have opened.
  - b. When engaged, the Out-of-Service Control feature shall cause the car door to remain open and the car call buttons rendered inoperative.
  - c. The elevator shall not respond to hall call assignments from dispatching systems when the Out-of-Service Control feature is active.
2. Firefighters’ Emergency Operation shall override this feature.

K. Sequential Transformer Connection Operation (New)

1. Provide the means for controlling the sequence of connecting the motor drive step-up, step-down or isolation transformers to the main power feeders to minimize the cumulative effects of instantaneous half-cycle inrush currents.
  - a. Contactors shall be provided to connect the primary side of the transformer to the main line power feeders.
  - b. When power is applied to the main line feeder, an internal timer shall time the operation of the contactor.
    - 1) Timers within a group of elevators will be set such that there is a minimum of three (3) seconds between individual contactor operation.
  - c. The number of transformers that may be connected simultaneously is contingent on the power available from the building and overcurrent protective devices. Coordinate requirements with Building Management and/or Owner’s Representative.
  - d. Provisions for group-to-group sequencing shall be included in the base design of the sequential connection controllers where necessary.
    - 1) Timer settings between groups, powered by a common feeder, shall be set so that transformers are connected to the feeder one (1) at a time.
  - e. All elevator controls may be provided with Sequential Transformer Contactors, however, the minimum number of units required shall be equal to the total number of elevators on a single feeder minus one.

L. Firefighters’ Emergency Operation (New)

1. Firefighters Service Operation and devices shall meet applicable code requirements of the AHJ.
2. Contractor shall be responsible for compliance in all aspects of Firefighters Service including, but not limited to the mode of operation, initiation of operation, operating control and signaling devices as well as fixture engraving including operating instructions applicable to and where required by the AHJ.

M. Door Operation (New)

1. Car and hoistway doors shall be arranged to operate in unison without excessive noise or slamming in either direction of travel.
  - a. Door opening speeds of two (2) feet per second shall be provided in conjunction with closing speeds of one (1) foot per second in accordance with governing code.
  - b. Door operation shall commence as the car stops level at the floor and the machine brake is applied. Pre-door opening shall not be permitted.
2. Where the hoistway door and the car door are mechanically coupled, the kinetic energy of the closing door system shall be based upon the sum of the hoistway and the car door weights, as well as all parts rigidly connected thereto, including the rotational inertia effects of the door operator and the connecting transmission to the door panels.
3. The force necessary to prevent closing of the car and hoistway door from rest shall not exceed thirty (30) lbf. This force shall be measured on the leading edge of the door with the door at any point between one-third and two-thirds of its travel.
4. Door open and door close time shall be measured between the moment car door operation in either direction begins and the instant at which that cycle is completed.
5. When responding to either a car or corridor call, the amount of time that the elevator door remains stationary in the open position shall be adjustable up to sixty (60) seconds.
  - a. Door open dwell time for a corridor call shall be separate of that for a car call, and in both cases, dwell time shall be canceled whenever the car door protection device is momentarily interrupted by passenger transfers, followed by a reduced door open dwell time of approximately one (1) second (adjustable) after the door protection device is cleared of obstructions.
6. The operation of the door protective device by interruption of one or more infrared light beams (dual or multi-beam non-contact) during the close cycle shall cause the immediate reversing of the doors to the full open position.
7. The door closing cycle shall be arranged so that, in the event the door protective devices become continually obstructed after the normal door open dwell time has expired and following a time interval of approximately thirty (30) seconds (adjustable), a warning tone shall sound and the door closing cycle shall commence at reduced speed and torque per applicable Code requirements.
8. Each car operating station shall be provided with a “door open” and “door close” push button.
  - a. Pressure on the “door open” button shall cause doors in the full open position to remain so, and doors engaged in the close cycle to reverse direction and assume the full open position so long as pressure remains applied to the button.

- b. The “door open” buttons shall also control the open cycle during Phase II - Emergency In-car Operation.
  - c. The “door close” push button shall function on Independent Service, Attendant Service and Phase II - Emergency In-car Operation as well as during normal automatic operations.
- 9. Repeated attempts by the power door operator to open or close the door at any landing shall be monitored by the control system.
  - a. In the event the door fails to cycle properly after a preset (adjustable) number of attempts, the car shall either travel to the next stop or remove itself from service, depending upon whether the malfunction is in the open or close cycle.
- 10. Each hoistway door shall be provided with an automatic self-closing mechanism arranged so that the door shall close and lock if the car should leave the landing while the hoistway door is unlocked.
- 11. Car doors shall be arranged to prevent their being manually opened from inside the car unless the elevator is positioned within a floor landing zone.

## 2.5 MACHINE ROOM / SECONDARY EQUIPMENT (New)

### A. Control Equipment (New)

- 1. Provide a microprocessor-based elevator control system.
- 2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.
- 3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
- 4. System operating software shall be stored in non-volatile memory.
  - a. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, circuit boards, static motor drive units, wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.
  - b. The motor drive may be located in its own cabinet where the physical size of the drive prohibits installation within the elevator signal controller cabinet.
  - c. Mechanical ventilation of the cabinet shall be provided and shall be adequate to dispose of the full load heat losses without exceeding 40° C (104° F) ambient temperature.
    - 1) Control equipment cabinets shall be provided with forced air ventilation to prevent overheating of the electrical components housed therein.
  - d. All electrical wiring inside the control equipment cabinet shall be performed in a neat manner with field wiring terminated at stud blocks provided inside the control cabinet.
  - e. Each wiring terminal shall be clearly identified according to the nomenclature used on the “as built” wiring diagrams. No more than two (2) field wires may be connected to any single terminal stud.

- f. Spare wires shall be tagged according to their point of termination, bundled, and placed at the bottom of the control equipment cabinet.
- g. Each electrical component within the cabinet shall be permanently identified with symbols identical to those used on the “as-built” wiring diagrams.
- h. A data plate that indicates the edition of the Code in effect at the time of installation and/or alteration shall be provided in accordance with applicable code and requirements of ASME A17.1 Code. The data plate shall be in plain view and securely attached on the mainline disconnect or on the controller.
- i. Control equipment shall comply with requirements of all applicable Sections of the ASME A17.1 Code as approved and adopted by the AHJ.
- j. The manufacturer’s standard on-board “LCD” display shall be incorporated on the main processor board and/or otherwise incorporated in the controller cabinet. The “LCD” shall be capable of providing alpha-numeric characters to view the operational status of the elevator and/or group functions depending on the application. The display shall provide the user with necessary information for troubleshooting and reprogramming of the basic system parameters.
  - 1) Where the “LCD” is not an integral part of the controller and troubleshooting/reprogramming requires the use of a separate tool, the tool shall be maintained in the machine room and accessible to service personnel. This tool, along with all technical documentation for the correct use of the tool, shall remain the property of the Owner.
  - 2) Password protection of critical programming features is required to prevent accidental changes to life-safety and other non-typical control settings.
  - 3) Where a separate dispatch or group control panel is provided, a separate “LCD” display shall be provided to view group functions.

**B. Machine Beams (Existing)**

- 1. Provide additional support beams, angles, plates, bearing plates, blocking steel members, etc., to support new machine, governors, dead end hitches, deflector and overhead sheaves from existing machine beams where applicable.
- 2. Contractor shall verify adequacy of all existing supports scheduled to be reused and report any potential issues to the Owner.

**C. Geared Traction Machine / Sheaves / Brake (New)**

- 1. Provide a worm-gear traction machine with a direct current brake and demountable drive sheave, mounted in proper alignment on a common bedplate.
- 2. The worm shall be accurately machined from steel and provided with a single end, double race ball bearing thrust.
- 3. The worm gear shall be made from a phosphor bronze rim, accurately cut, fitted and bolted to a cast iron spider.
- 4. The drive sheave shall be a demountable casting from the best grade of metal with a Brinell hardness of 215 to 230, and shall be machined with grooves, providing maximum traction with a minimum of rope and sheave wear.
  - a. Roping requirements and type of steel rope used as suspension means shall be engineered by the contractor and manufacturer of the equipment for maximum life of ropes and sheave.

5. Provide means for lubricating the machine.
6. The gear housing shall have a gasketed hole to inspect the gear.
7. Provide machine with an electro-mechanical brake.
  - a. The brake shall be spring applied and electrically released where drum or disk-type brakes are employed.
  - b. Design the brake electro-magnet for quick release and application of the brake.
  - c. The brake lining material shall be non-asbestos.
  - d. The brake pulley or disk shall act as the coupling between the drive motor shaft and the worm shaft.
8. Provide a raised machine arrangement so that the deflector sheave is located above the machine room slab. Provide adequate steel blocking members to support the machine assembly.
9. Provide sheave guards to prevent ropes from jumping off of the sheave grooves.
10. Provide hoist cable guards at the car and counterweight-drop side of the machine sheave.
  - a. Guards shall cover cables from the point of slab penetration to the point where the hoist cables contact the sheave.
  - b. Guards shall prevent access to cables at pinch points.
11. Provide hoisting machine based on passenger elevator cab enclosure weight as specified and as shown on the architectural drawings.

D. Deflector Sheave (New)

1. Provide overhead and/or hoisting machine wire rope deflector sheave(s) with related apparatus and structural mounting supports.
  - a. Locate and size new sheave to maximize use of available clearances maintaining the present car and counterweight hitch drops.
  - b. New support bearings shall be of a roller type designed for a minimum of twice the total load calculation.
  - c. The sheaves shall be equipped with suitable lubrication devices.
  - d. The deflector sheave shall be provided with means to guard the hoist ropes, so they do not jump out of their respective grooves during a slack rope condition.
  - e. Required new mounting beams and structural supports shall be interfaced with existing building structures as may be modified under the terms of this contract for the new design rated loading where applicable.

E. Machine Brake (New)

1. Provide an electro-mechanical brake.
  - a. Drum or disk-type brakes shall be spring applied and electrically released.
  - b. Design the brake electro-magnet for quick release and application of brake shoes.
  - c. Swivel type brake shoes shall be applied to the braking surface (pulley or disk).
  - d. The brake lining material shall be non-asbestos and shall be attached to two (2) cast iron shoes.

- e. The brake pulley or disk shall act as the coupling between the drive motor shaft and the worm shaft.
- 2. The brake shall be designed and adjusted to safely hold 125% of rated full load capacity in accordance with applicable code.

F. AC Drive Motor / Geared Applications (New)

- 1. Provide a vector duty, variable speed, reversible alternating current induction motor with high starting torque and low starting current, rated for 50° C (122° F) during continuous operation, designed for this particular elevator application with 210 starts per hour.
  - a. Provide adequate ventilation of internal stator windings and rotating element to prevent overheating. (Constant velocity fan for constant cooling.)
  - b. Provide thermal overload protection of the stator windings.
- 2. The hoist motor housing shall have a rigid cast iron stator frame.
  - a. Core plate stator laminations shall be press fit into frame and properly secured.
  - b. Minimum class “F” (or approved equal) insulation shall be used to ensure long-term reliability.
- 3. The rotating element shall be fabricated from drawn bars machined and fitted in slots with end rings brazed together and shall be dynamically balanced for vibration-free operation. The motor shaft shall be manufactured from high-strength alloy steel for maximum strength.
- 4. Provide a motor coupling machined for proper fit on motor shaft with slotted keyway and key to properly secure same for standard NEMA mounted construction (foot or footless).
- 5. Properly align the hoisting motor to the hoisting machine for vibration-free operation.
- 6. The motor shall have proper labeling in accordance with the requirements of the AHJ.

G. VVVF AC Drive (New)

- 1. Provide a solid-state, variable voltage, variable frequency (VVVF), 3-phase AC hoist motor drive system as part of the microprocessor-based equipment.
  - a. VVVF drive system shall be a low-noise, flux-vector inverter device.
  - b. Include a digital LED readout and touch-key pad to facilitate software parameter adjustments, monitor system operation and display fault codes.
- 2. The drive shall utilize a 3-phase, full wave rectifier and capacitor bank to provide direct current power for solid-state inversion.
- 3. The inverter shall utilize IGBT power semiconductors and duty cycle modulation fundamental frequency of not less than one kilohertz to synthesize 3-phase, variable voltage variable frequency output.
- 4. The system shall be designed and configured with the following countermeasures for noise generated by the pulse-width modulated (PWM) inverters.
  - a. Control of radiated noise via inverter and/or motor cables.
  - b. Conducted noise through power lines.

- c. Induction noise and ground noise.
- 5. Inverter shall be encased in metal and independently grounded.
- 6. A noise filter for the input power line shall be provided to prevent penetration into radios, wireless equipment and smoke detectors.
- 7. A three percent (3%) three-phase line reactor shall be provided on the power system rated at the utility voltage input to the drive and sized for the rated drive current.
- 8. The drive shall:
  - a. Be configured as a complete digital drive system.
  - b. Be totally software configurable.
  - c. Interface with external equipment/signals via either discrete local I/O connections or high-speed Local Area Network (LAN).
  - d. Be located within the limits of the control cabinet (where system size allows) or separately mounted in an appropriate chassis with hinged swing-out doors with clearances equal to the cabinet width dimensions.
  - e. Provide programmable linear or S-curve acceleration.
  - f. Provide free run or programmable linear or S-curve deceleration.
  - g. Have controlled reversing.
- 9. Operating and Environmental Conditions:
  - a. Have a service factor of one (1.0).
  - b. Rated for continuous duty.
  - c. Humidity – ninety percent (90%) rated humidity non-condensing.
  - d. Cooling - forced air when required.
  - e. Digital display for:
    - 1) Running - output frequency, motor RPM, output current, voltage.
    - 2) Setting - Parameters values for setup and review.
    - 3) Trip - separate message for each trip, last thirty (30) trips to be retained in memory.
- 10. Protective Features:
  - a. Motor overspeed.
  - b. Adjustable current limit.
  - c. Isolated control circuitry.
  - d. Digital display for fault conditions.
  - e. Selectable automatic restart at momentary power loss.
  - f. Manual restart.
  - g. Over/Under Voltage.
  - h. Line to line and line to ground faults.
  - i. Over-temperature.

#### H. VVVF AC Drive - Dynamic Braking Module (New)

- 1. Provide a separate dynamic braking module to control overhauling motor speed, reduce hoist motor deceleration time and dissipate regenerated power. The unit shall consist of:

- a. A resistor bank to absorb power regenerated by the hoist motor.
- b. A 3-phase AC contactor rated for proper HP with overload protection to disconnect the inverter from the hoist motor whenever the elevator is stopped.

I. Overspeed Governor (New)

1. Provide a speed governor, located overhead, to operate the car safety.
  - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
    - 1) Springs used to develop the tension are not acceptable.
  - b. Provide rope grip jaws, designed to clamp the governor rope to actuate the car safety upon a predetermined overspeed downward.
    - 1) The centrifugal type governor shall trip and set rope jaws within sixty (60) degrees of governor sheave rotation after reaching rated tripping speed.
  - c. Design the governor rope tripping device so that no appreciable damage to or deformation of the governor rope shall result from the stopping action of the device in operating the car safety.
  - d. Provide an electrical governor overspeed protective device which shall remove power from the driving machine motor and brake before or at the application of the safety.
    - 1) The setting for the overspeed switch shall be as prescribed in the ASME A17.1 Safety Code.
    - 2) Locate and enclose the switch to ensure that excess lubrication will not enter the switch enclosure.
    - 3) Overspeed switch shall operate in both direction of travel on systems employing a static power drive unit.
  - e. Seal and tag the governor with the running speed, tripping speed and date last tested.
  - f. Design the governor to prevent false tripping due to conditions caused by rope dynamics.

J. Equipment Isolation (New)

1. Provide sound reducing vibration isolation elements at all support points of elevator controller, solid-state motor drives, isolation transformers, reactance units, hoisting motors and machines.
2. The elements for controllers, solid-state motor drives and isolation transformers shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries, Type ND, with 0.35" static deflection under design load ratings.
3. Elements between the hoisting machine unitized base and machine support beams shall be similar to triple layer ribbed neoprene pads, separated by appropriate steel shims as manufactured by Mason Industries, Type W pads, at 50 durometer, loaded for 40 psi or approved equal.

4. All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.
5. Isolation of existing hoisting machine and motor is contingent on the OEM design of the apparatus.
  - a. Existing isolation pads shall be replaced with new.

K. Sequential Transformer Contactor / Controller (New)

1. Where step-up, step-down or isolation transformers are used, provide each elevator with an electrical disconnect panel located between the main line disconnect and the transformer.
2. The electrical disconnect panel shall have the following features:
  - a. A properly sized contactor to interrupt the main line wiring to the car transformer rated for a minimum of 500,000 operations.
  - b. An internal timer for contactor control adjustable from five (5) to thirty (30) seconds.
  - c. A push-activated emergency disconnect switch to deactivate the line contactor.
  - d. A timer bypass switch to manually bypass internal timer operation.
  - e. A jewel to indicate that the unit is active, and the contactor is engaged.
  - f. Terminals for external supervisory control to facilitate group to group sequencing as required.
3. Mount the components in a ventilated NEMA rated cabinet or in the controller.
4. Mount the sequence controller in close proximity to, or bundled with, the isolation transformer enclosure.
  - a. Where conditions allow, the contactor may be installed within the confines of the controller cabinet.
  - b. Timing and bypass circuitry shall be located within the cabinet and properly identified.

L. Overhead / and Governor Stop Switches (New)

1. Provide a positive action stop switch at the following locations as required by applicable code:
  - a. Overhead machine/sheave space.
  - b. Secondary level.
  - c. Overhead governor access panel or space as may be mandated by the AHJ.
2. The switch shall be arranged to prevent the application of power to the hoist motor and machine brake when placed in the “OFF” position.
  - a. Clearly identify the switch with permanent marking on the switch cover that indicates “RUN” and “STOP” positions.

M. Emergency Brake (New)

1. Ascending Car Overspeed Protection Device (New)

- a. Provide a device designed to prevent an ascending elevator from striking the hoistway overhead structure.
  - b. The device shall decelerate the car with any load up to the rated capacity by applying an emergency brake.
    - 1) The device shall detect an ascending car overspeed condition of not greater than ten percent (10%) higher than the speed that the car governor is set to trip.
    - 2) The device, when activated, shall prevent operation of the car until the device is manually reset.
    - 3) The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.
2. Unintended Car Movement Protection Device (New)
- a. Provide a device to prevent unintended car movement away from the landing when the car and hoistway doors are not closed and locked.
    - 1) The device shall prevent such movement in the event of failure of:
      - a) The electric driving machine motor.
      - b) The brake.
      - c) The machine shaft or shaft coupling.
      - d) Machine gearing.
      - e) Control system.
      - f) Any component upon which the speed of the car depends.
      - g) Suspension ropes and the drive sheave of the traction machine are excluded.
    - 2) The device shall prevent operation of the car until the device is manually reset.
    - 3) The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.
3. Where the installation of the Emergency Brake involves the raising of existing hoisting machines or modifications to the machine room slab, the contractor shall provide necessary engineering data, structural review and drawings as part of the submittal process.

N. Machine Room Guarding (New)

- 1. Elevator machine room equipment must be guarded as required by the Occupational Health and Safety Act.
- 2. The guarding must:
  - a. Meet the requirements of Occupational Health and Safety Act for Industrial Establishments - Machine Guarding and Maintenance and Repairs.
  - b. Include a Professional Engineer, with the expertise and knowledge of the Occupational Health and Safety Act.
    - 1) The Professional Engineer is to review each elevator machine room equipment guarding installed.

- c. Provide Health and Safety Review of the completed work for each elevator, signed and stamped by the Professional Engineer.
    - 1) The Health and Safety review must note the approval of the installed elevator machine room equipment guarding and certify compliance with the Occupational Health and Safety Act for Industrial Establishments.
  - d. If a Ministry of Labor inspector does not approve the machine guarding as originally installed and certified by the Professional Engineer, the Contractor shall make all necessary changes to comply with the Occupational and Safety Act at no additional charge.
  - e. Meet the requirements of ASME A17.1/CSA B44 - 07 - Safety Code for Elevators and Escalators.
3. Costs associated with this work shall be included in the base lump-sum modernization price.
- O. Hoisting Machine Brake Inspection Platforms and Ladders (New)
- 1. Provide platforms, grating, handrails, ladders and required accessories to service and maintain the hoisting machine brake assemblies where their height above the floor exceeds that mandated by the AHJ.
  - 2. The design, fabrication and installation shall be by the Elevator Contractor and shall be in compliance with all applicable Codes.
  - 3. Submit drawings showing details for the assembly for approval by the Owner and structural engineer.
  - 4. Apply two (2) coats of rust inhibiting paint to exposed ferrous metal surfaces.

## 2.6 HOISTWAY EQUIPMENT

### A. Guide Rails / Inserts / Brackets (Reuse)

- 1. Car and counterweight guide rails, fishplates, rail brackets, backing support and related attachments shall be inspected to determine if unfavorable conditions exist that diminish the structural integrity of any component.
  - a. In the event substandard conditions are disclosed by means of this inspection, the Contractor shall immediately inform the Consultant as to the exact nature of said problems and then undertake whatever repairs and/or replacements the Consultant may deem appropriate to remedy the situation.
- 2. Each stack of guide rails shall be individually examined to determine if excessive compression has occurred from building settlement.
  - a. In the event such conditions are found to exist, each affected stack shall be cut off enough to relieve pressure.
  - b. Jacking bolts shall be provided underneath each stack of both car and counterweight guide rails.

3. Each stack of guide rails shall be realigned so that total deviation from plumb in any direction does not exceed 1/8" over the entire length of the hoistway and that DBG measurements never vary more than .030".
4. As required, car guide rails joints shall be individually filled, filed and sanded in order to eliminate minor variations in adjoining machined surfaces.

**B. Counterweight Assembly (Reuse)**

1. The existing counterweight assembly shall be refurbished to as new condition and reused.
2. Individual counterweight frame members shall be inspected for any indication of damage and to determine if the overall assembly is twisted, racked, or otherwise distorted.
  - a. All fastenings between counterweight frame members shall be individually examined, tightened and if necessary renewed.
  - b. In case any of these conditions are found to exist, the Contractor shall immediately inform the Consultant about the exact nature of the problem and undertake whatever corrective action the Consultant may deem appropriate to remedy the situation.
3. The amount of filler weight placed within the counterweight frame shall be adjusted so the weight of the entire counterweight assembly is equal to that of the renovated elevator car, plus forty to forty-two percent (40-42%) of its rated loading capacity unless otherwise required by a manufacturer where new hoisting machinery is employed.
  - a. Filler weights shall be held securely in place at all times with tie rods passing through holes in both the weights and the counterweight frame with tie rods secured on each end with double lock nut and a cotter pin arrangement.

**C. Roller Guides (Reuse)**

1. The existing roller guide assemblies shall be retained and rebuilt for new.
  - a. Replace all worn rollers, bearings, shafts, pivot pins, tensioning devices, shock absorbers and adjustment hardware.
  - b. Realign guide stands to frame mountings.
  - c. Reset roller tensioning in conjunction with static balancing of the car enclosure after cab or other apparatus are installed.
  - d. Replace roller guide assemblies as necessary to meet the performance criteria specified herein.
2. Contractor may provide new roller guide assemblies, of equal or greater quality, in lieu of rebuilding the existing, as part of the base bid subject to the approval of the Consultant. Costs associated with replacement shall also be included in the base bid cost.

**D. Hoist Ropes (New)**

1. Pre-formed traction steel wire rope, specifically constructed for elevator applications, shall be provided for suspension of the elevator car and counterweight assembly.
  - a. Fastenings shall be accomplished by use of individual tapered rope sockets (wedge clamp) with adjustable shackles.

- b. General design requirements for rope shackles and the method of securing wire rope shall conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
  - 2. New ropes shall be identical in number and construction to those which are currently in use.
  - 3. Broken rope shackle springs shall be replaced on an as needed basis.
  - 4. New rope shackles shall be provided.
  - 5. Existing hitch plates shall be inspected for wear. Hitch plates with elongated holes or other conditions that may damage shackles shall be replaced with new.
  - 6. Provide anti-spinout as required by applicable code at all shackles where applicable.
- E. Governor Rope (New)
- 1. Pre-formed wire rope specifically constructed for elevator applications, shall be provided for governor ropes.
    - a. Rope shall be traction steel or iron in accordance with OEM design requirements.
    - b. Rope diameter and method of fastening shall be in accordance with ASME A17.1 Safety Code as adopted and/or otherwise modified by the AHJ.
- F. Electrical Conduit / Wiring / Traveling Cable (New)
- 1. Electrical wiring shall be provided.
    - a. All wiring shall be stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
    - b. Electrical wiring provided for hoistway interlock shall be of a flame-retardant type, capable of withstanding temperatures of at least 392 degrees Fahrenheit. Conductors shall be Type SF or equivalent.
    - c. Each run of electrical conduit or duct shall contain no less than ten percent (10%) spare wires and, in any case, no fewer than two (2) spare wires.
    - d. Crimp-on type wire terminals shall be used where possible.
  - 2. Traveling cable shall be provided.
    - a. Each traveling cable shall be provided with a flame- and water-resistant polyvinyl chloride jacket.
    - b. Electrical wiring shall consist of stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
    - c. Each traveling cable shall contain no less than ten percent (10%) spare wires.
    - d. Traveling cable exceeding 100' in length shall be provided with a steel wire rope support strand from which the cable shall be suspended.
    - e. Traveling cable must be contained within an approved electrical conduit to within 6' of the final suspension point in the hoistway.

- f. Each traveling cable shall be arranged to provide no fewer than six (6) individually shielded pairs of 20-gauge wire and arranged to contain no less than one (1) coaxial cable for CCTV remote monitoring.
  - g. Traveling cable conductors that terminate at a hoistway center box shall be connected to stud blocks provided for that purpose.
    - 1) Each wiring terminal shall be clearly identified by its nomenclature as shown on the "as built" wiring diagrams and solderless, crimp-on type wire terminals shall be used where possible.
  - h. The attachment of a traveling cable to the underside of the elevator car shall be performed so that a minimum loop diameter of thirty times (30x) the cable diameter is provided.
  - i. Pre-hang the cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting during operation.
3. Rigidly supported EMT conduit, flexible metal conduit and galvanized steel trough shall be utilized throughout the hoistway.
- a. Both EMT and flexible conduit shall be connected on either end by use of compression fittings and secured in place with metal clamps sized in accordance with the diameter of conduit utilized.
    - 1) Wire or plastic wire ty-raps shall not constitute an acceptable means of fastening.
  - b. The use of flexible metal conduit shall be limited to runs not greater than three feet (3') in length.
  - c. All abandoned or unused electrical conduit shall be removed from the hoistway.
  - d. Existing conduit and wiring duct may be reused if suitable for the application.
    - 1) Reuse of existing conduit/duct shall be at the discretion of the Consultant.

G. Normal and Final Terminal Stopping Devices (New)

- 1. Provide normal terminal stopping devices to stop the car automatically from any speed obtained under normal operation within the top and bottom overtravel, independent of the operating devices, final terminal stopping device and the buffers.
- 2. Provide final terminal stopping devices to stop the car and counterweight automatically from the speed specified within the top clearance and bottom overtravel.
- 3. The terminal stopping devices shall have rollers with rubber or other approved composition tread to provide silent operation when actuated by the cam fixed to the top of the car.
  - a. Terminal stopping devices that are not mechanically operated (i.e.: magnetic proximity) shall be provided by the manufacturer of the control equipment, intended for use as a terminal limit, and designed for reliable operation in the hoistway environment.
- 4. Final terminal limits shall be pinned so as to prevent movement after final adjustment where required by the AHJ.

#### H. Emergency Terminal Speed Limiting Device (New)

1. Provide necessary emergency terminal speed limiting devices where reduced stroke buffers are used.
  - a. Operation of the device shall be independent of the operation of the normal terminal stopping device.
  - b. Arrange the device to automatically reduce the car and counterweight speed by removing power from the driving machine motor and brake so that the rated striking speed of the buffer is not exceeded at the time of impact.
  - c. The sensing device shall be independent of the normal speed control system.
  - d. Short circuits caused by grounds or other conditions shall not prevent the operation of the device.

#### I. Emergency Terminal Stopping Device (New)

1. Provide necessary emergency terminal stopping devices where static motor control is used at speeds over 200 feet per minute.
  - a. Operation of the device shall be independent of the operation of the normal terminal stopping device.
  - b. Arrange the device to remove power from the driving machine motor and brake should the normal terminal stopping device fail to cause the car to slow down at the terminal as intended.

### 2.7 PIT EQUIPMENT

#### A. Car and Counterweight Buffer (Reuse)

1. Existing car and counterweight buffers shall be reused.
  - a. Pit channels, related supports and fastenings shall be inspected for damage and to determine if the structural integrity of any component is diminished by the effects of rust or other unfavorable conditions.
    - 1) In the event defects are found, the Contractor shall immediately inform the Consultant and undertake whatever repair and/or replacement the Consultant may deem appropriate.
  - b. Surface rust shall be removed from all reused components.
  - c. Where hydraulic buffers are used:
    - 1) Buffer plunger shall be honed free of all surface rust and blemishes and provided with a protective coating of machinist bluing.
    - 2) The hydraulic fluid reservoir on each buffer shall be drained, flushed and refilled with fresh oil. The grade and amount of fluid added to each buffer shall conform to O.E.M. specification.

- d. Provide a permanent buffer marking plate which indicates the manufacturer's name, identification number, rated impact speed and stroke.
- e. Provide a permanent data plate in the vicinity of the counterweight buffer indicating the maximum designed counterweight runby in accordance with ASME A17.1 as may be modified by, and/or in addition to codes and standards accepted by the AHJ.
- f. The buffer shall undergo testing in accordance with ASME A17.1 Code as modified by, and/or in addition to codes and standards accepted by the AHJ.

B. Governor Rope Tension Assembly (New)

- 1. Provide a governor rope tension assembly.
  - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
    - 1) Springs used to develop the tension are not acceptable.
  - b. The sheave shall be of proper diameter and set directly plumb with the governor rope drop to prevent the rope from pulling off of the sheave at an angle.
  - c. Lubrication fittings shall be provided on the assembly.
  - d. The assembly shall have necessary rope guards to prevent accidental contact of the rope/sheave by service personnel and to prevent the governor rope from jumping off of the sheave.

C. Pit Stop Switch (New)

- 1. Where pit depth does not exceed 67", each elevator pit shall be provided with a push/pull or toggle switch that is conspicuously designated "EMERGENCY STOP" and located so as to be readily accessible from the hoistway entrance on the lowest landing served at a height of approximately 18" above the floor.
  - a. This switch shall be arranged to prevent the application of power to the hoist motor and machine brake when placed in the "OFF" position.
- 2. Where climb-in pit depth exceeds 67", each pit shall be provided with two (2) push/pull or toggle switches conspicuously designated "EMERGENCY STOP".
  - a. Both of these stop switches shall be located immediately adjacent to the pit access ladder.
    - 1) Place one stop switch approximately 47" above the pit floor.
    - 2) Place the second stop switch 18" above the hoistway entrance sill on the lowest landing served.
    - 3) These switches shall be arranged so as to prevent the application of power to the hoist motor or machine brake when either one is placed in the "OFF" position.
- 3. Where a walk-in pit exists, each elevator shall be provided with a push/pull or toggle switch that is conspicuously numbered and designated "EMERGENCY STOP".

- a. The location of this stop switch shall be approximately 47” above the pit floor at the nearest point of pit entry from the access door.
  - b. This switch shall be arranged so as to prevent the application of power to the hoist motor and machine brake when placed in the “OFF” position.
- 4. Provide an electric contact safety switch for the pit access door if any equipment attached to the car extends within the space of the hoistway pit when the car is level at the bottom terminal landing.
  - a. Opening the pit access door shall cause the electric contact switch to stop the elevator by interrupting electric power to the driving machine and brake.
  - b. Provide a sign on the pit door “**WARNING – OPENING OF PIT DOOR WILL STOP ELEVATOR**” using lettering a minimum of two (2) inches high.
- 5. Existing stop and/or pit door switch conforming to the requirements set forth herein may be refurbished to as new condition and reused subject to approval of the Consultant.

## 2.8 HOISTWAY ENTRANCES

### A. Hoistway Entrances (Reuse)

- 1. Hoistway entrance sills, sill supports, entrance frames, headers and header supports shall be reused and refurbished.
  - a. Hoistway entrances that have become distorted or bent shall be straightened, plumbed, reset to the proper width dimension and reinforced as necessary.
  - b. Provide 14-gauge steel fascia plates that extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
    - 1) Reinforce fascia to allow not more than ½” of deflection.
    - 2) Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.
  - c. Provide 14-gauge steel toe guards that extend 12” below any sill not protected by fascia.
    - 1) The toe guards shall extend the full width of the door and shall return to the hoistway wall at a fifteen (15) degree angle and be firmly fastened.
  - d. Remove oil, dirt, and impurities on new and existing apparatus and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.

### B. Slide Type Hoistway Entrance Door Panels (Reuse)

- 1. Hoistway entrance door panels shall be reused and refurbished.

- a. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in existing sill grooves with a minimum clearance.
  - 1) The guide mounting shall permit their replacement without removing the door from the hangers.
  - 2) A steel wear indicator shall be enclosed in each guide.
- b. Provide the meeting edge of center opening doors with necessary new continuous rubber astragal bumper strips.
  - 1) Astragal shall be relatively inconspicuous when the doors are closed.
  - 2) Provide rubber bumpers at the top and bottom of each section of door to stop them at their limit of travel in the opening direction.
2. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
3. Provide a special key so that an authorized person can open any landing door when the car is elsewhere.
  - a. The keyhole shall be not less than 3/8" in diameter and shall be fitted with a stainless steel or bronze ferrule to match related equipment.
  - b. Where applicable, plug the abandoned hoistway door access hole in each door panel, secured from the hoistway side of the door, finished to match existing or as otherwise directed by the Owner/Architect.
4. Where conditions warrant, or where otherwise required by code, equip all hoistway landing doors with one (1) piece full height non-vision wings of material and finish to match hall side of door panels.

C. Tracks / Hangers / Closers (Reuse)

1. The existing hoistway door hangers and tracks shall be reused and rehabilitated.
2. Roller/hanger assemblies, consisting of the roller and eccentric, shall be cleaned, degreased and adjusted for proper operation.
3. Up-thrust shall be minimized through adjustment of the eccentric roller.
4. Worn rollers and eccentrics shall be replaced where needed.
5. Thoroughly clean the track of all dirt and grease accumulations to provide a smooth surface.
  - a. Where track liners are employed, new liners shall be provided.
6. Closers at each entrance shall be cleaned and pivot pins lubricated.
  - a. Worn and/or defective sill closers as well as noisy spirators shall be replaced as required to maintain self-closing of the hoistway doors should the elevator leave the floor for any reason with the car door open.
7. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.

D. Interlocks / Unlocking Devices (New)

1. Each set of landing doors shall be provided with a complete electromechanical interlock assembly.
  - a. Each interlock assembly shall consist of:
    - 1) A switch housing with contacts.
    - 2) Lock keeper.
    - 3) Clutch engagement/release subassembly.
    - 4) Associated linkages.
  - b. Arrange the lock so that individual leading door panels (side slide or center opening) are locked when in the closed position.
2. Non-typical mounting arrangements for interlocks and/or related mechanisms must receive prior approval from the Consultant.
3. Each hoistway door interlock assembly shall be provided with an emergency release mechanism utilizing a drop-leaf type access key at all landings served.
  - a. Each hoistway door shall accommodate manufacturers standard lock release key with escutcheon.
    - 1) The keyhole shall be fitted with a metal ferrule that matches the door finish.
    - 2) Drilling key holes in the field will not be accepted.

E. Hoistway Door Bottom Guides / Safety Retainers (New)

1. The bottom of each side sliding type hoistway door panel shall be equipped with a minimum of two (2) guiding members.
  - a. Metal mounting angles shall be secured to the integral panel frame structure; and when conditions warrant, additional external metal support plates or angles shall be installed to ensure the integrity of the panel frame is not compromised.
  - b. Guides shall be manufactured of low friction non-metal material with sufficient strength to withstand forces placed on door panels per ASME A17.1 Standards.
  - c. Each guide assembly shall incorporate a steel wear indicator and be so designed to permit sliding member replacements without removal of door panel(s) from top hanger devices.
  - d. Panels shall be hung with a maximum vertical clearance of 3/8 inch between top of sill and bottom of panel and the guide shall engage the sill groove by not less than 1/4 inch.
2. The bottom of each side sliding type hoistway door panel shall be equipped with a guiding member safety retainer to prevent displacement in the event of primary guide means failure.
  - a. A metal reinforcement (12 gauge stainless or galvanized steel) shall be installed between the two (2) primary guiding members (a.k.a. "Z" bracket).

- b. The reinforcement shall be designed with a minimum length of eight (8) inches or the maximum possible length that will fit between the primary members and a minimum overall height of two and one-half (2.5) inches secured on the internal face of the door panel. (Hoistway side)
- c. The retainer shall be set with the supplemental safety angle 3/8 inch into the corresponding sill groove; and be capable of preventing displacement of the panel no more than 3/4 inch with an applied force of 1125 lbf at right angles over an area twelve (12) inches x twelve (12) inches at the approximate center of the door panel.

## 2.9 CAR EQUIPMENT / FRAME

### A. Car Frame (Reuse)

- 1. The existing car frame assembly shall be refurbished to as new condition and reused.
- 2. Individual car frame members, platform isolation framework, door operator support structure, related bracing and hardware shall be inspected for any indication of damage or distortion.
  - a. Where damage is detected, the Contractor shall immediately inform the Consultant and then undertake corrective action deemed appropriate by the Consultant to remedy the condition.
- 3. Provide new elastomer isolation pads for all existing platforms where pads are presently installed.
- 4. The car frame, door operator support and related bracing shall be modified or reconfigured as necessary in order to accommodate new cab enclosure and/or master door operating equipment specified herein.
- 5. The elevator car shall undergo static balancing upon substantial completion of all work described in the project specifications and subsequent to any car interior refinishing or cab replacement work performed in conjunction with the project.

### B. Car Platform (Reuse)

- 1. The existing platform shall be modified to accommodate the new apparatus specified herein.
  - a. Where necessary, the underside of platform shall be refurbished and treated with fire-rated material.
  - b. Where necessary, provide a new safety access hole ring and cover assembly to match selected cab finishes.
  - c. At Contractor's option or when conditions warrant, provide a totally new platform in lieu of repairs, modifications and upgraded specified above.

### C. Car Safety (Reuse)

- 1. The existing governor actuated car safety device shall be retained, overhauled and upgraded for current code compliance.
- 2. Readjust safety for proper operation in accordance with current ASME A17.1 design standards.

3. Check the existing safety operated switch (plank-switch) for proper adjustment and operation.
  - a. Provide a new plank-switch where none currently exists.
4. A new safety shall be provided where the existing is not suitable for reuse due to overall condition or in conjunction with an increase in the elevator speed or full load capacity.

D. Automatic Leveling / Releveling / Positioning Device (New)

1. Equip the elevator with a floor leveling device which shall automatically bring the car to a stop within 1/4" of any floor for which a stop has been initiated regardless of load or direction of travel.
2. This device shall also provide for releveling which shall be arranged to automatically return the elevator to the floor in the event the elevator should move below or above floor level in excess of 1/4".
3. This device shall be operative at all floors served and whether the hoistway or car door is open or closed provided there is no interruption of power to the elevator.
4. A positioning device shall be part of the controller microprocessor systems.
  - a. Position determination in the hoistway may be through fixed tape in the hoistway or by sensors fitted on each driving machine to encode and store car movement.
  - b. Design the mechanical features and electrical circuits to permit accurate control and rapid acceleration and retardation without discomfort.
5. Where there are consecutive floors/stops that are short stops, the system shall be capable of distinguishing between the two (2) landing zones without error.
6. All equipment and logic required for leveling system to properly function with short stops shall be included.

E. Top-of-Car Inspection Operating Station (New)

1. An inspection operating station shall be provided on top of the elevator car.
2. This station shall be installed so that the controls are plainly visible and readily accessible from the hoistway entrance without stepping on the car.
3. When the station is operational, all operating devices in the car shall be inoperative.
4. Provide the following control devices and features:
  - a. A push/pull or toggle switch designated "EMERGENCY STOP" shall be arranged so as to prevent the application of power to the hoist motor or machine brake when in the "off" position.
  - b. A toggle switch designated "INSPECTION" and "NORMAL" to activate the top of car Inspection Service Operation.
  - c. Push button designated "Up", "Down" and "Enable" to operate the elevator on Inspection Service (the "Enable" button shall be arranged to operate in conjunction with either the "Up" or "Down" button).
  - d. An indicator light and warning buzzer that are subject to activation under Phase I - Fire Emergency Recall Operation.

F. Load Weighing Device (New)

1. Provide means to measure the load in the car within an accuracy of  $\pm$  four percent (4%) of the elevator capacity.
2. Provide one (1) of the following types of devices:
  - a. A device consisting of four (4) strain gauge load cells located at each corner of the car platform and supporting a free-floating car platform and cab with summing circuits to calculate the actual load under varying conditions of eccentric loading.
  - b. A strain gauge device located on the crosshead, arranged to measure the deflection of the crosshead and thus determine the load in the car.
  - c. A device consisting of four (4) strain gauge load cells, supporting the weight of the elevator machine with summing circuits to calculate the actual load under varying conditions of load.
  - d. A device to measure the tension in the elevator hoist ropes and thus determine the load in the car.
3. Arrange that the output signal from the load weighing device be connected as an input to the signal and motor control systems to pre-torque of the hoisting machine motors where applicable.
4. Provide audible and visual signals in connection with the load weighing device when used as an “overload” device.

G. Car Enclosure Work Light / Receptacle (New)

1. The top and bottom of each car shall be provided with a permanent lighting fixture and 110-volt GFI receptacle.
2. Light control switches shall be located for easy accessibility from the hoistway entrance.
3. Where sufficient overhead clearance exists, the car top lighting fixture shall be extended no less than 24” above the crosshead member of the car frame.
4. Light bulbs shall be guarded so as to prevent breakage or accidental contact.

H. Emergency Exits / Top (New)

1. Ensure they operate as per code and have proper electrical contacts and mechanical locks on the exterior of the cab enclosure.
2. No other key to the building shall unlock the emergency exit lock except access switch keys which may be keyed alike.
  - a. Keys shall be assigned in accordance with ASME A17.1 Group 1 Security requirements.

I. Car Door Zone Lock Restrictor (New)

1. The new car door operator shall incorporate a new car door zone lock restrictor.
2. In case of interruption or failure of electric power from any cause, the door operating mechanism shall permit emergency manual operation of both the car door and the hoistway door within the floor landing zone.
  - a. The hoistway door shall continue to be self-locking and self-closing.
  - b. The door operator shall operate in conjunction with or be equipped with all gate switches and safety contacts required by ASME A17.1 Code.

J. Car Door Hangers / Tracks / Gate Switch (New)

1. Provide sheave type two-point suspension hangers and track for each car door.
  - a. Sheaves shall be hardened steel, not less than 3-1/4 inches in diameter with sealed grease packed precision ball bearings.
  - b. The upthrust shall be taken by a roller mounted on the hanger and arranged to ride on the underside of the track.
2. The track shall be of formed cold rolled steel or cold drawn steel and shall be rounded on the track surface to receive the hanger sheaves.
  - a. The track shall be removable and shall not be integral with the header.
3. Provide a gate switch that mounts directly to the car door track.
  - a. The gate switch shall prevent movement of the elevator until such time as it signals the control equipment that the car door has physically closed.

K. Car Door Gate Switch (New)

1. Provide a car door electrical safety (gate) switch that connects directly to the car door track.
  - a. The gate switch shall prevent movement of the elevator until such time as it signals the control equipment that the car door has physically closed.

L. Car Door Panel(s) (Reuse)

1. The existing car door panel(s) shall be reused.
2. Drill and reinforce panels for installation of door operator hardware, door protective device, door gibs, etc., as necessary.
  - a. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in the sill grooves with minimum clearance.
  - b. The guide mounting shall permit their replacement without removing the door from the hangers.
3. Provide the meeting edge of center opening doors with necessary continuous rubber astragal bumper strips.
  - a. These strips shall be relatively inconspicuous when the doors are closed.

M. Door Reopening Device (New)

1. Provide an infrared curtain door protection system.
2. The door shall be prevented from closing and reopen when closing if a person interrupts any one of the light rays.
3. The door shall start to close when the protection system is free of any obstruction.
4. The infrared curtain protective system shall provide:
  - a. Protective field not less than 71" above the sill.

- b. Where a horizontal infrared light beam system is used:
    - 1) A minimum of forty-seven (47) light beams.
    - 2) Accurately positioned infrared lights to conform to the requirements of the applicable handicapped code.
  - c. Modular design to permit on board test operation and replacement of all circuit boards without removing the complete unit.
  - d. Controls to shut down the elevator when the unit fails to operate properly.
5. Existing infrared door protection systems, designed in accordance with the criteria specified herein, may be retained and refurbished for new subject to the Consultant's review and approval.

## 2.10 FINISH / MATERIALS / SIGNAGE

### A. Material, Finishes and Painting

#### 1. General

- a. Cold-rolled Sheet Steel Sections: ASTM A366, commercial steel, Type B
- b. Rolled Steel Floor Plate: ASTM A786
- c. Steel Supports and Reinforcement: ASTM A36
- d. Aluminum-alloy Rolled Tread Plate: ASTM B632
- e. Aluminum Plate: ASTM B209
- f. Stainless Steel: ASTM A167 Type 302, 304 or 316
- g. Stainless Steel Bars and Shapes: ASTM A276
- h. Stainless Steel Tubes: ASTM A269
- i. Aluminum Extrusions: ASTM B221
- j. Nickel Silver Extrusions: ASTM B155
- k. Bronze Sheet: ASTM B36(36M) alloy UNS No. C2800 (Muntz Metal)
- l. Structural Tubing: ASTM A500
- m. Bolts, Nuts and Washers: ASTM A325 and A490
- n. Laminated / Safety Tempered Glass: ANSI Z97.1

#### 2. Finishes

- a. Stainless Steel
  - 1) Satin Finish: No. 4 satin, long grain.
  - 2) Mirror Finish: No. 8 non-directional mirror polished.
- b. Sheet Steel:
  - 1) Shop Prime: Factory-applied baked on coat of mineral filler and primer.
  - 2) Finish Paint: Two (2) coats of low sheen baked enamel; color as selected by the Architect.
  - 3) Steel Equipment: Two (2) coats of manufacturer's standard rust-inhibiting paint to exposed ferrous metal surfaces in both the hoistway and pit that do

not have galvanized, anodized, baked enamel, or special architectural finishes.

3. Painting

- a. Apply two (2) coats of paint to the machine room floor.
- b. Apply two (2) coats of clear lacquer to bronze or similar non-ferrous materials to prevent tarnishing during a period of not less than twelve (12) months after initial acceptance by the Owner or Agent.
- c. Identify all equipment including buffers, car apron, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
- d. Paint or provide decal-type floor designation not less than four (4) inches high on hoistway doors (hoistway side), fascias and/or walls as required by A17.1 as may be adopted and/or modified by the AHJ. The color of paint used shall contrast with the color of the surface to which it is applied.

B. Car Interior Finishes

1. Car interior finishes shall be as selected by Owner .
2. Contractor shall provide samples of finishes as required for approval prior to fabrication.
3. Refer to specifications for other design requirements where provided.
4. Special attention shall be given to flooring materials and suitability for intended duty.

C. Designation and Data Plates, Labeling and Signage.

1. Provide an elevator identification plate on or adjacent to each entrance frame where required by the AHJ.
2. Elevators shall be identified by "number" only. Where a "letter" is used to identify the elevator, the letter shall indicate the Bank the elevator is in.
  - a. The designation numeral shall be a minimum of 3" in height.
3. Provide floor designation cast plates at each elevator entrance, on both sides of the jamb at a height of sixty (60) inches to the baseline of floor indication.
  - a. Floor number designations and Braille shall be 2" high, 0.03" raised and stud mounted.
4. Provide elevators with data and marking plates, labels, signages and refuge space markings complying with A17.1 Elevator Safety Code as may be adopted and/or otherwise modified by the AHJ.
5. Architect shall select the designation and data plates from manufacturer's premium line of plates.

2.11 FIXTURES / SIGNAL EQUIPMENT (New)

A. General - Design and Finish

1. The design and location of the hall and car operating and signaling fixtures shall comply with the ADAAG and local requirements of the AHJ.
2. The operating fixtures shall be selected from the manufacturer's premium line of fixtures.
3. Custom designed operating and signaling fixtures shall be as shown on the drawings or as approved by the Owner .
4. The layout of the fixtures including all associated signage and engraving shall be as approved by the Owner .
5. Where no special design is shown on the drawings, the buttons shall be as follows:
  - a. Stainless steel circular type as selected by the Owner / Consultant from the manufacturer's premium line of push buttons.
  - b. The button shall have a collar/small round indicator on the outside of the button with LED call registered light.
6. Where no special design is shown on the drawings, the faceplates shall be as follows:
  - a. Passenger Elevators
    - 1) Ground Floor: stainless-steel faceplate with No. 4 finish.
    - 2) Typical Floors: 1/8" thick stainless-steel faceplate with No. 4 finish.
7. Mount passenger elevator fixtures with tamperproof screws. The screw/fastener and key switch cylinder finishes shall match faceplate finish.
8. Where key-operated switch and or key operated cylinder locks are furnished in conjunction with any component of the installation, four (4) keys for each individual switch or lock shall be furnished, stamped or permanently tagged to indicate function.
9. All caution signs, pictographs, code mandated instructions and directives shall be engraved and filled with epoxy in code required colors.

**B. Main Car Operating Panel (New)**

1. Provide a main car operating push button panel on the inside front return panel of the car.
2. Car operating panel shall be flush mounted with swing type, one-piece faceplate with heavy-duty concealed hinges.
  - a. Mount all key switches that are required to operate and maintain the elevators exposed on the car station except those specified within a locked service cabinet.
3. The push buttons shall become individually illuminated as they are pressed and shall extinguish as the calls are answered.
4. The operating panel shall include:
  - a. A call button for each floor served, located not more than 48" above the cab floor.
  - b. "Door open" / "Door close" buttons.
  - c. "Alarm" button, interfaced with emergency alarm. The alarm button shall illuminate when pressed.
  - d. "Emergency Stop" switch per local law located at 35" above the cab floor.
  - e. Self-dialing, hands-free emergency communication system actuation button with call acknowledging feature and ASME A17.1. design provisions.

- f. Three (3) position firefighter key operated switch, call cancel button and illuminated visual/audible signal system with mandated signage engraved per ASME A 17.1 Standards as modified by the AHJ.
  - g. The “City-Wide Standard Fireman’s Service Key” (FEKO1) shall be used for all Fire Emergency operating devices.
- 5. Locked Firemen’s’ Service cabinet, keyed in accordance with local Code, containing required devices and signals in accordance with ASME A17.1 Standards.
  - a. Automatic opening of the locked cabinet door may be provided with signals initiated by the fire detection and alarm system where approved by the Authority Having Jurisdiction.
- 6. Provide a locked service cabinet flush mounted and containing the key switches required to operate and maintain the elevator, including, but not limited to:
  - a. Independent service switch.
  - b. Light switch.
  - c. Fan switch.
  - d. G. F. I. duplex receptacle.
  - e. Emergency light test button and indicator.
  - f. Inspection Service Operation key switch.
  - g. Port for hand-held service tool where applicable.
  - h. Dimmer for cab interior lighting.
- 7. Car operating panel shall incorporate:
  - a. An integral (no separate faceplate) digital L.E.D. floor position indicator.
  - b. Black-filled engraved unit I.D. number or other nomenclature, as approved by Owner.
  - c. A “No Smoking” advisory.
  - d. The rated passenger load capacity in pounds.
  - e. 3/16” “push for alarm” engraving.
  - f. 3/16” communication device usage instructions.
- 8. Equip the main car operating panel with security car call keyed switches OR proximity card reader to disconnect the corresponding floor push button.
  - a. Security system shall be overridden by Phase II Firefighter’s Emergency Operations in accordance with code.
- 9. Where posting of an advisory is permitted by the Governing Authority in lieu of the inspection certificate, engrave the following advisory on the hinged cover of the service cabinet, or where otherwise directed by the Owner.
- 10. Post Inspection Certificate behind an opening in the car operating panel that is fitted with a flush-mounted clear Plexiglas without a frame.

C. Car Position Indicator (New)

1. The position of the car in the hoistway shall be indicated by the illumination of the position indicator numeral corresponding to the floor at which the car has stopped or is passing.
  - a. Provide 2" high, ten (10) segment LED type position indicator with direction arrows, integral with the car operating panel.
  - a. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
  - b. Provide audible floor passing signal per ADA standards where not provided by the elevator signal control.
  - c. Flush mount fixture with cover to match selected car front or car operating panel finish as directed by the Owner.

D. Car Direction Lantern (New)

1. Provide a car riding lantern with visual and audible signal in the edge of the strike and/or return post.
2. The lens shall project a minimum of 1/4" and shall be of solid Plexiglas.
3. Use tamperproof screws for flush faceplate with hairline joint.
4. Car lantern shall indicate the direction of travel when doors are 3/4 open.
5. The unit shall sound once for the "up" direction and twice for the "down" direction.
  - a. Provide an electronic chime with adjustable sound volume.

E. Voice Annunciator (New)

1. Provide a voice annunciator in each elevator.
2. The device features shall comply with the requirements of ADAAG and local accessibility requirements.
3. Coordinate size, shape and design with Designer and other trades.
4. The system shall include, but not limited to:
  - a. Solid state digital speech annunciator.
  - b. A recording feature for customized messages.
  - c. Playback option.
  - d. Built-in voice amplifier.
  - e. Master volume control.
  - f. Audible indication for selected floor, floor status or position, direction of travel, floor stop, seismic operation, firefighter service and nudging.
5. Locate all associated equipment in a single, clearly labeled enclosure located either in the machine room and/or on car top.

F. Signal Annunciator System (New)

1. Provide a single / double indication, surface-mounted, manually reset signal annunciator.
  - a. Annunciator cover shall have all necessary mounting plates and brackets.
  - b. Provide multi-conductor signal traveling cable and properly connect same to the annunciator and shaft wiring.
  - c. Provide new single / double hall push buttons at each landing served.

- d. Provide new low-voltage hoistway wiring installed in a method required by the AHJ.
- e. Provide new transformer to supply low voltage power.

G. Corridor Push Button Stations / Reuse Back Boxes

- 1. Push button signal fixtures shall be provided on each landing.
- 2. Each signal fixture shall consist of:
  - a. Up and down illuminating push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
  - b. A recessed mounting box, electrical conduit and wiring.
- 3. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
- 4. Include firefighter key switch in the main lobby level station or other designated recall landing.
- 5. Where existing fixtures are located greater than 48" above the floor:
  - a. The existing back boxes shall be retained and used to attach the oversized fixture faceplate to locate the new buttons with a centerline of 42" above the finished floor.
    - 1) The Contractor has the option of providing a single oversized back box in lieu of retaining existing for faceplate attachment.
  - b. Standardize the new centerline distance on all floors.
- 6. All cutting, patching, grouting and/or plastering of masonry walls resulting from the removal or installation of corridor fixtures shall be performed by the Contractor so as to maintain the fire rating of the hoistway.
  - a. Finished painting or decorating of wall surfaces shall be by Others.
- 7. All faceplates shall be engraved with fire logo and "In Case of Fire Use Stairs" to help fill the void created by the use of oversized covers.
- 8. Provide a digital floor position indicator with 1" high numerals at all landings served.

H. Floor Position Indicator (New)

- 1. Remove existing floor position indicator at each landing and provide new digital LED type unit.
- 2. New plate shall completely cover the present cutout and provide 2" numerals located on center.
- 3. Provide integral direction arrows that will indicate the direction in which the elevator is traveling.

I. Hall Direction Lanterns (New)

- 1. Provide a visual and audible signal at each entrance to indicate the direction of travel and, where applicable, which car shall stop in response to the hall call.

- a. Design the lantern with up and down indication at intermediate landings and a single indication at terminal landings.
  - b. Lanterns shall sound once for the up direction and twice for the down direction.
    - 1) Provide an electronic chime with adjustable sound volume.
  - c. Provide adjustable signal time (three [3] to ten [10] seconds, with one [1] second increments) to notify passengers which car shall answer the hall call and preset per ADAAG notification standards.
- 2. Main Lobby fixture shall incorporate a 2" high LED floor position indicator in the hall lantern fixture with direction arrows located on both sides of the indicator.
  - 3. Locate the lantern above to the corridor entrance.

J. Lobby Control Panel (New)

- 1. Provide a Lobby Control Panel for elevators adjacent to the Fire Command Center as directed by the Owner.
- 2. Provide stainless steel faceplate with tamperproof screws.
- 3. The panel shall include:
  - a. 2" high LCD car position and travel direction indicators.
  - b. Master intercom station / telephone.
  - c. Three (3) position (on/car to lobby/off) switches.
  - d. Emergency power controls and indicators as per code requirements.
  - e. "Car at the designated floor with its doors open" indicator.
  - f. System trouble indications.
  - g. Car call floor lockout switches.

2.12 CAR ENCLOSURES (Retain/Remodel)

A. Elevator Car Enclosure(s) and the Five Percent (5%) Rule:

- 1. In accordance with A17.1, Section 8.7, as adopted and/or modified by the AHJ, entitled "Alterations", where a new or remodeled elevator car enclosure is included in the base scope of work, the Contractor shall, within thirty (30) days after execution of the contract, weigh the elevator, or one (1) elevator of each group of elevators included in the base scope of work, to determine the present deadweight of the platform/sling/cab assembly.
- 2. The Contractor shall, when necessary, weigh the interior materials of a single cab to better estimate the total existing weight of existing materials being removed as part of the alteration.
- 3. The Contractor shall make every effort to provide accurate weight measurements while taking into consideration all weights that may present themselves at the time the measurement is taken such as compensation, compensating sheave, hoist ropes and traveling cables that may affect the measurement of the assembly itself.
- 4. The Contractor shall evaluate the actual counterbalance percentage for each sample elevator to identify prevailing conditions.
- 5. Measurements of actual cab weight shall be compared to the original deadweight of the car as stamped on the crosshead data tag.

6. Where no data tag exists, the Contractor shall make every effort to determine the original weight of the platform/sling/cab through calculations based on the current weight of the counterweight assembly and the verified percent of full load counterbalance.
7. The amount of weight that may be added to the car, so as to remain within the limits of the “Five Percent (5%) Rule”, shall be calculated based on the following:
  - a.  $(\text{Original Deadweight} + \text{Capacity}) \times (0.05) = \text{Maximum Additional Weight Allowed}$
8. The Contractor shall document and notify the Owner and Consultant of the results of the measurements taken and what weight, if any, can be added or needs to be removed from the cab in order to maintain compliance with the Five Percent (5%) Rule.
9. The Contractor shall work diligently with the Owner and/or Owner’s Representative and/or Architect as well as the manufacturer of the car enclosure to minimize additional weights of the new or remodeled car enclosure so as to maintain compliance with the Five Percent (5%) Rule.
10. Contractor shall be responsible for proper adjustment of the counterbalance of the system, including the static balance of the platform/sling/car enclosure, upon completion of the car interior work.
11. Costs associated with this work shall be included in the base modernization price.
12. Provide a new data tag on the crosshead of the elevator indicating the new deadweight, the current percent counterbalance and the date of the alteration.

B. Elevator Cab Remodel

1. Refer to Appendix A

C. Elevator Cab / Refurbish / Remodel

1. Please refer to matrix and appendix for approved materials and styles.
2. Replace finished top floor covering using a commercial grade floor tile over the existing sub floor.
3. Replace car door entrance saddle using a nickel silver sill with necessary cradle supports.
4. Install new high speed exhaust fan with security protection off-set grill.
  - a. Automatic operating controls to turn fan on/off when doors are in the open/closed position. (Override keyed control switch to be incorporated in new car operating panel for full time operation and disconnect).
5. Install new LED low voltage, low heat, recessed down-lights in the cab dome to maximize inside floor-to-ceiling clearance.
  - a. Minimum of four (4) to six (6) lighting fixtures with clear Halo lens trim and Lexan shields.
6. Refinish interior ceiling with a LED down lighting and associated moldings.
7. Provisions for hidden security CCTV camera specified herein.
8. Installation of rear wall handrail thirty-two (32) inches above the finished floor with three (3) points of attachment designed for interior access servicing and support plates on the exterior of the enclosure.

9. Installation of protection pads for all walls and returns (floor to ceiling) using pad buttons permanently attached at top and ring or snap hardware at bottom to maintain hanging tension.

D. Elevator Cab / General Design Requirements

1. The design, materials and finishes of the cab enclosures shall be approved by Ownership.
2. Materials:
  - a. Particleboard: Premium grade, AWI, Section 200, fire retardant treated, equal to Duraflake FR
  - b. Plastic Laminate: Comply with NEMA LD3, 0.05" thick, color, texture and finish as selected by the Owner.
  - c. Wood Panels: AWI Premium Grade.
  - d. Trims: AWI Premium Grade.
3. Steel Shell: 14-gauge furniture steel reinforced and designed to accept finished wall panels. Finish shell panels with one (1) coat of rust inhibitive primer and two (2) coats of enamel paint in accordance with Section 09900. Apply 1/8" thick, rubberized sound deadening material to the hoistway side of the shell.
  - a. All panels shall have minimum radii. Apply sealant beads to panel joints before bolting together with lock washers.
4. Aluminum Shell: Minimum .090" walls and .125" canopy. Reinforce wall panels and ceiling as may be necessary.
  - a. Apply sealant beads to panel joints before bolting together with lock washers.
5. Wood Shell: 3/4" thick particleboard with backing laminate at both sides designed to accept finished wall panels. Apply 26-gauge sheet steel or fire proofing compound to the hoistway side of the shell.
6. Canopy: Canopy construction methods shall match the shell walls. Use 12-gauge furniture sheet steel and adequately support canopy to comply with the loading requirements of the Code.
  - a. Provide necessary cutouts for the installation of fan and top emergency exit. Arrange exit panel to swing up using a heavy-duty piano hinge.
  - b. The exit panel shall have dual locks, necessary stops and a handle.
  - c. When in the locked position, the panel shall be flush with the interior face of the canopy with hairline joints.
7. Base: Where finished base provided under another section of these specifications, recess and prepare the shell to accept the base.
  - a. Provide concealed vent slots above side and rear wall base for proper ventilation. Arrange and size vent slots for quiet operation without any whistling. Use 16-gauge baffles to protect the hoistway side of the vent slots.
  - b. The elevator cab shop drawings shall include elevator vent calculations and number, location and size of top and bottom vent holes.

8. Flooring: Where finished flooring is provided under another section of these specifications, recess and prepare sub-flooring to accept the finished flooring.
  - a. Service and Freight Elevators: Provide steel or aluminum diamond plate flooring in sections of not more than 24" x 48". Install each section using flat head stainless steel screws.
9. Front Return Panels, Entrance Posts and Transom: Use 14-gauge furniture sheet steel with proper reinforcing to prevent oil canning.
  - a. Fixed type return panel shall have required cutouts for car operating and signaling fixtures.
  - b. Swing front return panels shall have required cutouts for the car call buttons, keyed switches, indicators, emergency light fixture, cabinets and the specified special control and signaling devices.
    - 1) Provide concealed full height stainless steel piano hinges of sufficient strength to support the panel, without sagging, in the open position.
    - 2) The concealed locks shall secure the panel at two (2) points with linkage that shall be free of vibration and noise when in the locked position.
    - 3) When locked in the closed position, the front return panel shall be in true alignment with the transom and base.
    - 4) Lock release holes shall be not more than 1/4" diameter and be located at the return side jamb of the panel.
    - 5) Engrave the elevator identification number and capacity, no smoking sign, firefighter instructions, and other code mandated instructions and caution signs directly in the front return panel. Applied panels are unacceptable.
  - c. Transom shall be 14-gauge and be reinforced and constructed the same as the front return panels.
  - d. Construct entrance posts for the passenger elevators from 12-gauge sheet steel and reinforce to maintain vertical alignment with the adjacent panels.
  - e. Provide channel post entrance jambs for the service elevators. Clad channels with 14-gauge sheet steel and through bolt channels to the floor and to the reinforced header section.
10. Cab Doors: Standard 1" thick, 14-gauge hollow metal flush construction, reinforced for power operation and insulated for sound deadening. Paint hatch side of doors black and face cab side with 16-gauge sheet steel in selected material and finish.
  - a. The door panels shall have no binder angles. All welds shall be continuous, ground smooth and invisible.
  - b. Drill and reinforce doors for installation of door operator hardware, door protective device, door gibs, etc.
11. Ceiling: Construction techniques for wall panels shall apply to ceiling panel construction. Locate top emergency exit inconspicuously. Construct and mount the exit panel to prevent light leakage around the perimeter of panel.
12. Ventilation: The ventilation system of the exhaust type shall be provided in each elevator.

- a. The system shall include a blower driven by a direct connected motor and mounted on top of car with isolation to effectively prevent transmission of vibration to the car structure. The blower shall have not less than two (2) operating speeds. The ventilation system shall be sized to provide one (1) air change per minute at low speed and one and one-half (1.5) air changes per minute at high speed. The unit design and installation shall be such that the maximum noise level, when operating at high speed, shall not exceed 55 dBA approximately three (3) feet above the car floor. A three (3)-position switch to control the blower shall be provided in the service panel.
  - b. The fan or blower shall start upon the pressing of a car or landing call button and shall stop a predetermined time (approximately two [2] minutes) after the car has answered the last registered call.
  - c. The cab ventilation fan shall be designed not to consume more than .33 watts per CFM while operating at maximum speed.
- 13. Lighting: Arrange lighting fixtures and ceiling assembly to provide even illumination without hot spots and shadows. Overlap fluorescent lamps where cove lighting is specified.
  - a. Design and configure lighting system to facilitate maintenance of the fixtures.
  - b. Cab lighting source shall be designed to provide a minimum of 35 lumens per watt.
  - c. When an unoccupied elevator has remained stationary for fifteen (15) minutes, the cab lighting shall become de-energized. The control system shall automatically re-energize the lighting system upon opening of the cab door.
- 14. Handrails: All attachment hardware shall match the selected handrail and shall permit handrail removal from within the cab.
  - a. Provide a minimum of 10-gauge plate at the hatch side of the shell, aligned with the handrail attachment points, to assure secure handrail mounting.
  - b. Design handrail attachment system to support the weight of a person (two hundred fifty [250] pounds) sitting on it without any deflection and damage to the handrail, cab panel and the shell.
- 15. Protective Pads and Pad Hooks: Provide pad hooks at locations as directed by the Architect. Protective pads shall cover the front return panels, and the side and rear walls. Provide cutouts in pads for access to the cab operating and signaling devices. Pads shall be fire-resistant canvas with two (2) layers of cotton batting padding.
  - a. Identify each pad by elevator number and wall location.
- 16. Accessories: Construct elevator cab to accommodate the door operator, hangers, interlocks and all accessory equipment provided under other sections of these specifications, including firefighter phones, card readers and CCTV.
- 17. All cab materials shall conform to the code prescribed flame spread rating and smoke development requirements.

E. Cab Fabrication and Installation

- 1. Maintain accurate relation of planes and angles with hairline fit of contacting panels and/or surfaces.

2. Any shadow gaps (reveals) between panels shall be consistent and uniform.
3. Unless otherwise specified or shown on the drawings, for work exposed to view use concealed fasteners.
4. Maximum exposed edge radius at corner bends shall be 1/16". There shall be no visible grain difference at the bends.
5. Form the work to the required shapes and sizes with smooth and even curves, lines and angles. Provide necessary brackets, spacers and blocking material for assembly of the cab.
6. Interior cab surfaces shall be flat and free of bow or oil canning. The maximum overall deviation between the low and high points of 24" x 24" panel section shall not exceed 1/32".
7. Make weights of connections and accessories adequate to safely sustain and withstand stresses to which they will be subjected.
8. All steel work except stainless steel and bronze materials shall be painted with an approved coat of primer and one (1) coat of baked enamel paint.
9. Cab Finish Warranty Enhancement
  - a. Contractor shall be responsible for engineering and installing interior cab finishes in a manner that will withstand all code mandated inspections and test procedures. Failure of finishes during testing shall be repaired by the contractor without expense to the owner. Any objections or qualifications to material selection or design shall be identified during the engineering of the cab interior drawings for review by the owner.

F. Passenger Elevators

1. Wall Panels:
  - a. 3/4" thick fire-retardant plywood or particleboard with all surfaces faced with stainless steel as directed by the Owner. The panels shall be constructed as the removable type.
  - a. Modify the existing car shell for removable panel application.
2. Canopy: Paint canopy with a coat of primer and one (1) coat of low sheen enamel paint.
3. Front Return Panels and Transom: Stainless steel fixed type front return panel.
4. Cab Doors: Stainless steel with matching finish.
5. Ceiling:
  - a. Suspended 3/4" thick fire-retardant plywood or particleboard with all surfaces faced with stainless steel; front and sides stainless steel, and rear side prime painted steel.
  - b. The perimeter of each ceiling panel shall have steel trim.
  - c. Suspended 1/4" thick laminated glass ceiling with stainless/bronze frame system. The laminated panels, composed of two 1/8" thick clear glass with a 030" vinyl interlayer, shall comply with ANSI Z97.1 - 1984, CPSC 16 CFR.
  - d. Suspended 1" square egg crate with 1/4" thick white diffuser in stainless steel frame.
6. Handrails:
  - a. Flat 1/4" x 4" stainless steel/bronze handrail at the sides/rear wall(s).
7. Lighting:

- a. The cab lighting system shall be as shown on the drawings.
  - b. Fully recessed LED down light fixtures with aluminum alzak reflector. Unless otherwise shown on the drawings, provide a light fixture in each ceiling panel.
8. Base: Provide a 4" high base in the material and finish selected by the Owner at the sides and rear of the cab enclosure.

G. Elevator Cab Enclosure Fan (New)

- 1. Provide an exhaust type two (2) speed fan unit with cover grill, mounting accessories and necessary cab enclosure modifications.
  - a. Fan unit shall include self-lubricating motor with housing rubber mounted for sound vibration isolation.
- 2. Provide a key switch in the elevator cab enclosure for control of fan unit.
- 3. Provide necessary wiring and approved conduit to properly connect fan unit with power source and control key switch.

H. Inspection Certificate and Frame (New)

- 1. Provide the mandated inspection card frame for posting the required certificate or an alternate plaque as directed by the Owner designee.
- 2. The alternate plaque shall indicate the location of the certificate within the building, including floor and/or room designation, where access is available during normal business hours.

2.13 EMERGENCY LIGHTING / COMMUNICATIONS / SIGNALING (New)

A. Battery Back Up Emergency Lighting Fixture and Alarm (New)

- 1. Provide a self-powered emergency light unit.
  - a. Arrange a minimum of two (2) of the cab light fixtures to operate as the emergency light system.
  - b. Where cab lighting is utilized for emergency lighting, Contractor shall coordinate the battery back-up equipment so that it is compatible with the type of cab lighting specified by the Owner or Architect.
- 2. Provide a car-mounted battery unit including solid-state charger and testing means enclosed in common metal container.
  - a. The battery shall be rechargeable nickel cadmium with a ten (10) year minimum life expectancy. Mount the power pack on the top of the car.
  - b. Provide a 6" diameter alarm bell mounted directly to the battery/charger unit and connected to sound when any alarm push button or stop switch in the car enclosure is operated.

- c. The bell shall be configured to operate from power supplied by the building emergency power generator. The bell shall produce a sound output of between 80-90 dBa (measured from a distance of 10') mounted on top of the elevator car.
      - 1) Activation of this bell shall be controlled by the stop switch and alarm button in the car operating station.
      - 2) The alarm button shall illuminate when pressed.
  - 3. Where required by Code for the specific application, the unit shall provide mechanical ventilation for at least one (1) hour.
  - 4. The operation shall be completely automatic upon failure of normal power supply.
  - 5. Unit shall be connected to normal power supply for car lights and arranged to be energized at all times, so it automatically recharges battery after use.
- B. Common Alarm Bell (New)
- 1. Provide a common alarm bell located in the elevator pit.
    - a. The bell shall be configured to operate when the alarm or stop switch of any elevator is activated, during both normal and battery back-up power conditions.
    - b. Existing common alarm bells may be rehabilitated and reused providing they meet the intent of this section and applicable codes.
- C. Emergency Voice Communication / Telephone (New)
- 1. A hands-free emergency voice communication system shall be furnished in each car mounted as an integral part of the car operating panel.
    - a. Necessary wires shall be included in the car traveling cable and shall consist of a minimum of one shielded pair of 20AWG conductors.
    - b. 120V power shall be provided to power the hands-free device.
  - 2. The telephone shall be equipped with an auto-dialer and illuminating indicator which shall illuminate when a call has been placed and begin to flash when the call has been answered.
    - a. Engraving shall be provided next to the indicator which says, "When lit help is on the way".
  - 3. In addition to the standard "Alarm" button, a separate activation button shall be provided on the car operating panel to initiate the emergency telephone and place a call.
    - a. The telephone must not shut off if the activating button is pushed more than once.
    - b. The telephone shall transmit a pre-recorded location message only when requested by the operator and be provided with an adjustable call time which can be extended on demand by the operator.
    - c. Once two-way communication has been established, voice prompts shall be provided which instruct the operator on how to activate these functions as well as alerting the operator when a call is being attempted from another elevator in the building.

4. The system shall be compatible with ring-down equipment and PBX switchboards.
5. The system shall be capable of serving as the audio output for an external voice annunciation system.
  - a. Conversation levels shall measure 60 dbA or higher and measure 10 dbA above ambient noise levels.
  - b. Each device shall be provided with a self-diagnostic capability in order to automatically alert building personnel should an operational problem be detected.
6. The phone shall be able to:
  - a. Receive incoming calls from any On-Site Rescue Station (when provided or required).
  - b. Receive incoming calls from other off-site locations via the public telephone system.
  - c. Acknowledge incoming calls and automatically establishing hands-free two-way communications.
    - 1) If no On-Site Rescue Station is provided, each hands-free device shall have built in line consolidation which will allow up to six (6) elevators to be called individually from outside the building over a single telephone line and up to eighty (80) elevators if an On-Site Rescue Station is provided.
7. The emergency elevator communication system shall require a maximum of one (1) telephone line.
  - a. The system must provide line sharing capability to eliminate the need for a dedicated telephone line.
  - b. The line sharing function must ensure that the emergency telephones always receive dialing priority even if the line is in use and that the emergency telephones can be called into from an off-site location.
8. The system shall provide its own four (4) hour backup power supply in case of a loss of regular AC power.
9. The system must provide capability for building personnel to call into elevators and determine the charge state of any backup batteries provided for the emergency telephones.
10. Pushing the activation button in any of the elevator car stations will cause any on-site Rescue Station (where provided or required) or security telephone to ring.
  - a. If the on-site call is not picked up within thirty (30) seconds, the call will be automatically forwarded to a twenty-four (24) hour off-site monitoring service.
  - b. The arrangements and costs of the off-site monitoring and telephone line shall be by others.
11. All connections from the junction box to the telephone system shall be done by the Elevator Contractor where existing provisions can be reused.
12. New telephone lines, where required, shall be provided and interfaced by others.
13. All connections from the junction box to the security room's main telephone system shall be done by others.
14. All electrical work shall conform to Division 16 requirements.

15. Existing phone systems removed shall be returned to the Owners for installation by others in other areas.

D. Firefighters' Two-Way Telephone Communications System (New)

1. Provide a complete two-way telephone communications system for point-to-point communications between authorized personnel.
2. Provide firefighter telephone jack behind a lockable box in the car operating panel in accordance with the requirements of the local authorities. The box shall be fitted with a flush mounted door having hairline joints.
3. Connection devices (jacks) and all associated wiring shall be provided by the elevator Contractor as part of the base bid.
4. The handsets shall be self-powered and not require an external power source for operation.
  - a. The firefighter phone shall be furnished under Division 16.

E. Life Safety System (New)

1. Install Life Safety System speaker in each elevator cab.
2. Provide all necessary wiring and interfacing between the elevator system and the Life Safety System as required.
3. The Life Safety System speaker shall be furnished under Division 16.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Inspection

1. Study the Contract Documents with regard to the work as specified and required so as to ensure its completeness.
2. Examine surface and conditions to which this work is to be attached or applied and notify the Owner in writing if conditions or surfaces are detrimental to the proper and expeditious installation of the work. Starting the work shall imply acceptance of the surfaces and conditions to perform the work as specified.
3. Verify, by measurements at the job site, dimensions affecting the work. Bring field dimensions which are at variance with those on the accepted shop drawings to the attention of the Owner. Obtain the decision regarding corrective measures before the start of fabrication of items affected.
4. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

### 3.2 INSTALLATION / PROJECT PHASING

A. Installation

1. Modernize the elevators, using skilled personnel in strict accordance with the final accepted shop drawings and other submittals.
2. Comply with the code, manufacturer's instructions and recommendations.
3. Coordinate work with the work of other building functions for proper time and sequence to avoid delays and to ensure right-of-way of system. Use lines and levels to ensure dimensional coordination of the work.
4. Accurately and rigidly secure supporting elements within the shaftways to the encountered construction within the tolerance established.
5. Provide and install motor, switch, control, safety and maintenance and operating devices in strict accordance with the submitted wiring diagrams and applicable codes and regulations having jurisdiction.
6. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
7. Arrange door tracks and sheaves so that no metal-to-metal contact exists.
8. Reinforce hoistway fascias to allow not more than 1/2" of deflection.
9. Install elevator cab enclosure on platform plumb and align cab entrance with hoistway entrances.
10. Sound isolate cab enclosure from car structure. Allow no direct rigid connections between enclosure and car structure and between platform and car structure.
11. Isolate cab fan from canopy to minimize vibration and noise.
12. Remove oil, dirt and impurities and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.
13. Prehang traveling cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting after installation.
14. After installation, touch up in the field, surfaces of shop primed elements which have become scratched or damaged.
15. Lubricate operating parts of system as recommended by the manufacturer.

#### B. Project Phasing

1. Phase I - Final design development and contractors' preliminary work procedures to be completed within four (4) weeks from date of contract award.
  - a. Prevailing conditions review and layout.
  - b. Selection meeting for aesthetic design and finishes with Owners' designee.
  - c. Filing for required permits or other governing authorities work procedure requirements.
2. Phase II - Submittal approvals and confirmations shall be completed within eight (8) weeks from date of contract award.
  - a. Selection confirmations.
  - b. Manufacturer's shop drawings applicable, i.e., fixtures, cab, machine room layouts, doors, etc.
  - c. Engineering data acknowledgment applicable, i.e., power, heat, structural loads.
  - d. Delivery dates for major component suppliers, i.e., controls, machinery, fixtures, cabs, etc.
  - e. Posting of permits or other governing agency authorizations to proceed.
  - f. Proposed work implementation schedule based on the aforementioned procedures/confirmations.

3. Phase III - Mobilization of Final Design Approvals
  - a. Revision confirmations. (Equipment, etc.)
  - b. Preliminary work procedures.
  - c. Schedule confirmations.
4. Contractor shall provide a project schedule as part of the Bid based on the following:
  - a. Include three (3) days of simulated operation, with or without door operation, while not allowing passenger use.
  - b. Consultant punch list inspection report shall be performed after acceptance testing by the AHJ for each individual elevator.
  - c. Contractor shall complete all punch list items issued by both the AJH and the Consultant prior to turn-over for beneficial use by the Owner and removal of the next elevator for modernization.

C. Removal of Elevators

1. If extenuating circumstances (i.e. separating controller interconnections, inspection, testing, etc.), require that multiple cars of a single elevator group be removed from service simultaneously, the work shall be performed outside of the normal business hours at a time mutually agreed to by the Owner and Contractor.
2. A minimum of five (5) days advance written notice shall be given to the Owner and Elevator Consultant by the Contractor detailing the reasons for the simultaneous removal of the elevators from service along with the estimated out-of-service time.
3. The request shall be subject to review by the Elevator Consultant and approved by the Owner prior to the commencement of the work.
4. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

D. Transfer of Hall Button Risers

1. Transfer of the hall button riser(s) to the new signal control systems shall be performed on a not-to-interfere basis and shall not interrupt building operations or inconvenience building occupants.
2. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

### 3.3 FIELD QUALITY CONTROL

A. Inspection and Testing

1. Upon completion of each work phase or individual elevator specified herein, the Contractor shall, at its own expense, arrange and assist with inspection and testing as may be required by the A.H.J. in order to secure a Certificate of Operation.

B. Substantial Completion

1. The work shall be deemed “Substantially Complete” for an individual unit or group of units when, in the opinion of the Consultant, the unit is complete, such that there are no material and substantial variations from the Contract Documents, and the unit is fit for its intended purpose.
2. Governing authority testing shall be completed and approved in conjunction with inspection for operation of the unit; a certificate of operation or other required documentation issued; and remaining items mandated for final acceptance completion are limited to minor punch list work not incorporating any life safety deficiencies.
3. The issuance of a substantial completion notification shall not relieve the Contractor from its obligations hereunder to complete the work.
4. Final completion cannot be achieved until all deliverables, including but not limited to training, spare parts, manuals, and other documentation requirements, have been completed.

C. Contractor’s Superintendent

1. The Contractor shall assign a competent project superintendent during the work progress and any necessary assistant, all satisfactory to the Owner. The superintendent shall represent the Contractor and all instructions given to him shall be as binding as if given to the Contractor.

### 3.4 PROTECTION / CLEANING

A. Protection and Cleaning

1. Adequately protect surfaces against accumulation of paint, mortar, mastic and disfiguration or discoloration and damage during shipment and installation.
2. Upon completion, remove protection from finished surfaces and thoroughly clean and polish surfaces with due regard to the type of material. Work shall be free from discoloration, scratches, dents and other surface defects.
3. The finished installation shall be free of defects.
4. Before final completion and acceptance, repair and/or replace defective work, to the satisfaction of the Owner, at no additional cost.
5. Remove tools, equipment and surplus materials from the site.

B. Barricades and Hoistway Screening

1. The Contractor shall provide barricades where necessary in order to maintain adequate protection of areas in which work specified by the Contract Documents is being performed, including open hoistway entrances. Fabrication and erection as all barricades shall be in compliance with applicable OSHA regulations.
2. As required, the Contractor shall provide temporary wire mesh screening in the hoistway and of any elevator undergoing work specified in the Contract Documents. This screening shall be installed in such a manner as to completely segregate the hoistway from that of adjacent elevators. Screening shall be constructed from .041” diameter wire in a pattern that rejects passage of a 1” diameter ball.

### 3.5 DEMONSTRATION

A. Performance and Operating Requirements

1. Passenger elevators shall be adjusted to meet the following performance requirements:

- a. Speed: within  $\pm$  three percent (3%) in both directions of travel under any loading condition.
- b. Leveling: within  $\pm 1/4"$  as measured between the car entrance threshold and the landing sill on any given floor under any loading condition.
- c. Typical Floor-to-Floor Time: (Recorded from the doors start to close on one floor until they are 3/4 open at the next floor) under various loading conditions.

Group Passenger Elevators	10.5 – 11.5 seconds
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d. Door Operating Times

Door Type	Opening	Closing
36" center opening	1.5 sec.	2.1 sec.

- e. Door dwell time for hall calls: 4.0 sec with Advance lantern signals.
- f. Door dwell time for hall calls: 5.0 sec without Advance lantern signals.
- g. Door dwell time for car calls: 3.0 seconds.
- h. Reduced non-interference dwell time: 1.0 seconds.

2. Maintain the following ride quality requirements for the passenger elevators:

- a. For speeds up to 1400 fpm, the speed of the car roller guides shall not exceed 500 rpm.
- b. Where pit permits, extend bottom roller guides by not less than one half the distance from the centerline of the upper roller guides to the platform.
- c. Noise levels inside the car shall not exceed the following:
  - 1) Car at rest with doors closed and fan off - 40 dba.
  - 2) Car at rest with doors closed, fan running - 55 dba.
  - 3) Car running at high speed, fan off - 50 dba.
  - 4) Door in operation - 60 dba.
- d. Vertical accelerations shall not exceed 14 milli-g and horizontal accelerations shall not exceed 20 milli-g.
  - 1) The accelerometer used for this testing shall be capable of measuring and recording acceleration to nearest  $0.01 \text{ m/s}^2$  (1 milli-g) in the range of  $0\text{-}2 \text{ m/s}^2$  over a frequency range from 0-80 Hz with ISO 8041 filter weights applied. Accelerometer should provide contact with the floor similar to foot pressure, 60 kPa (8.7psi).
- e. The amplitude of acceleration and deceleration shall not exceed  $2.6 - 2.8 \text{ ft./sec}^2$  for geared and MRL traction, and  $3.5 - 4 \text{ ft./sec}^2$  for gearless traction elevators.
- f. The maximum jerk rate shall be 1.5 to 2.0 times the acceleration and deceleration.

- g. The maximum velocity which the elevator achieves in either direction of travel while operating under load conditions that vary between empty car and full rated load shall be within  $\pm$  three percent (3%) of the rated speed.

B. Acceptance Testing

1. Comply with the requirements of Division 01.
2. The Contractor shall provide at least five (5) days prior written notice to the Owner and Consultant regarding the exact date on which work specified in the Contract Documents will reach completion on any single unit of vertical transportation equipment.
3. In addition to conducting whatever testing procedures may be required by local inspecting authorities in order to gain approval of the completed work, and before seeking approval of said work by the Owner, the Contractor shall perform certain other tests in the presence of the Consultant.
4. The Contractor shall provide test instruments, test weights, and qualified field labor as required to safely operate the unit under load conditions that vary from empty to full rated load and, in so doing, to successfully demonstrate compliance with applicable performance standards set forth in the project specifications with regard to:
  - a. Operation of safety devices.
  - b. Sustained high-speed velocity of the elevator in either direction of travel.
  - c. Brake-to-brake running time and floor-to-floor time between adjacent floors.
  - d. Floor leveling accuracy.
  - e. Door opening/closing and dwell times.
  - f. Ride quality inside the elevator car.
  - g. Communication system.
  - h. Load settings at which anti-nuisance, load dispatch, and load non-stop features are activated.
5. Upon completion of work specified in the Contract Documents on the last car in any group of elevators, and in conjunction with the aforementioned testing procedures, the Contractor shall carry out additional testing of group dispatch/supervisory control features in the presence of the Consultant.
6. The Contractor shall provide test instruments and qualified field labor as required to successfully demonstrate:
  - a. The back-up operating mode for group dispatch failure.
  - b. Simulated and actual emergency power operation.
  - c. Firefighter and independent service operations.
  - d. Restricted access security features and card reader controls.
  - e. Zoning operations and floor parking assignments.
  - f. Up/down peak operation.
7. Upon completion of the modernization of each individual elevator, emergency power testing shall be conducted by the Building Management after normal business hours and/or weekends.
8. After hour tests of systems such as emergency generators, fire service, and security systems shall be conducted at no extra cost to the Owner.

END OF SPECIFICATION

Appendix A						
Bldg. No.	WSU Bldg. ID	WSU Bldg. Address	WSU ID #	Elevator Type	Cab Flooring Material (per specifications)	Interior Wall Finishes (per specifications)
5	Science Hall	5045 Cass Avenue, Detroit, MI 48202	005 01	Traction	Seamless Resilient Rubber	5WL hanging panels ???
34	Student Center Center	5221 Gullen Mall Detroit, MI 48202	034 03	Traction	diamond plate	5WL hanging panels ???
36	Reuther Library	5401 Cass Avenue, Detroit, MI 48202	036 01	Hydraulic	Seamless Resilient Rubber	Plastic laminate panels
42	Alumni House	441 Gilmour Mall Detroit, MI 48202	042 01	Hydraulic	Porcelain tile	Wood Veneer panels
45	Parking Structure 5	5501 Anthony Wayne Drive, Detroit, MI 48202	045 01 045 02	Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
51	Parking Structure 1	450 West Palmer, Detroit, MI 48202	051 03 051 04	Traction Traction	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
71	5057 Woodward	5057 Woodward, Detroit, MI 48202	071 01 071 02 071 03 071 03 071 03	Traction Traction Traction Traction Traction	Seamless Resilient Rubber	Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels
88	Parking Structure 6	61 Putnam Avenue, Detroit, MI 48202	088 01 088 03 088 02	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels 5WL hanging panels
89	Biological Sciences	5047 Gullen Mall, Detroit, MI 48202	089 01 089 02	Traction Traction	Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels 5WL hanging panels
130	Faculty / Administration Building	656 West Kirby Avenue, Detroit, MI 48202	130 03 130 02 130 01	Hydraulic Hydraulic Hydraulic	Existing to remain	Plastic laminate panels Plastic laminate panels Plastic laminate panels
629	Elliman Clinical Research	421 East Canfield Avenue	629 01 629 02 629 03	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels Plastic laminate panels 5WL hanging panels

## APPENDIX A

### WAYNE STATE UNIVERSITY CAR ENCLOSURE AND INTERIOR FINISH STANDARDS

#### CAR ENCLOSURE AND INTERIOR FINISHES

- A. Passenger Elevator: Retain existing car enclosure and provide new interior finishes.
1. Check and tighten all fastenings.
  2. Provide new interior finishes as specified herein.
  3. Modify car enclosure for application of new signal and pushbutton fixtures.
  4. Post modernization weight not to exceed code allowable limits.
  5. Provide the following features:
    - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
    - b. Stationary Return Panels: Retain.
    - c. Entrance Columns: Retain.
    - d. Transom: Retain.
    - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
    - f. Base: Stainless steel with concealed ventilation cutouts.
    - g. Interior Wall Finish:
      - 1) Removable panels, faced and edged, with color core plastic laminate. Plastic laminate (HPDL) shall meet or exceed NEMA Standard LDI-1964 for Type 1, 1/16" high pressure general purpose laminate.
      - 2) Color and finish as selected by Purchaser.
      - 3) 5WL hanging panels with #4 stainless steel reveals between panels.
    - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
    - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
    - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
    - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
    - l. Cab Flooring, provide floor covering per below:
      - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
      - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
      - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
      - 4) Seamless resilient non-slip rubber or vinyl with sealed edges

- 5) Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

B. Service Elevator: Retain existing car Shell enclosure and provide new interior finishes.

1. Check and tighten all fastenings.
2. Provide new interior finishes as specified herein.
3. Modify car enclosure for application of new signal and pushbutton fixtures.
4. Post modernization weight not to exceed code allowable limits.
5. Provide the following features:
  - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
  - b. Stationary Return Panels: Retain.
  - c. Entrance Columns: Retain.
  - d. Transom: Retain.
  - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - f. Base: Textured stainless steel with concealed ventilation cutouts.
  - g. Interior Wall Finish: Removable panels made of 5WL.
  - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
  - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - l. Cab Flooring: Provide a heavy vinyl cab floor covering as selected by the Purchaser.
  - m. Pads and Buttons: 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.

C. Passenger Elevator: New Car Enclosure and Interior Finishes.

1. Remove all existing interior finishes and shell components, weigh, and document.
2. Provide complete new car enclosure and interior finishes as specified herein.
3. Post modernization weight not to exceed code allowable limits.
4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel stainless steel formed panels Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - d. Entrance Columns: Reinforced 14 gauge satin finish stainless steel.
  - e. Transom: Reinforced 14 gauge satin finish stainless steel full width of enclosure.
  - f. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.

- g. Base: Stainless steel with concealed ventilation cutouts.
- h. Interior Wall Finish: Removable panels, faced and edged, with color core plastic laminate. Color and finish as selected by Architect/Purchaser.
- i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
- k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
- l. Subfloor; 5/8" thick marine grade plywood.
- m. Cab Flooring: Provide floor covering per below:
  - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
  - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
  - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
  - 4) Seamless resilient non-slip rubber or vinyl with sealed edges
- n. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
- o. Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

D. Service Elevator: New Car Enclosure and Interior Finishes.

- 1. Remove all existing interior finishes and shell components, weigh, and document.
- 2. Provide complete new car enclosure and interior finishes as specified herein.
- 3. Post modernization weight not to exceed code allowable limits.
- 4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel textured stainless steel formed panels with baked enamel interior finish as selected. Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Car Sill:
  - d. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - e. Entrance Columns: Reinforced 14 gauge textured satin finish stainless steel.
  - f. Transom: Reinforced 14 gauge textured satin finish stainless steel full width of enclosure.
  - g. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - h. Base: Textured stainless steel with concealed ventilation cutouts.
  - i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.

- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - l. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - m. Guardrails:
    - 1) Solid stainless steel flat stock bars, 4" x 3/8", mounted across rear and side walls.
    - 2) Locate guardrail line at 8" above car floor.
    - 3) Bolt rails through car walls from back and mount on 1½" deep solid round stainless steel standoff spacers no more than 18" O.C.
    - 4) Return guardrail ends to car walls.
    - 5) Pads and Buttons: 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.
  - n. Cab Flooring:
    - 1) Seamless resilient non-slip rubber or vinyl with sealed as selected by the Owner.
- E. Freight Elevator Enclosure: Car weight to be verified prior to removal of interior cab finishes/cab enclosure. Post modernization weight not to exceed code allowable limits. Provide the following features:
- 1. Enclosure Walls: Reinforced 10-gauge furniture steel formed panels no more than 20" wide with light-proof joints.
    - a. Baked enamel finish as selected.
    - b. Provide recess in car side wall for recessed mounting of car operating panel.
  - 2. Enclosure Canopy:
    - a. Reinforced 12-gauge furniture steel formed panels no more than 20" wide with light-proof joints and Hinged emergency exit.
    - b. Interior finish white reflective baked enamel.
    - c. Lighting: Recessed LED down lights with on/off switch in car operating panel. Recess mount fixture flush with inside surface of car top. Provide steel guard on car top over fixture.
    - d. Bumper Rails: Two rows of 2" x 12" oak or maple bumpers mounted on both sides and rear of the car.
      - 1) Locate bottom rail at floor level and top rail at 36" above the car floor.
      - 2) Bolt rails through car walls with bolt and captive nuts on exterior of wall panel sections on 18" centers.
      - 3) Finish both upper and lower top edges with a 45-degree chamfered edge to eliminate collection of trash.
      - 4) Finish ends of upper and lower bumpers on side walls to 45° chamfer to eliminate carts and people from hitting blunt ends.
      - 5) Flooring: Provide cab flooring which is 1/8" aluminum diamond plate.

**DIVISION 14**

**SECTION 14 24 23**

**TECHNICAL SPECIFICATIONS FOR**

**THREE (3) ELEVATORS**

**AT**

**WSU - PARKING STRUCTURE 6**

**61 PUTNAM AVENUE**

**DETROIT, MI**

**ADDENDUM #2**

DATE: February 26, 2024

VDA No. 69966/BM

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## DIVISION 14 – CONVEYING SYSTEMS

### 14 00 00 Conveying Equipment

#### 14 24 00 – Hydraulic Elevators

##### 14 24 23 – Hydraulic Passenger Elevators

## PART 1 - GENERAL

### 1.1 SUMMARY AND DEFINITIONS

#### A. Related Documents

1. Division 01 - Supplementary General Conditions
2. 14 24 23 - Hydraulic Passenger Elevators
3. Request for Proposal

#### B. Intent

1. This section includes:
  - a. Hydraulic passenger
2. The following outlines the scope of work covered in this Section:
  - a. Comprehensive “Turn-key” modernization of three (3) 3,000 lbs. capacity conventional hydraulic passenger elevators operating at 125 fpm.
  - b. Completion of Related Work identified herein Item 1.5.A.
  - c. This is a "TURN-KEY" project with the Elevator Contractor designated the "PRIME CONTRACTOR" for all related and non-related work specified and required unless specifically excluded or referenced to be done by others.

As this is a “Turn-Key” project, with the Elevator Contractor being the “Prime” Contractor, it is the Elevator Contractor’s responsibility to perform a detailed survey of the existing jobsite conditions to determine applicability and detailed scope for related work completion.

The Elevator Contractor is required to retain the services of trade sub-contractors that are either experienced in working as subcontractors on elevator modernization projects or that have relevant experience on similar projects. The trade sub-contractors shall be required to complete a detailed survey of related work / building conditions at this location(s) alongside the Elevator Contractor as a requirement to provide cost proposals for the related scope of work. At a minimum, trade sub-contractors that are required to be included on the Elevator Contractors project team should include:

Electrical Contractor

## Mechanical Contractor

## Fire / Life Safety Contractor

The Elevator Contractor is required to identify in their proposal the Trade sub-contractors utilized to compile their cost estimates included in their Base Bid.

It is the intent of this specification that the Elevator Contractor include in their Base Bid the cost to complete all elevator and related work that will be required to return each of the units to public use with no Code violations or punch-list items identified by the local Authority Having Jurisdiction (AHJ) as remaining to be completed. As such, the items Identified in Section 1.5.A of the Technical Specifications are intended to be as accurate a listing as can be compiled at the time of preparation of these documents.

However, should other related building work items be necessary to be completed to meet the requirements of the AHJ for issuance of permanent elevator operating certificates / permits, it will be the responsibility of the Elevator Contractor to complete the additional items under the scope of their Base Bid amount, with no additional costs to the Owner.

3. Related equipment shall be designed, constructed, installed and adjusted to produce the highest results with respect to smooth, quiet, convenient and efficient operation, durability, economy of maintenance, and the highest standard of safety.
4. It is not the intent of these specifications to detail the construction and design of all parts of the equipment, but it is expected that the type, materials, design, quality of work and construction of each part shall be adequate for the service required, durable, properly coordinated with all other parts, and in accordance with the best commercial standards applicable and of the highest commercial efficiency possible.
5. Electric and magnetic circuits and related parts shall be of proper size, design and material to avoid heating and arcing, and all other objectionable effects which may reduce the efficiency of operation, economy of maintenance and/or net-useful life of the apparatus.
6. Minimum requirements for design, materials, etc., are for certain parts of the equipment. Equivalent requirements approved by the Consultant shall apply to such parts as are of special design, construction or material and to which the specified requirements are not directly applicable. These minimum requirements as a whole shall be considered as establishing proportionate general minimum standards for all parts of the equipment.
7. The Consultant may permit variations from the requirement of these specifications to permit use of the Contractor's standard equipment, provided such standard equipment is in every way adequate for the intended use and meets the full intent of these specifications. All such variations proposed by the manufacturer shall be called to the attention of the Consultant and shall only be made if approved in writing prior to the award of the contract.
8. General requirements for design, materials and construction are intended primarily to apply to the heavy-duty and important parts of the equipment specifically mentioned and to other parts of similar duty and importance. Less important and light-duty parts may be of the standard design, materials and construction provided that, in the opinion of the Consultant, such standards are in accordance with the best commercial practice and are fully adequate for the purpose of use. All such variations shall be made only on the Consultant's written approval.

9. All equipment and component parts installed, supplied or provided under this contract shall be manufactured and distributed by a third-party, non-installer company servicing the vertical transportation industry.
  - a. Apparatus shall conform to the design and construction standards referenced herein and shall be rated the best commercial grade suitable for this application.
  - b. Equipment and component systems shall not employ any experimental devices or proprietary designs that could hamper and/or otherwise prohibit subsequent maintenance repairs or adjustments by all qualified contractors.
  - c. Manufacturers of the apparatus shall provide technical support and parts replacements for their equipment and component systems for a minimum of twenty (20) years and issue such guarantee of support to the purchaser with written certification naming the final Owner of their product(s) to ensure the apparatus or systems remain maintainable regardless of who may be selected for future service.
10. All equipment provided shall be factory and field tested with a history of design reliability and net-useful life established.
  - a. Contractor must be able to demonstrate the apparatus to be installed has been used successfully in a substantially similar manner under comparable conditions.
  - b. If the apparatus proposed differs substantially in construction, material composition, design, size, capacity, duty or other such rating from the equipment previously used for the same purpose by the manufacturer, the Consultant may reject the apparatus or require the vendor test and demonstrate the adequacy and suitability for this particular situation. Any necessary tests shall be performed at the sole expense of the Contractor with no prior guarantee of acceptance after the testing procedure.
11. The Contractor shall not use as part of the permanent equipment any experimental devices, proprietary design, components, construction of materials which have not been fully tried out in at least substantially similar or under comparable service, except as may be especially approved by the Consultant. If any important equipment or devices to be used on this installation differ substantially in construction, materials, design, size, capacity or duty from corresponding items previously used for the same purpose by the manufacturer, they shall pass such tests as the Consultant may require to fully show their adequacy and suitability. These tests shall be in addition to tests herein specified and shall be made at the expense of the Contractor.
12. Certain design limitations, tests, etc., are herein specified as a partial check of the adequacy of design, construction and materials used. These requirements do not cover all features necessary to ensure satisfactory and approved operation, etc., of the equipment.
13. It is understood, the entire system shall be designed, fabricated, modified and/or upgraded in full compliance with applicable local laws and code standards. The absence of a particular item or requirement shall not relieve the Contractor of the full and sole responsibility for such equipment, features and/or procedures.
14. With the exception of only those items specifically identified as being performed by others, the Specifications are intended to include all engineering, material, labor, testing, and inspections needed to achieve work specified by the Contract Documents. Inasmuch as it is understood that any incidental work necessary to complete the project is also covered by the Specifications, bidders are cautioned to familiarize themselves with the existing job site conditions. Additional charges for material or labor shall not be permitted subsequent to execution of the Contract.

15. Bidders must report discrepancies or ambiguities occurring in the Specifications to the Consultant for resolution prior to the bidding deadline, otherwise the Specifications shall be deemed acceptable in their existing form.
16. Fixtures, Operating Devices and Signage Survey
  - a. Upon award of the Contract, Contractor shall perform a survey of the existing elevator operating fixtures and devices, including signage, and present a report to the Building Management. The report shall include photographs of the following existing items:
    - 1) Hall call push buttons
    - 2) Floor identification / Braille signage in entrance jambs
    - 3) Lobby directional lanterns at all floors
    - 4) Applicable wall surfaces
  - b. The Contractor shall submit, as part of the report, pictures or catalog cuts of the new devices intended to be installed under the modernization project at the various locations including any additional signage either new or replacing existing.

C. Termination of Existing Agreement(s)

1. By submitting a bid, the existing maintenance provider agrees that any service contract(s) in effect shall be terminated by the Owner should the project be awarded to another vendor upon thirty (30) day written notice to the Contractor by the Owner.
  - a. The contract(s) shall be terminated with no penalty to the Owner or Contractor.
  - b. Owner will be responsible for money owed the Contractor for services provided and work performed up until the date of cancellation.

D. Abbreviations and Symbols

1. The following abbreviations, Associations, Institutions, and Societies may appear in the Project Manual or Contract Documents:

ADA	Americans with Disabilities Act
AHJ	Authority Having Jurisdiction
AIA	American Institute of Architects
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
IBC	International Building Code
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
OSHA	Occupational Safety and Health Act

E. Codes and Ordinances / Regulatory Agencies

1. Work specified by the Contract Documents shall be performed in compliance with applicable Federal, State, and municipal codes and ordinances in effect at the time of Contract execution. Regulations of the Authority Having Jurisdiction shall be fulfilled by the Contractor and Subcontractors. The entire installation, when completed, shall conform with all applicable regulations set forth in the latest editions of:
  - a. Local and/or State laws applicable for logistical area of project work.
  - b. Building Code applicable to the AHJ.
  - c. Elevator Code applicable to the AHJ.
  - d. Safety Code for Elevators and Escalators, ASME A17.1 and all supplements as modified and adopted by the AHJ.
  - e. Safety Code for Elevators and Escalators, A17.1S supplement to A17.1 as modified and adopted by the AHJ for Machine Room Less installations (MRL).
  - f. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2.
  - g. Safety Code for Existing Elevators and Escalators, ASME A17.3 as modified and adopted by the AHJ.
  - h. Guide for emergency evacuation of passengers from elevators, ASME A17.4.
  - i. National Electrical Code (ANSI/NFPA 70).
  - j. American with Disabilities Act - Accessibility Guidelines for Building and Facilities and/or A117.1 Accessibility as may be applicable to the AHJ.
  - k. ASME A17.5/CSA-B44.1 - Elevator and escalator electrical equipment.
  - l. ECC (Energy Conservation Code) as may be applicable to the AHJ.
2. The Contractor shall advise the Owner's Representative of pending code changes that could be applicable to this project and provide quotations for compliance with related costs.

F. Reference Standards

1. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
2. ANSI/AWS D1.1 - Structural Welding Code, Steel.
3. ANSI/NFPA 80 - Fire Doors and Windows.
4. ANSI/UL 10B - Fire Tests of Door Assemblies.
5. ASTM D1785 - PVC Pipe
6. ASTM D2466 - PVC Pipe Fittings
7. ASTM D2564 - Cement for PVC Pipe and Fittings
8. ANSI/IEEE - 519-Latest Edition
9. ANSI/IEEE - Guide for Surge Withstand Capability (SWC) Tests
10. ANSI Z97.1 - Laminated/Safety Tempered Glass

G. Definitions

1. Defective Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
2. Provide: Where used in this document, provide shall mean to install new device, apparatus, system, equipment or feature as specified in this document.
3. Definitions in ASME A17.1 as amended or modified by the AHJ apply to work of this Section.

## 1.2 PERMITS AND SUBMITTALS

### A. Permits

1. Prior to commencing work specified by the Contract Documents, the Contractor shall, at its own expense, obtain all permits or variances as may be required by the AHJ and provide satisfactory evidence of having obtained said permits and variances to both the Owner's Representative and Consultant.
2. File necessary drawings for approval of all Authorities Having Jurisdiction.
3. The Elevator Contractor shall undertake the necessary review and search procedure to identify open applications and/or outstanding violations for this property; and close-out such applications and/or expunge such violations relative to the project scope as required for final acceptance by the AHJ.
4. Outstanding applications and violations must be indicated on the request for permit filing for this procedure to ensure such applications and/or violations are dismissed accordingly.

### B. All relative costs shall be included in the base bid proposal with the understanding that corrective actions are covered under the specified scope of work.

### C. Submittals

1. Prior to beginning the work, the Contractor shall submit and have approved copies of layout drawings, shop drawings and standard cuts. These items shall include:
  - a. A plan and section view of the hoistway, pit and machine room
  - b. Machine assembly, controller, door equipment, signal fixtures Door panels, car and counterweight guides, travel cable, and cab enclosures/ interiors.
  - c. All specified additional accessories.
2. The Consultant and the Owner's Representative shall pass on the submittals with reasonable promptness and the Contractor shall be responsible to ensure that there will be no delay in their work or that of any other trade involved.
3. Approved filing and submittal requirements must be completed before equipment and related materials are ordered.
4. Copies of Department of Buildings' permits and/or governing authority's documents will be posted at the job site with copies issued to the Owner's Agent, Owner's Representative and Consultant.
5. Samples of wood, metal, plastic, paint or other architectural finish material applicable to this project shall be submitted for approval by the Owner's designee.
6. It shall be understood that approval of the drawings and cuts by Owner's designee, Architect and/or Consultant shall be for general arrangement only and does not include measurements which are the Contractor's responsibility or approval of variations from the contract documents required by the AHJ.
7. The Contractor shall prepare a record log and maintain all submittals, shop drawings, catalog cuts and samples.

### D. Measurements and Drawings

1. Drawings or measurements included with the bidding material shall be for the convenience of the bidders only and full responsibility for detailed dimensions lies with the Contractor.

2. In the execution of the work on the job, the Contractor shall verify all dimensions with the actual conditions.
3. Where the work of the Elevator Contractor is to join other trades, the shop drawings shall show the actual dimensions and the method of joining the work of the various trades.

E. Substitutions

1. Requests for substitutions will be considered under the following time limitations and situations:
  - a. Not less than ten (10) calendar days before bids are due.
  - b. Work or equipment specified becomes unavailable through unforeseen events such as strikes, loss of manufacturer's plant through fire, flood or bankruptcy.
2. Requested substitutions will be reviewed and adjudged. Failure of the Owner to raise objection shall not constitute a waiver of any of the requirements of the Contract Documents.
3. Request for substitutions shall include complete data with drawings and samples as required, including the following:
  - a. Quality Comparison - Proposed substitution versus the specified product.
  - b. Changes required in other work because of the substitution.
  - c. Effect on the construction schedule.
  - d. Cost Data - Resulting from the proposed substitution versus the specified product. The Contractor shall certify that the cost data presented is complete and includes all related costs under this Contract.
  - e. Safety Comparison – Proposed substitution shall provide equivalent or greater safety, with certification data provided where relevant.
4. When proposing a substitution, the Contractor represents that:
  - a. They have investigated the proposed substitution and have determined that it is equal to or better than the product specified.
  - b. They will guarantee the substitution in the same manner as the product specified.
  - c. They will coordinate and make other changes as required in the work as a result of the substitution.
  - d. They waive all claims for additional costs as a result of the substitution, with the exception of those identified above under "cost data".
5. The Owner will be sole judge of the acceptability of the proposed substitution.
6. The Owner and Consultant will have authority to approve or reject substitutions or to change the specified standards of quality. However, neither this authority to act under this provision nor any decision made in good faith, either to exercise or not to exercise this authority, shall give rise to any duty or responsibility of the Owner to the Contractor, any Subcontractor, any Sub-Subcontractor, any of their agents or employees or any other persons performing the work or offering to perform the work.

F. Changes in Scope and Extra Work

1. The Owner may at any time make changes in the specifications, plans and drawings, omit work, and require additional work to be performed by the Contractor.
  - a. Each such addition or deletion to the Contract shall require the Owner and the Contractor to negotiate a mutually acceptable adjustment in the contract price, and, for the Contractor to issue a change order describing the nature of the change and the amount of price adjustment.
  - b. The Contractor shall make no additions, changes, alterations or omissions or perform extra work except on written authorization of the Owner.
  - c. Each change order shall be executed by the Contractor, Owner, and the Consultant.

#### G. Keys

1. Upon the initial acceptance of work specified by the Contract Documents on each unit, the Contractor shall deliver to the Owner, six (6) keys for each general key-operated device that is provided under these specifications in accordance with ASME A17.1, Part 8 standards as may be adopted and modified by the AHJ.
2. All other keying of access or operation of equipment shall be provided in accordance with ASME A17.1 Part 8 as may be adopted and modified by the AHJ.

#### H. Diagnostic Tools

1. Prior to seeking final acceptance of the project, the Contractor shall deliver to the Owner any specialized tools required to perform diagnostic evaluations, adjustments, and/or programming changes on any microprocessor-based control equipment installed by the Contractor. All such tools shall become the property of the Owner.
  - a. Owner's diagnostic tools shall be configured to perform all levels of diagnostics, systems adjustment and software program changes which are available to the Contractor.
  - b. Owner's diagnostic tools that require periodic re-calibration and/or re-initiation shall be performed by the Contractor at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the project.
  - c. The Contractor shall provide a temporary replacement, at no additional cost to the Owner, during those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation or repair.
2. Contractor shall deliver to the Owner, printed instructions, access codes, passwords or other proprietary information necessary to interface with the microprocessor-control equipment.

#### I. Service Support Requirements

1. Software / Firmware Updates
  - a. During the life of the equipment and subject to the term of the maintenance agreement, where revisions to firmware and/or software are issued by the control manufacturer or manufacturer of solid state and microprocessor-based subsystems subsequent to the beneficial use of the equipment, updates shall be provided so that

the installation and spare circuit boards are current with respect to software and firmware versions.

J. Wiring Diagrams, Operating Manuals and Maintenance Data

1. Deliver to the Owner two (2) identical volumes of printed information organized into neatly bound manuals prior to seeking final acceptance of the project.
2. The manuals shall also be submitted in electronic format on non-volatile media, incorporating raw 'CAD' and/or Acrobat 'PDF' file formats. Electronic manuals shall be properly indexed, bookmarked, and searchable.
3. Manuals, as well as electronic copies, shall contain the following:
  - a. Step-by-step adjusting, programming and troubleshooting procedures that pertain to the solid-state microprocessor-control and motor drive equipment.
  - b. Passwords or identification codes required to gain access to each software program in order to perform diagnostics or program changes.
  - c. A composite listing of the individual settings chosen for variable software parameters stored in the software programs of both the motion and dispatch controllers.
  - d. Method of control and operation.
4. Provide two (2) sets of "AS INSTALLED" straight-line wiring diagrams in both hard and electronic format in accordance with the following requirements:
  - a. Displaying name and symbol of each relay, switch or other electrical component utilized including identification of each wiring terminal.
  - b. Electrical circuits depicted shall include all those which are hard wired in both the machine room and hoistway.
  - c. Supplemental wiring changes performed in the field shall be incorporated into the diagrams in order to accurately replicate the completed installation.
5. Furnish two (2) sets of bound instructions and recommendations for maintenance, with special reference to lubrication and lubricants along with the full Maintenance Control Program as required Part 8 of ASME A17.1.
6. Manuals or photographs showing controller replacement parts with part numbers listed.

K. Training

1. Prior to seeking final acceptance of the project, the Contractor shall conduct an eight (8) hour training program on-site with building personnel selected by the Owner.
2. The focus of the session shall include:
  - a. Instructions on proper safety procedures and who to contact for the purpose of assisting passengers that may become entrapped inside an elevator car.
  - b. Explain each control feature and its correct sequence of operation.
3. Control features covered shall include but not be limited to:
  - a. Independent Service Operation.
  - b. Emergency Fire Recall Operation - Phase I.

- c. Emergency In-car Operation - Phase II.
- d. Emergency Power Operation.
- e. Emergency Communications Equipment.
- f. Hospital Emergency Service.
- g. Security Operating Features.
- h. Interactive Systems Management.
- i. Remote Monitoring/Controls.

L. Patents

- 1. Patent licenses which may be required to perform work specified by the Contract Documents shall be obtained by the Contractor at its own expense.
- 2. The Contractor agrees to defend and save harmless the Owner, Consultant and agents, servants, and employees thereof from any liability resulting from the manufacture or use of any patented invention, process or article of appliance in performing work specified in the Contract Documents.

M. Advertising

- 1. Advertising privileges shall be retained by the Owner.
- 2. It shall be the responsibility of the Contractor to keep the job site free of posters, signs, and/or decorations.
- 3. Contractor's logo shall not appear on faceplates or entrance sills without the approval of the Owner.

### 1.3 QUALITY ASSURANCE

A. Materials and Quality of Work

- 1. All materials are to be new and of the best quality of the kind specified.
- 2. Installation of such materials shall be accomplished in a neat manner and be of the highest quality.
  - a. Should the Contractor receive written notification from the Owner stating the presence of inferior, improper, or unsound materials or quality of installation, the Contractor shall, within twenty-four (24) hours, remove such work or materials and make good all other work or materials damaged.
  - b. Should the Owner permit said work or materials to remain, the Owner shall be allowed the difference in value or shall, at its election, have the right to have said work or materials repaired or replaced as well as the damage caused thereby, at the expense of the Contractor, at any time within one (1) year after the completion of the work; and neither payment made to the Contractor, nor any other acts of the Owner shall be construed as evidence of acceptance and waiver.

B. Electrical Design Requirements (General)

- 1. The following typical requirements shall apply to all parts of the work and are supplementary to other requirements noted under the respective headings.

- a. The design and construction of the motors shall conform to the requirements of these specifications and to the ASME Standards for Rotating Electrical Machinery with revisions issued to the first day when the work of this Contract was advertised.
  - 1) Motors shall operate successfully under all loads and speeds and during acceleration and deceleration.
  - 2) Motors shall be designed for quiet operation without excessive heat.
  - 3) Insulation on motor coils and windings and on all insulated switch, relay, brake and other coils shall conform to the requirements of minimum Class "F" insulation, as defined in ANSI Standards for Rotating Electrical Machinery. All motors shall be impregnated twice.
  - 4) Switches, relays, etc., on controller, starter and signal panels and similar items on other parts of the equipment shall be the latest improved type for the condition of use. They shall function properly in full accordance with the requirements of the machines controlled and with the specified operating requirements of the elevator. Any of these parts showing wear or other injurious effects during the guarantee period to the extent that abnormal maintenance is required or indicated shall be replaced with proper and adequate parts by the Contractor.
  - 5) Contacts in elevator motor circuits which are intended to be opened by governors or other safety devices shall be copper to carbon or other approved non-fusing type.
  - 6) Where required, controllers and other component parts of the installation shall be labeled in accordance with the latest codes and standards as adopted and/or otherwise modified by the AHJ.
  - 7) Electrical equipment, motors, controllers, etc., installed under this contract shall have necessary CSA/US or UL/US listing as may be required by the AHJ. Equipment shall be labeled or tagged accordingly.

C. Energy Conservation Code

1. The Contractor shall comply with the requirements set forth in the Energy Conservation Code as may be applicable to the AHJ.
2. Except for equipment or systems under the purview of other disciplines, elevator and escalator equipment provided by the Contractor requiring compliance shall include, but not be limited to:
  - a. Absorption of regenerated power for elevators
  - b. Energy efficiencies of car interior lighting and ventilation
  - c. Automatic operation of car interior lighting and ventilation through the individual car controller

D. Materials, Painting and Finishes

1. Two (2) coats of rust inhibiting machinery enamel shall be applied to exposed ferrous metal surfaces in the pit that do not have a galvanized, anodized, baked enamel, or special architectural finishes.
2. Two (2) coats of rust inhibiting enamel paint to the machinery located within the machine room and secondary level (where applicable) as well as to the machine room floors.

3. Architectural metal surfaces of bronze or similar non-ferrous materials which are specified to be refinished, re clad and/or provided new, shall be sufficiently clear coated so as to resist tarnishing during normal usage for a period of not less than twelve (12) months after final acceptance by the Owner.
4. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
5. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by Code at intervals not exceeding 7'-0". The color of paint used shall contrast with the color of the surface to which it is applied.

#### E. Accessibility Requirements

1. Locate door reopening devices at 5" and 29" above the finish floor when individual contact projection apparatus is employed.
2. Locate the alarm button and emergency stop switch at 35", and floor and control buttons not more than 48" above the finished floor. The alarm button shall illuminate when pressed for visual acknowledgement to user.
3. Provide raised markings in the panel to the left of the car call and other control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons and cover plate.
4. The centerline of new hall push button shall be 42" above the finished floor.
5. The hall arrival lanterns, or cab direction lantern provided shall sound once for the "up" direction and twice for the "down" direction. Design and locate fixtures per Federal standards.
6. Provide floor designations at each entrance on both sides of jamb at a height of 60" above the floor.
  - a. Use cast metal plates and polished numbers secured with tamper-proof hardware.
  - b. Designations shall be 2" high, raised .03" on a contrasting color background as selected by the Owner.
7. Provide an audible signal within the elevator to tell passenger that the car is stopping or passing a floor served by the elevator.
8. Where elevators operate at a speed greater than 200 fpm, provide a verbal annunciator to announce the floor at which the elevator is stopping where required by the AHJ.
9. Provide signal control timing for passenger entry/exit transitions per Federal and/or Local standards.
10. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
11. Provide visual call acknowledgment signal for car emergency intercommunication device.

#### F. Qualifications

1. The work shall be performed by a company specialized in the business of manufacturing, installing and servicing conveying systems of the type and character required by these specifications with a minimum of ten (10) years of experience.

2. Prior written acceptance is required for manufacturers other than those listed, before quoting this project. Requests for acceptance will not be considered unless they are submitted before bid date and are accompanied by the following information:
  - a. List of five (5) similar installations having exact equipment being proposed for this project arranged to show name of project, system description and date of completed installation. The list shall include the names, position and resumes of the construction team and field supervisor of the installations.
  - b. Complete literature, performance and technical data describing the proposed equipment. Include the names, position and resumes of the proposed construction team and field supervisor.
  - c. List of ten (10) service accounts by building name, building manager or owner, including phone numbers.
  - d. Location of closest service office from which conveying system will be maintained.
  - e. Location of closest parts inventory for this installation.
  - f. List of the names, positions and resumes of the construction teams and field supervisor for the installation.

G. Structural, Mechanical and Electrical Design Parameters

1. The mechanical and electrical systems and the building structure have been designed for the following design loads:
  - a. Structural Loads:
    - 1) The pit, machine room and rail loads are shown on the drawings.
2. Power supply: 208 / 460V-3PH-60Hz (EE to verify)
3. Electrical Loads: (EE to verify)
4. Heat Release: (EE to verify)
5. Submit a written statement with the bid that the above design loads and the clearance requirements shown on the Architectural drawings are acceptable for the proposed equipment. If not, specifically state the design variances.
6. After the award, if the type of equipment provided requires structure, mechanical and electrical system changes and/or revisions, the Elevator Contractor shall be responsible for all additional design and construction costs.
7. Electrical equipment, motors, controllers, etc., installed under this contract shall have necessary CSA/US or UL listing as may be required by the AHJ. Equipment shall be labeled or tagged accordingly.

1.4 DELIVERY / STORAGE / HANDLING / COORDINATION

A. Delivery and Storage of Material and Tools

1. Comply with the requirements of Division 01.
2. Delivery, Storage and Handling:
  - a. Deliver materials to the site ready for use in the accepted manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand

name and manufacturer's name. Delivered materials shall be identical to accepted samples.

- b. Store materials under cover in a dry and clean location, off the ground.
  - c. Remove delivered materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
3. The Owner shall bear no responsibility for the materials, equipment or tools of the Contractor and shall not be liable for any loss thereof or damage thereto.
  4. The Contractor shall confine storage of materials on the job site to the limits and locations designated by the Owner and shall not unnecessarily encumber the premises or overload any portion with materials to a greater extent than the structural design load of the Facility.

**B. Work with Other Trades / Coordination**

1. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are embedded in concrete or masonry for the applicable equipment. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
2. Coordinate sequence of installation with other work to avoid delaying the Work.
3. Coordinate locations and dimensions of other work relating to the equipment scheduled for installation including pit ladders, sumps, and floor drains in pits; entrance subsills; machine beams; and electrical service, electrical outlets, lights, and switches in pits and machine rooms, secondary levels, overhead sheave rooms and hoistways as it relates to the specific equipment.

**C. Removal of Rubbish and Existing Equipment**

1. On a scheduled basis, the Contractor shall remove all rubbish generated in performing work specified in the Contract Documents from the job site.
2. Any component of the existing elevator plant that is not reused under the scope of work specified in the Contract Documents shall become property of the Contractor and, as such, shall be removed from the premises at the Contractor's sole expense.
3. The Contractor agrees to dispose of the aforementioned equipment and rubbish in accordance with any and all applicable Federal, State, and municipal environmental regulations, and further accepts all liability that may result from handling and/or disposing of said material.

**D. Protection of Work and Property**

1. The Contractor shall continuously maintain adequate protection of all their work from damage and shall protect the Owner's property from injury or loss arising out of this contract.
2. The Contractor shall make good any such damages, injury or loss, except such as may be directly caused by agents or employees of the Owner.
3. The Contractor shall provide all barricades required to protect open hoistways or shafts per OSHA regulations. Such protection shall include any necessary guards or other barricades for employee protections during and after the modernization procedure.

## 1.5 RELATED WORK

### A. Work by Elevator Contractor Included in the Base Bid

1. The following requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.
  - a. Installation of new electrical conduit and power feeders between the load side of existing and new main line disconnect switches and new elevator control equipment.
  - b. The top surface of any setback or projection in the hoistway that measures 2" or more in width shall be beveled at an angle of not less than 75 degrees from horizontal. Each bevel plate shall be constructed from prime painted 14 gauge cold-rolled steel and installed so as to conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
  - c. Provide the following signage, plates and tags:
    - 1) Provide all required manufacturer data plates and installation-specific tags and signs of the types and styles containing information as required by applicable Codes and Standards as adopted and/or modified by the AHJ.
  - d. Provide a standard railing conforming to Code on the outside perimeter of the car top on all sides where the perpendicular distance between the edges of the car top and the adjacent hoistway enclosure exceeds 300 mm (12 in.) horizontal clearance or as otherwise required by the Authority Having Jurisdiction.
  - e. Provide necessary patching, repairing and installation of masonry and/or dry wall for smooth and legal elevator hoistways.
  - f. Subsequent to the contract execution, the Contractor shall perform the following procedures and engineering tasks relative to balance loading of system and cab work included under base specification requirements and alternative/optional upgrades:
    - 1) Perform balance load testing to determine existing conditions and requirements applicable to new/modified equipment.
    - 2) Provide data for Purchaser and/or their agents to evaluate any limitations that may be placed on design/finish options due to prevailing conditions or total suspended loading.
  - g. Subsequent to the contract execution, the Contractor shall perform a Violation search and review of all open Applications in conjunction with the filing procedure. Subsequently, any and all outstanding Violations and/or open Applications shall be indicated on the Request for Permit; and such outstanding Violations shall be expunged, and open Applications closed out as part of this filing procedure.
    - 1) If requirements and/or work necessary to satisfy outstanding Violation or Applications are not included in the contracted scope of work, the Elevator Contractor shall prepare an itemized listing with relative extra costs to cure the condition(s) and expunge and/or close out the Violation or Application for the Owners' and Consultants' review/approval prior to executing such work procedures.

### B. Work by Others

1. The following requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.
  - a. Installation of new fully enclosed, externally operated, fused main line and/or auxiliary disconnect switch, with 4<sup>th</sup> wire ground, properly located in accordance with local law that can be locked in the open (off) position.
  - b. Installation of new electrical conduit and power feeders between the load side of new main line disconnect switches and new elevator control equipment.
  - c. Where there is an increase in HP of the elevator pump motor, Contractor shall conduct an investigation to determine if existing feeder wires and conduit / piping to the elevator machine room are adequate in size to supply the new pump motor. Where they are not adequate in size, or where power supply from the building distribution panel is not large enough for feeder size / motor HP rating, Contractor shall include in their Base Bid proposal the cost to provide new building distribution electrical distribution supply connections, feeder wires and conduit / piping to elevator machine room.
  - d. Installation of battery lowering control interface provisions to interlock the mainline disconnect to prevent application of battery lowering operation when disconnect switch is turned to the “off” position. Provide auxiliary contacts and associated wiring and hardware in the existing or new mainline disconnect switch enclosure as required per Code.
  - e. Provide auxiliary power feeds with required distribution load center (circuit breaker panel) for intercommunication, CCTV systems, cab lighting or other specialty devices existing or to be provided by the Elevator Contractor.
    - 1) Voltage shall be 120 VAC with one (1) 15-Amp circuit breaker or fuse for lighting of each individual elevator car enclosure.
    - 2) Voltage shall be 120 VAC with one (1) 20-Amp circuit breaker or fuse for battery power lowering system.
    - 3) Circuit breakers and/or fused disconnects shall be lockable in the “OFF” position in accordance with applicable code.
  - f. Installation of new main line power feed with related disconnect switch designed and located per local law requirements.
  - g. Provide remote/auxiliary disconnects where new or existing disconnect switches are not in line-of-sight of the controller.
  - h. Installation of auxiliary power feed with related distribution panel(s) and disconnect(s) designed and located per local law requirements.
    - 1) Voltage shall be 110 VAC with one (1) 15-Amp circuit breaker or fuse for lighting of each individual elevator car enclosure.
    - 2) Circuit breakers and/or fused disconnects shall be lockable in the “OFF” position in accordance with applicable code.
  - i. Installation of new permanent dual lamp LED lighting fixtures with protective guards and 110-volt duplex GFI receptacles inside the machine room. Illumination shall be no less than thirty (30) foot-candles at floor level. A light control switch shall be provided immediately adjacent to the machine room entrance door. Provide necessary receptacles as required by Elevator Contractor to supply power to auxiliary elevator equipment and/or remotely located monitors.

- j. Provide machinery spaces of the secondary level directly below the machine room with permanent lighting fixtures having protective guards and a duplex GFI receptacle. Illumination shall be no less than nineteen (19) foot-candles at floor level. A light control switch shall be provided immediately adjacent to the secondary level entrance door/ladder in accordance with code.
- k. Provide each elevator pit with a 110-volt GFI duplex receptacle and a permanent dual lamp LED lighting fixture equipped with protective guard. Illumination shall be no less than ten (10) foot-candles at pit floor level. A light control switch shall be provided and so positioned as to be readily accessible from the pit entrance door or ladder.
- l. Installation of hoistway and machine room smoke relief provisions in accordance with local laws.
- m. Provide each machine room, secondary space and pit with a self-closing, self-locking, fire-labeled access door. Locking means shall be spring-type arranged to permit the doors to be opened from the inside without a key.
- n. Provide a smoke detector system meeting the requirements of A17.1 and/or the Local Governing Authority.
- o. Installation of fire emergency control interface provisions for automatic recall of the elevator(s) through operation of the fire detection system. Provisions shall be made for alternate designated fire recall landing with connection contingent on Codes recognized by the local governing authority. The interfacing contacts shall be wired to an electrical junction box located inside each elevator machine room for connection to the elevator control systems by the Elevator Contractor. Each wire shall be clearly labeled with its control function. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.
- p. Installation of new or modification of existing fire emergency control interface provisions for automatic recall of the elevator(s) through operation of the fire detection system. Provisions shall be made for primary, alternate and third-zone (Fire-Hat) designated fire recall landing with connection contingent on Codes recognized by the local governing authority. The interfacing contacts shall be wired to an electrical junction box located inside each elevator machine room for connection to the elevator control systems by the Elevator Contractor. Each wire shall be clearly labeled with its control function. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.
  - 1) Installation of heat / smoke detecting devices in the elevator machine room, elevator lobbies, top of shaft and / or pit as required for elevator fire recall operation to meet current requirements of A17.1 and/or the local Governing Authority. Connection and programming of these new devices to existing building fire alarm control panel.
  - 2) Modification of existing fire alarm control panel and interface / wiring to panel as required to accommodate new heat / smoke detecting devices or new elevator fire recall zones, including installation of expansion panel and new power supply(s) (if required) to existing FACP.
  - 3) Software modifications as required to the existing fire alarm control panel as required to accommodate new smoke / heat detecting devices, new elevator fire recall zones, or expansion panel (if required).
  - 4) All wiring, piping, coring, cutting, patching, as required for new ducts / conduits to connect new or modified components of the fire alarm control

system to operate elevator fire recall to meet current requirements of ASME A.17.1 and/or the local Governing Authority.

- q. Where sprinkler fire protective systems are provided inside any elevator hoistway, machine room or associated machinery space, provisions shall be made for the disconnecting of the main line power supply from the affected elevator prior to activation. This means of disconnect shall be manually reset in accordance with code.
- r. Installation of emergency power control interface provisions to signal the elevator control apparatus of a transfer from normal (utility) power to the building emergency (generator) power supply. Also, provide additional control interface to give advanced notification to the elevator control apparatus that the power source will transfer from emergency (generator) power to normal (utility) power. Interfacing contacts shall be wired to an electrical junction box located inside each machine room for connection to the elevator control equipment by the Elevator Contractor. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.
  - 1) On the line side of each main line disconnect switch, provide some means to absorb power that may be regenerated by the elevator hoist motor during emergency power operation.
  - 2) Normal Power/Emergency Power Control Signals consisting of two (2) dry contacts provided by others to function as follows:
    - a) One (1) dry contact normally open to make when Normal Power is available. (Logic state of dry contact is to be confirmed by the Manufacturer of the Elevator Control Equipment).
    - b) One (1) dry contact normally open to make when emergency power is available. (Logic state of dry contact is to be confirmed by the Manufacturer of the Elevator Control Equipment).
- s. Installation of HVAC provisions inside the machine room so as to maintain ambient temperature and humidity levels that are within the range specified by the microprocessor-control equipment manufacturers.
- t. Provide a class “ABC” fire extinguisher in electrical machinery and control spaces. Locate the extinguisher in close proximity to the access door.
- u. Provide necessary telephone wiring with connection to local telephone service for remote elevator monitoring and/or two-way voice emergency communications systems.
  - 1) Terminate the telephone wiring in junction boxes or standard phone jack terminals in the machine room.
  - 2) Coordinate the quantity and termination method of individual phone connections with the Elevator Contractor.
  - 3) Identify each phone line for connection by the Elevator Contractor to the appropriate elevator device(s).
  - 4) Telephone wiring, where required by applicable codes, shall be installed in conduit.

- v. Sumps in pits where provided, shall be covered. The cover shall be level with the pit floor so as not to produce a tripping hazard.
- w. Where the pit extends more than three (3) feet below the sill of the pit access door, provide a permanent fixed metal ladder.
  - 1) Ladder shall extend no less than 48" above the sill of the access door. Handgrips shall extend from the ladder to a point no less than 48" above the sill of the access door where the ladder does not comply.
  - 2) The rungs shall be a minimum of 12" wide. Where prevailing conditions prevent a 12" wide rung, the rung may be reduced to no less than 9".
  - 3) The rungs shall be spaced 12" on center.
  - 4) A clear distance of no less than 4-1/2" from the centerline of the rungs and handgrips to the nearest permanent object in back of the ladder shall be provided.
- x. Provide Ethernet connection terminals in elevator machine rooms and location of elevator monitoring system.

## 1.6 WARRANTY / MAINTENANCE SERVICES

### A. Contract Close-Out, Guarantee and Warranties

- 1. The Contractor agrees to certify that work performed in accordance with the Contract Documents shall remain free of defects in materials and quality of work for a period of one (1) year after final acceptance of the completed project, or acceptance thereof by beneficial use on a unit-by-unit basis, whichever occurs first.
- 2. The sole duty of the Contractor under this warranty is to correct any non-conformance or defect and all damages caused by such defect without any additional cost to the Owner and within fifteen (15) days of notification.
- 3. The express warranty contained herein is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.
- 4. In the event the Contractor fails to fulfill its obligations defined herein, the Owner shall have the express right to perform the Contractor's obligations and to charge the Contractor the cost of such performance or deduct an equal amount from any monies due the Contractor.

### B. Maintenance Coverage

- 1. The following maintenance coverage apply:
  - a. Interim Maintenance
    - 1) Provide full protective maintenance services and equipment coverage for one (1) month prior to the commencement of work, and during the work implementation procedure, until final acceptance of the finished project.
    - 2) Interim full comprehensive maintenance services shall be provided in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.

- 3) Costs related to interim maintenance shall be included in the base bid quotation indicated on the bid form provided with a deduction for unit(s) out of service for upgrading.
- b. Guarantee Maintenance
- 1) Provide full comprehensive preventative maintenance services for a period of twelve (12) months after the final completion and acceptance of the entire project.
  - 2) Guarantee maintenance and related services shall be provided in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.
  - 3) Costs related to guarantee maintenance shall be included in the base bid quotation indicated on the bid form in the space provided.
- c. Long-Term Maintenance
- 1) Long-term full comprehensive maintenance and related services shall be returned to the incumbent service provider once the guarantee period has completed and approved by Ownership.

## 1.7 AUXILIARY SYSTEMS / TESTING PROCEDURES

### A. Smoke Detector System (New)

1. The Elevator Contractor shall provide a complete smoke detector system for elevator recall complying with the governing authority's requirements and ASME A17.1 as approved or modified under local law.
  - a. Smoke detectors shall be installed in the elevator lobby at each floor, top of hoistway, in pit areas, and associated elevator machine room in accordance with NFPA and/or other applicable codes and standards of the authority having jurisdiction.
  - b. The activation of a smoke detector in any elevator lobby or associated elevator machine room other than the designated level (1st Floor) shall cause all cars in all groups that serve that lobby to return non-stop to the designated level (1st Floor).
  - c. The activation of a smoke detector at the designated level (1st Floor) shall cause the cars to return to an alternate level as required and/or allowed by applicable code unless the Phase I key-operated switch is in the "firemen service" position.
  - d. Smoke detectors and/or smoke detector system shall not be self-resetting.
  - e. Elevator Recall System shall incorporate a minimum number of zones as follows:
    - 1) Zone 1, First Floor
    - 2) Zone 2, Alternate Floor
    - 3) Zone 3, Machine Room
    - 4) Zone 4, Top of Shaftway
    - 5) Zone 5, Pit
    - 6) Zone 6, Spare
    - 7) Zone 7 to All Typical Landings serviced

- f. The system shall be independent of the existing building systems and shall contain the following:
  - 1) Modular LED control panel/annunciator, located at the 1st Floor Lobby in a specially designed tamperproof station, shall be custom designed for each individual system and location.
  - 2) Smoke detectors shall be photoelectric type or approved equal.
  - 3) Primary power supply shall be provided by Elevator Contractor.
  - 4) Minimum twenty-four (24)-hour emergency power failure battery back-up with automatic recharging apparatus and signal status indicators.
- g. Elevator Contractor shall provide all wiring, conduit and make final connections. Conduit may run in elevator hoistway as part of elevator control signal systems provided such circuitry is installed per local code requirements.

## 1.8 ALTERNATES AND VALUE ENGINEERING:

The following alternatives are elective upgrades which constitute changes to the base scope of work specified. Pricing for each alternate upgrade is requested from the bidder with costs indicated in the appropriate space in the Request for Proposal (RFP). Contractor shall take into consideration, as part of the alternative pricing, alternate work that is required either in lieu of, or in addition to, work specified in the base scope and shall not duplicate costs.

### A. Contractor's Value Engineering Options

1. This alternative is provided for individual contractors to propose optional equipment or otherwise offer cost saving suggestions that will provide the same desired results or further enhance the safety, durability or performance of the elevator systems.
2. Each suggestion must be fully detailed on the contractor's own letterhead with the associated price change specified on the form of proposal provided.

## PART 2 - PRODUCTS

### 2.1 GENERAL DESCRIPTION

### 2.2 Hydraulic Elevator

#### A. WSU 61 Putnam, Detroit, MI 48202 US - Hydraulic Elevator PE1, PE2, PE3

1. Quantity	Three (3)
2. Type	Hydraulic Elevator Passenger
3. Capacity (lbs)	3000
4. Speed (fpm)	125
5. Travel in Feet	Existing
6. Number of Landings	Six (6)
7. Number of Openings	Six (6)

8.	Front Openings	Six (6)
9.	Rear Openings	None (0)
10.	Side Openings	None (0)
11.	Operation	Group Selective Collective Operation
12.	Controller	Control Equipment (New)
13.	Machine Room, Secondary, Pit	New
14.	Machine Type	Dry Unit - New
15.	Power Drive	480 VAC (field verify)
16.	Machine Location	Adjacent
17.	Power Unit	New
18.	Hydraulic Jack / Cylinder	Jack Unit (Reuse)
19.	Hydraulic Piping	New
20.	Rescuator	Hydraulic Auto Lowering
21.	Governor	Not Applicable
22.	Car Platform / Frame / Safety	Car Frame (Reuse); Car Platform (Reuse)
23.	Counterweight	Not Applicable
24.	Counterweight Safety	Not Applicable
25.	Guide Rails	Reuse
26.	Guides	Roller Guides (New)
27.	Buffers	Car and Counterweight Buffers (Reuse)
28.	Buffer Ladder / Platform	New
29.	Car Door Type	
	a. Front Door	Single Speed Center Opening (New)
	b. Rear Door	N/A
	c. Side Door	N/A
30.	Car Door Size	
	a. Front Door	42" wide x 84" height
	b. Rear Door	Not Applicable
	c. Side Door	Not Applicable
31.	Hoistway Door Type	Single Speed Center Opening
32.	Hoistway Door Size	42" wide x 84" height
33.	Master Door Operator	Car Door Zone Lock Restrictor (New)
34.	Hoistway Entrance Sills	Retain/Recondition
35.	Sill Finish	Nickle Silver
36.	Hoistway Entrances	Reuse
37.	Tracks / Hangers / Interlocks / Closers	Interlocks / Unlocking Devices (New); Tracks / Hangers / Closers / Related Equipment (New)
38.	Emergency Access Doors	New
39.	Emergency Exits / Top and Side	New
	a. Comments	Top
40.	Keyed Access	Not Applicable
41.	Pit Ladder	New
42.	Power Supply	480V-3-60 (Field verify)
43.	Electrical Conduit / Wiring / Traveling Cable (New)	New
44.	CCTV	New
45.	Card Reader	New
46.	Floor Lockout Feature	Provisions

47.	Number of Push Button Risers	One (1)
48.	Inconspicuous Riser	Zero (0)
49.	Car Operating Fixtures	New
50.	Emergency Communication	New
51.	Door Reopening Device	Door Reopening Device (New)
52.	Emergency Cab Lighting	New incorporated into the cab lighting
53.	Car Ventilation	New
54.	Elevator Cab Enclosure	Remodel
55.	Car Doors / Gate Panels	Car Door Panel(s) (New)
56.	Car Flooring	New
57.	Car Sill	New Nickel Silver
58.	Platform Size	Retain/field verify
59.	Door Operation	Power Car / Slide Hoistway
60.	Emergency Access Doors	New
61.	Intercom / Central Exchange	New

## 2.3 MANUFACTURERS

### A. Pre-Approved Equipment Manufacturers

1. The following manufacturer's equipment and materials have been pre-approved by Wayne State University for use on all their traction and hydraulic elevator modernization project.
2. Other equipment not specifically mentioned shall be considered for approval on an individual basis.
  - a. Controller - GAL (GALaxy), Elevator Controls Corporation, Smartrise
  - b. Tracks, Hangers, Interlocks and Door Operators - G.A.L., ECI.
  - c. Fixtures - Innovation, PTL, MAD.
  - d. Door Protective Device - Janus, T.L. Jones, Tri-Tronics.
  - e. Cabs and Entrances/Entrance Door Panels - Tyler, Velis, Gunderlin, Columbia Elevator Products, United Cabs.
  - f. Cab interiors refurbish/remodel – Architectural Metals, A better Elevator Co., Weir inc.
  - g. Machines - Hollister-Whitney, Titan, Imperial, Torin.
  - h. Motors - Imperial Electric, General Electric, Baldor, Reuland Electric.
  - i. SCR Power Drives - MagneTek, KEB, Nidec.
  - j. VVVF Power Drives - Mitsubishi, MagneTek, Yaskawa, TorqMax.
  - k. Guide Rails - AFD Industries, Savera, Monteferro.
  - l. Electrical Traveling Cables - Draka, James Monroe.
  - m. Hydraulic Systems/Components - Canton, Elevator Equipment Corporation, MEI, Schumacher.
  - n. Freight Doors and Systems - Courion, EMS Group, Peelle.
  - o. Guide Shoes/Rollers – ELSCO, G.A.L.
  - p. Wire Ropes - Paulsen, Bethlehem, Wayland, Draka.
  - q. Intercommunications/Telephones -K-Tec, Rath Microtec, Wurtec, Janus, Kings three.
  - r. Compensation Chains - Draka
  - s. Compensation Chain Guides - Draka

- t. All specialized tools, equipment, software, and passwords, required to maintain, repair, adjust the operation, and perform code mandated inspections are provided to the Owner as part of the base installation.
    - 1) Updates to these items shall be available via the parts supply facility referenced above.
  - u. Technical support of the product(s) shall be available to the Owner's elevator service provider.
3. Original Equipment Manufacturers are not accepted.

## 2.4 CONTROL FEATURES / OPERATION

### A. Motion Control (New)

- 1. Smooth stepless acceleration and deceleration of the elevator car shall be provided in either direction of travel during both single and multiple floor runs.
- 2. Use digital logic to calculate optimum acceleration and deceleration patterns during each run.
- 3. Acceleration, deceleration, jerk, maximum velocity, leveling accuracy and elapsed flight time, for a typical elevator one (1) floor run, shall not exceed values as further specified.

### B. Group Selective Collective Operation (New)

- 1. Provide group selective collective operation from a riser of hall push button stations.
- 2. The registration of one or more car calls shall dispatch the car to the selected floors.
  - a. The car shall also respond to registered hall calls in the same direction of travel.
  - b. Car and hall calls shall be canceled when answered.
- 3. Stops in response to calls that are registered in either the car or hall push button stations shall occur in the natural order of progression in which the floors are encountered, depending on the direction of car travel, and irrespective of the order in which calls are registered.
- 4. When the car has responded to the highest or lowest call, and calls are registered for the opposite direction, the car shall reverse direction automatically and respond to those registered calls.
- 5. When the car arrives at its last stop and reverses direction of travel, all previously registered car calls shall be automatically cancelled.
- 6. When the car arrives at a landing where both up and down hall calls are registered, it will answer the call in the direction of travel.
  - a. After a pre-determined delay, if no car call is registered, the car shall respond to calls registered for the opposite direction. Car doors shall close immediately, re-open and respond to the call for the opposite direction.
  - b. Hall lantern operation shall always correspond to direction of service.

7. When an empty car reverses direction at a landing with no hall calls, the doors shall not open, and the hall lantern shall not operate.
8. If the car has no car calls registered and arrives at a floor where both up and down hall calls have been registered, the car shall respond to the hall call corresponding to the last direction of car travel. If, after making its stop, a car call is not registered and no other hall calls exist ahead of the car corresponding to its original direction of travel, the doors shall close and immediately reopen in response to the hall call for the opposite direction.
9. The car shall maintain its original direction at each stop until the doors are fully closed to permit a passenger to register a car call before the car reverses its direction of travel.

C. Independent Service Operation (New)

1. The car operating station shall be equipped with a key-operated switch labeled “IND SER”.
2. Locate the switch in the locked service compartment.
3. When placed in the “on” position the following shall occur:
  - a. Group elevator - the elevator shall bypass corridor calls and travel directly to any floor chosen by registration of a car call. Hall calls shall remain registered for service by another elevator in the group.
4. During Independent Service Operation, the elevator doors shall remain open at any landing until the door close or a car call push button is pressed and maintained until the doors are fully closed.
5. If more than one (1) car call is registered, all registered car calls shall extinguish when the elevator stops in response to the first call.
6. Fire Emergency Recall shall automatically override Independent Service Operation and engage Phase I - Fire Emergency Recall Operation following a period of approximately forty-five (45) seconds.

D. Inspection Service Operation (New)

1. Provide a key operated switch in the main car operating panel behind a locked service panel that, when turned to the ‘ON’ position, shall cause the elevator to be removed from service and placed in Inspection Service Operation.
2. Limited operation of the car shall be provided through pressing the Attendant Service up and down push buttons (if provided) or the highest or lowest car call push buttons (if up and down buttons are not provided) in the main car operating panel only.
3. The car shall move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with both the hall and car door panels in the closed and locked position.
4. The Inspection Service switch shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. The top of the elevator car shall be equipped with a control for limited operation of the car during repairs, maintenance and inspection conducted in the hoistway. The transfer of control to the top of car operating device shall cause that device to be the sole means of control for the elevator.
  - a. Visual and audible indication shall be provided on the top of the car when Firefighters’ Emergency Operation is initiated.

6. Power door operating equipment shall be rendered inoperative while the car is being operated in the Inspection Service mode with the exception of power closing of the door. The control system shall maintain closing power on the door while the elevator is moving under Inspection Service Operation.
7. The in-car Inspection Service switch shall be rendered ineffective when the top of car inspection control is activated.
8. Machine Room Inspection Operation and Inspection Operation with open door circuits shall be provided in accordance with A17.1 Safety Code, as modified and adopted, where required or allowed by the AHJ.

E. Hoistway Access Operation (New)

1. Provisions shall be made to allow access to the hoistway through the use of hoistway access switches.
2. Operating the access switch shall permit the car to move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with the hall and car doors in the open position to obtain access to the top of the car or climb-in pit.
3. The car shall automatically stop motion when the car top is level with the hoistway door sill for access to top of car.
4. The access key switch(es) shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. Access operation shall be disabled when top of car inspection operation is in effect.

F. Anti-Nuisance Operation (New)

1. In the event car loading is not commensurate with the number of car calls registered, all car calls shall be canceled.
  - a. The system shall monitor the door protection device to determine if passenger transfer has occurred.
  - b. If after the third (3<sup>rd</sup>) stop a passenger transfer has not occurred, the system shall cancel all remaining registered car calls and respond to assigned hall call demand.
  - c. The number of calls registered with no passenger transfer that will trigger anti-nuisance shall be adjustable and initially set to three (3) calls.

G. Out-of-Service Control Operation (New)

1. Provide an unidentified key-operated switch, engraved with “ON” and “OFF” only, that shall remove the elevator from service when placed in the “ON” position and the car is not in motion. Locate the switch in the service cabinet of the car operating panel.
  - a. When the key-switch is turned to the “ON” position while the elevator is in motion, the car shall proceed to the next call and be removed from service after leveling operations are completed and the doors have opened.
  - b. When engaged, the Out-of-Service Control feature shall cause the car door to remain open and the car call buttons rendered inoperative.
  - c. The elevator shall not respond to hall call assignments from dispatching systems when the Out-of-Service Control feature is active.

2. Firefighters' Emergency Operation shall override this feature.

H. Firefighters' Emergency Operation / National (New)

1. Phase I Emergency Recall Operation shall be provided for each car in accordance with ASME A17.1 code as modified under the applicable local or State law.
2. Each main or auxiliary car operating station shall be provided with an indicator light and warning buzzer, each of which shall become activated whenever Phase I Operation is engaged.
  - a. The warning buzzer shall cease to function once the car has completed the recall sequence and is positioned at the designated recall landing.
  - b. The indicator light shall remain illuminated as long as Phase I Operation is activated.
3. A three-position, key-operated switch shall be provided on the designated recall landing to manually activate Phase I Operation.
  - a. When activated, Phase I Operation shall be arranged so that in order to reset normal service, all cars must first be returned to the designated recall landing, after which the Phase I key-switch must be turned to the "OFF" position.
4. A standardized Fire Recall Key (FEOK1) shall be used where required by the codes and standards applicable to the AHJ.
  - a. Multiple elevators within a group or building that are not affected by the scope of work specified herein, shall be upgraded to the "Standardized Fire Recall Key".
  - b. The "Standardized Fire Recall Key" shall apply to both Phase I and Phase II Operation.
5. Phase II Emergency Recall In-Car Operation shall be provided for each car in accordance with ASME A17.1 code as modified under local or State law.
6. Locate controls required for Phase II In-Car Operation in a locked access cabinet in the main car operating panel.
  - a. The cover of the locked access panel shall be engraved as required by local or State law.
  - b. The locked access panel shall contain:
    - 1) Phase II key switch.
    - 2) Fire indicator light.
    - 3) Call cancel push button.
    - 4) Door open push button.
    - 5) Door close push button.
    - 6) Run/Stop switch.
    - 7) Fireman's phone jack.
    - 8) Other devices as may be required by local law.
  - c. Engrave the Firefighters' Service operating Instructions on the inside of the locked cabinet door.

I. Low Oil Protection and Protective Device (New)

1. Provide low oil protection operation and appropriate device(s) that will discontinue operation of the hydraulic elevator pump when:
  - a. The elevator stalls due to a low oil condition.
  - b. Fails to reach the landing in the up direction.
2. Pressure Switch: (New)
  - a. Where the top of the cylinder head is above the top of the tank, provide a pressure switch between the cylinder and the valve which shall be activated by the loss of pressure at the top of the cylinder, and control the operation of the elevator as required by Code.
3. Provide an additional protective device that shall automatically return the elevator to the bottom landing, open the door and shut down the system.
4. The protective device shall be an integral part of the control system.

J. Hydraulic Auto Lowering (New)

1. Provide automatic battery powered lowering feature for the hydraulic elevator.
  - a. In the case of normal power outage, the elevator shall be automatically lowered to the Main Lobby level.
  - b. The door shall open automatically to discharge passengers.
  - c. The elevator shall remain parked with its door closed and door open button operative until normal power is restored.
2. The control panel shall be located in the machine room or be an integral part of the control system.
  - a. It shall include necessary batteries, solid-state controls, charger, monitor lights and a test button.
  - b. It shall be fed by a 120-volt, 20 Ampere branch circuit from the emergency power source, provided by Others under another section of these specifications.
3. Provide necessary circuitry within the controller to determine the difference between an “intentional” loss of power and an “actual” loss of power in order to prevent operation of the auto lowering unit when the main line disconnect has been opened for elevator servicing.
4. Provide necessary terminals for connection to an auxiliary switch in main line disconnect provided by others.

K. Door Operation (New)

1. Car and hoistway doors shall be arranged to operate in unison without excessive noise or slamming in either direction of travel.

- a. Door opening speeds of two (2) feet per second shall be provided in conjunction with closing speeds of one (1) foot per second in accordance with governing code.
  - b. Door operation shall commence as the car stops level at the floor and the machine brake is applied. Pre-door opening shall not be permitted.
2. Where the hoistway door and the car door are mechanically coupled, the kinetic energy of the closing door system shall be based upon the sum of the hoistway and the car door weights, as well as all parts rigidly connected thereto, including the rotational inertia effects of the door operator and the connecting transmission to the door panels.
3. The force necessary to prevent closing of the car and hoistway door from rest shall not exceed thirty (30) lbf. This force shall be measured on the leading edge of the door with the door at any point between one-third and two-thirds of its travel.
4. Door open and door close time shall be measured between the moment car door operation in either direction begins and the instant at which that cycle is completed.
5. When responding to either a car or corridor call, the amount of time that the elevator door remains stationary in the open position shall be adjustable up to sixty (60) seconds.
  - a. Door open dwell time for a corridor call shall be separate of that for a car call, and in both cases, dwell time shall be canceled whenever the car door protection device is momentarily interrupted by passenger transfers, followed by a reduced door open dwell time of approximately one (1) second (adjustable) after the door protection device is cleared of obstructions.
6. The operation of the door protective device by interruption of one or more infrared light beams (dual or multi-beam non-contact) during the close cycle shall cause the immediate reversing of the doors to the full open position.
7. The door closing cycle shall be arranged so that, in the event the door protective devices become continually obstructed after the normal door open dwell time has expired and following a time interval of approximately thirty (30) seconds (adjustable), a warning tone shall sound and the door closing cycle shall commence at reduced speed and torque per applicable Code requirements.
8. Each car operating station shall be provided with a “door open” and “door close” push button.
  - a. Pressure on the “door open” button shall cause doors in the full open position to remain so, and doors engaged in the close cycle to reverse direction and assume the full open position so long as pressure remains applied to the button.
  - b. The “door open” buttons shall also control the open cycle during Phase II - Emergency In-car Operation.
  - c. The “door close” push button shall function on Independent Service, Attendant Service and Phase II - Emergency In-car Operation as well as during normal automatic operations.
9. Repeated attempts by the power door operator to open or close the door at any landing shall be monitored by the control system.
  - a. In the event the door fails to cycle properly after a preset (adjustable) number of attempts, the car shall either travel to the next stop or remove itself from service, depending upon whether the malfunction is in the open or close cycle.

10. Each hoistway door shall be provided with an automatic self-closing mechanism arranged so that the door shall close and lock if the car should leave the landing while the hoistway door is unlocked.
11. Car doors shall be arranged to prevent their being manually opened from inside the car unless the elevator is positioned within a floor landing zone.

## 2.5 MACHINE ROOM / SECONDARY EQUIPMENT

### A. Control Equipment (New)

1. Provide a microprocessor-based elevator control system.
2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.
3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
4. System operating software shall be stored in non-volatile memory.
  - a. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, circuit boards, static motor drive units, wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.
  - b. Solid-State electronic “Soft-start” pump motor starters shall be provided.
  - c. Mechanical ventilation of the cabinet shall be provided and shall be adequate to dispose of the full load heat losses without exceeding 40° C (104° F) ambient temperature.
    - 1) Control equipment cabinets shall be provided with forced air ventilation to prevent overheating of the electrical components housed therein.
  - d. All electrical wiring inside the control equipment cabinet shall be performed in a neat manner with field wiring terminated at stud blocks provided inside the control cabinet.
  - e. Each wiring terminal shall be clearly identified according to the nomenclature used on the “as built” wiring diagrams. No more than two (2) field wires may be connected to any single terminal stud.
  - f. Spare wires shall be tagged according to their point of termination, bundled, and placed at the bottom of the control equipment cabinet.
  - g. Each electrical component within the cabinet shall be permanently identified with symbols identical to those used on the “as-built” wiring diagrams.
  - h. A data plate that indicates the edition of the Code in effect at the time of installation and/or alteration shall be provided in accordance with applicable code and requirements of ASME A17.1 Code. The data plate shall be in plain view and securely attached on the mainline disconnect or on the controller.
  - i. Control equipment shall comply with requirements of all applicable Sections of the ASME A17.1 Code as approved and adopted by the AHJ.
  - j. The manufacturer’s standard on-board “LCD” display shall be incorporated on the main processor board and/or otherwise incorporated in the controller cabinet. The “LCD” shall be capable of providing alpha-numeric characters to view the operational status of the elevator and/or group functions depending on the

application. The display shall provide the user with necessary information for troubleshooting and reprogramming of the basic system parameters.

- 1) Where the "LCD" is not an integral part of the controller and troubleshooting/reprogramming requires the use of a separate tool, the tool shall be maintained in the machine room and accessible to service personnel. This tool, along with all technical documentation for the correct use of the tool, shall remain the property of the Owner.
- 2) Password protection of critical programming features is required to prevent accidental changes to life-safety and other non-typical control settings.
- 3) Where a separate dispatch or group control panel is provided, a separate "LCD" display shall be provided to view group functions.

B. Equipment Isolation (New)

1. Provide sound reducing vibration isolation elements at all support points of elevator controller and pump unit.
2. The elements shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries, Type ND, with 0.35" static deflection under design load ratings.
3. All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.

C. Sound Reducing Protection (New)

1. When operating in accordance with plans and specifications, the elevator equipment shall not generate noise levels in excess of NC-40 in occupied tenant spaces and shall be free of pure tones.
  - a. For the purpose of this specification, a pure tone shall be defined as a sound level in any one-third octave band which is greater than 5 dB above both adjacent one-third octave bands, in the range 45 to 11,200 Hz.
2. Provide the following treatments as a minimum.
  - a. Mount sound insulating panels, manufactured of reinforced 16-gauge steel panels with a 1" thick 1-1/2 lbs. core of fiberglass affixed to interior, on all four open sides of the power unit frame to isolate airborne noise from belt driven motor-pump assembly.
  - b. Install a minimum of two (2) sound isolating couplings in the oil line in the machine room between pump and jack.
    - 1) Each coupling shall consist of two (2) machined flanges separated by two (2) neoprene seals to absorb vibration and to positively prevent metal-to-metal contact in the oil line.
    - 2) Build coupling in such a manner that they will be absolutely blow-out proof.
  - c. Install an oil-hydraulic muffler in oil line near power unit.

- 1) The mufflers contain pulsation absorbing material inserted in a blow-out proof housing.
  - 2) Rubber hose without blow-out proof features will not be acceptable.
- d. Provide sound reducing vibration isolation elements at all support points of elevator controllers and pump units.
- 1) The elements shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries.
  - 2) All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.
- e. Locate the power unit at least one inch (1") from any walls.
- f. Use flexible conduit with ground wire for pump unit connections.

D. Hydraulic Pump Motor (New)

1. Provide an alternating current induction motor having a maximum speed of 1800 RPM, designed to operate at 120 starts per-hour and a continuous rated 50 degrees C temperature rise.

E. Hydraulic Power Unit / Motor (New)

1. Provide a self-contained power unit which includes:
  - a. Structural steel outer base.
  - b. Tank support.
  - c. Oil tight drip pan.
  - d. Floating inner base to prevent metallic contact for mounting the motor pump assembly.
  - e. Sound isolation panels to enclose the unit and reduce airborne noise.
2. Provide a reinforced overhead oil reservoir with a tight-fitting tank over the oil control unit which includes:
  - a. An oil fill strainer with air filter.
  - b. An oil level gauge assembly.
  - c. A self-cleaning strainer in the suction line.
3. The pump shall be for oil hydraulic elevator service with positive displacement screw type design for steady discharge with minimum vibration.
4. The drive shall be by multiple V-Belts and sheaves or directly driven by a submersible pump depending on the HP requirements of the system.
  - a. The use of submersible pumps having more than a 40 HP motor is unacceptable.
5. Pump drive motor control shall utilize solid state motor starter circuitry to provide reduced current starting and maximum protection of the motor.

6. The oil control unit shall be of the manufacturer's own design and shall include solid state motor starter technology or variable frequency motor control as well as relief, safety check valves and an electronic modulated oil control valve. The electronic valve shall:
  - a. Provide continuous short travel curve, independent of load and temperature.
  - b. Provide smooth acceleration and deceleration regardless of the load.
  - c. Maintain velocity control over a wide range of oil temperatures.
  - d. Allow the manual lowering of the elevator car in event of power failure and for use in servicing and adjusting the elevator mechanism.
  - e. Design the tank shut-off valve for isolating oil in the power unit tank to ensure each of servicing and adjusting the elevator mechanism without removing oil from the tank.
7. Manufacture the unit to operate under 600 psi (for dry units) / 700 psi (for submersible units) working pressure.
8. When the oil reservoir thermostat registers fifty (50) degrees F, the car shall "exercise" until the oil temperature reaches seventy-five (75) degrees F.

F. Hydraulic Piping (New)

1. Provide all necessary pipes and fittings to connect the power unit to the jack.
  - a. Use minimum Schedule 80 steel pipe.
  - b. Provide a shut off valve in the machine room for maintenance service.
2. The oil pipe and conduit shall be overhead above suspended ceiling.
  - a. Exact location must be coordinated with other trades.
  - b. For pipe hangers use spring hangers Type 30 of Mason Industries, Inc. or approved equal.
  - c. Provide neoprene isolation pads between the pipe and the hangers.
3. Adequately support the full run of pipe with isolation type support.
4. Where flexible hose and fitting assemblies, and flexible couplings are used for hydraulic connections, flexible hose and fitting assemblies shall:
  - a. Not be installed within the hoistway, nor project into or through any wall.
  - b. Installation shall be accomplished without introducing twist in the hose and shall conform with the minimum bending radius of SAE 100 R2 type, high pressure, steel wire reinforced, rubber covered hydraulic hose specified in SAE J517.
  - c. Have a bursting strength sufficient to withstand not less than ten (10) times the working pressure.
  - d. Be permanently marked indicating:
    - 1) Manufacturer of the hose and fittings.
    - 2) Type of hose and fitting.
    - 3) Minimum factory test pressure.
    - 4) Minimum bending radius of the hose.
    - 5) Date of installation.
    - 6) Inspection procedure.

7) Name of elevator contractor.

G. Hydraulic Mainline Oil Strainer (New)

1. Provide a mainline hydraulic oil strainer of the self-cleaning, compact type, equipped with a 40-mesh element and installed in the oil line.
2. Design the strainer for maximum system working pressure.

2.6 HOISTWAY EQUIPMENT

A. Guide Rails / Inserts / Brackets (Reuse)

1. Car guide rails, fishplates, rail brackets, backing support and related attachments shall be inspected to determine if unfavorable conditions exist that diminish the structural integrity of any component.
  - a. In the event substandard conditions are disclosed by means of this inspection, the Contractor shall immediately inform the Consultant as to the exact nature of said problems and then undertake whatever repairs and/or replacements the Consultant may deem appropriate to remedy the situation.
2. Each stack of guide rails shall be individually examined to determine if excessive compression has occurred from building settlement.
  - a. In the event such conditions are found to exist, each affected stack shall be cut off enough to relieve pressure.
  - b. Jacking bolts shall be provided underneath each stack of both car and counterweight guide rails.
3. Each stack of guide rails shall be realigned so that total deviation from plumb in any direction does not exceed 1/8" over the entire length of the hoistway and that DBG measurements never vary more than .030".
4. As required, car guide rails joints shall be individually filled, filed and sanded in order to eliminate minor variations in adjoining machined surfaces.

B. Roller Guides (New)

1. Provide roller guide shoes with adjustable mounting base, rigidly bolted to the top and bottom of each side of the car and counterweight frame.
  - a. Roller guides shall consist of a set of sound reducing polyurethane wheels in precision bearings held in contact with the three (3) finished rail surfaces by adjustable stabilizing springs.
  - b. The bearings shall be sealed or provided with grease fittings for lubrication.
  - c. Equip roller guides with adjustable stops to control postwise float.
  - d. Fit the top car roller guides with galvanized, painted or powder coated steel guards.
2. Approved applications and manufacturers:

- a. ELSCO Model B for car roller guides and ELSCO Model D for counterweight guides or approved equal.
- b. Gearless traction elevators with speeds below 1000 fpm: ELSCO Model A for car roller guides and ELSCO Model C for counterweight guides or approved equal.
- c. Gearless traction elevators with speeds 1000 fpm and 1200 fpm: ELSCO Model Express High Speed Roller guides for car guides, ELSCO Model A for counterweight guides, or approved equal.
- d. Gearless traction elevators with speeds greater than 1200 fpm: Use 12" diameter wheels on the car roller guides and ELSCO Model A for counterweight guides or approved equal.
- e. Roller guides shall not be installed on counterweight frames where traveling buffers with separate guide shoes are employed, and lubrication of the rails is necessary for proper guide operation.
- f. Roller guides shall not be installed on counterweight frames where counterweight safeties are employed, and prevailing conditions prohibit installation due to limitations in clearances or in cases where rollers will interfere with the operation of the safety plank.

C. Electrical Conduit / Wiring / Traveling Cable (New)

1. Electrical wiring shall be provided.

- a. All wiring shall be stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
- b. Electrical wiring provided for hoistway interlock shall be of a flame-retardant type, capable of withstanding temperatures of at least 392 degrees Fahrenheit. Conductors shall be Type SF or equivalent.
- c. Each run of electrical conduit or duct shall contain no less than ten percent (10%) spare wires and, in any case, no fewer than two (2) spare wires.
- d. Crimp-on type wire terminals shall be used where possible.

2. Traveling cable shall be provided.

- a. Each traveling cable shall be provided with a flame- and water-resistant polyvinyl chloride jacket.
- b. Electrical wiring shall consist of stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
- c. Each traveling cable shall contain no less than ten percent (10%) spare wires.
- d. Traveling cable exceeding 100' in length shall be provided with a steel wire rope support strand from which the cable shall be suspended.
- e. Traveling cable must be contained within an approved electrical conduit to within 6' of the final suspension point in the hoistway.
- f. Each traveling cable shall be arranged to provide no fewer than six (6) individually shielded pairs of 20-gauge wire and arranged to contain no less than one (1) coaxial cable for CCTV remote monitoring.

- g. Traveling cable conductors that terminate at a hoistway center box shall be connected to stud blocks provided for that purpose.
    - 1) Each wiring terminal shall be clearly identified by its nomenclature as shown on the “as built” wiring diagrams and solderless, crimp-on type wire terminals shall be used where possible.
  - h. The attachment of a traveling cable to the underside of the elevator car shall be performed so that a minimum loop diameter of thirty times (30x) the cable diameter is provided.
  - i. Pre-hang the cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting during operation.
3. Rigidly supported EMT conduit, flexible metal conduit and galvanized steel trough shall be utilized throughout the hoistway.
- a. Both EMT and flexible conduit shall be connected on either end by use of compression fittings and secured in place with metal clamps sized in accordance with the diameter of conduit utilized.
    - 1) Wire or plastic wire ty-raps shall not constitute an acceptable means of fastening.
  - b. The use of flexible metal conduit shall be limited to runs not greater than three feet (3') in length.
  - c. All abandoned or unused electrical conduit shall be removed from the hoistway.
  - d. Existing conduit and wiring duct may be reused if suitable for the application.
    - 1) Reuse of existing conduit/duct shall be at the discretion of the Consultant.

#### D. Normal and Final Terminal Stopping Devices (New)

- 1. Provide normal terminal stopping devices to stop the car automatically from any speed obtained under normal operation within the top and bottom overtravel, independent of the operating devices, final terminal stopping device and the buffers.
- 2. Provide final terminal stopping devices to stop the car automatically from the speed specified within the top clearance and bottom overtravel.
- 3. The terminal stopping devices shall have rollers with rubber or other approved composition tread to provide silent operation when actuated by the cam fixed to the top of the car.
  - a. Terminal stopping devices that are not mechanically operated (i.e.: magnetic proximity) shall be provided by the manufacturer of the control equipment, intended for use as a terminal limit, and designed for reliable operation in the hoistway environment.
- 4. Final terminal limits shall be pinned so as to prevent movement after final adjustment where required by the AHJ.

## 2.7 PIT EQUIPMENT

A. Car Buffer (Reuse)

1. Existing car and counterweight buffers shall be reused.
  - a. Pit channels, related supports and fastenings shall be inspected for damage and to determine if the structural integrity of any component is diminished by the effects of rust or other unfavorable conditions.
    - 1) In the event defects are found, the Contractor shall immediately inform the Consultant and undertake whatever repair and/or replacement the Consultant may deem appropriate.
  - b. Surface rust shall be removed from all reused components.
  - c. Where hydraulic buffers are used:
    - 1) Buffer plunger shall be honed free of all surface rust and blemishes and provided with a protective coating of machinist bluing.
    - 2) The hydraulic fluid reservoir on each buffer shall be drained, flushed and refilled with fresh oil. The grade and amount of fluid added to each buffer shall conform to O.E.M. specification.
  - d. Provide a permanent buffer marking plate which indicates the manufacturer's name, identification number, rated impact speed and stroke.
  - e. Provide a permanent data plate in the vicinity of the counterweight buffer indicating the maximum designed counterweight runby in accordance with ASME A17.1 as may be modified by, and/or in addition to codes and standards accepted by the AHJ.
  - f. The buffer shall undergo testing in accordance with ASME A17.1 Code as modified by, and/or in addition to codes and standards accepted by the AHJ.

B. Inspection Platforms, Ladders, Guard Rails, Screens and Guards

1. Provide the following secondary metal work in the pit, hoistway and in elevator machine room in accordance with bid documents.
  - a. Wire mesh separator screen between two (2) adjacent elevator pits located at different elevations.
  - b. Counterweight shall be guarded by means of a fixed screen from the pit floor to a position of at least 2450 mm (96") above pit floor.
  - c. Pit access ladders.
  - d. Buffer inspection platforms and ladders.
  - e. Guard rails and sixty (60) degree ships ladders in machine room.
  - f. Guard around machine, ropes and rope holes.
2. Submit detailed shop drawings of all miscellaneous metal items for Consultant's approval.
3. Provide painted sheet steel covers for all dead-end hitches.
4. The pit ladder shall have continuous steel flat bar side rails 12 mm (1/2") x 75 mm (3"), with eased edges, spaced a minimum of 400 mm (16") apart. Rungs shall be steel bars 18 mm (3/4") in diameter, spaced 300 mm (12") apart with top to have a non-slip surface. Rungs shall be located along centerline of side rails, located not less than 180 mm (7") from the nearest permanent object or structure. Plug weld and grind smooth on outer rails

faces. Support each ladder at top and bottom and at intermediate points spaced not more than 1500 mm (60"). Extend side rails 1200 mm (48") above top rung.

5. Prime paint and apply two (2) coats of rust inhibiting machinery enamel to metal work specified above as approved by the Consultant.

C. Jack Unit (Reuse)

1. The existing jack shall be reused.
2. The jack shall undergo the following work:
  - a. Check plunger for smooth surface and eliminate burrs where necessary.
  - b. Verify plunger sections are securely attached with minimum seam.
  - c. Check stop-ring for proper fit.
  - d. Renew internal babbitt-lined, guide bearing, packing or seals where necessary.
  - e. Clean drip ring around cylinder top to provide adequate drainage.
  - f. Check mounting hardware and welds where applicable.
  - g. Check secure attachment of head.
  - h. Remove rust and apply rust inhibiting paint.
3. Perform static load test of the jack unit to determine if there are any failures of the cylinder wall.
4. Where double-walled cylinders are not provided, and where prevailing conditions allow, install a plunger gripper to prevent freefall of the elevator in the event of a catastrophic failure of the hydraulic jack.

D. Hydraulic Check Valve (New)

1. A check valve shall be provided and installed so that it will hold the elevator with rated load at any point when the pump stops, and the down valves are closed, or the maintained pressure drops below the minimum operating pressure.

E. Overspeed (Rupture) Valve (New)

1. Where required by Code, an overspeed valve shall be provided and installed so that it will cause the flow of oil from the hydraulic jack through the pressure piping to cease when such flow exceeds a preset value relative to car speed in accordance with applicable codes.

F. Pit Stop Switch (New)

1. Where pit depth does not exceed 67", each elevator pit shall be provided with a push/pull or toggle switch that is conspicuously designated "EMERGENCY STOP" and located so as to be readily accessible from the hoistway entrance on the lowest landing served at a height of approximately 18" above the floor.
  - a. This switch shall be arranged to prevent the application of power to the hoist motor and machine brake when placed in the "OFF" position.
2. Where climb-in pit depth exceeds 67", each pit shall be provided with two (2) push/pull or toggle switches conspicuously designated "EMERGENCY STOP".

- a. Both of these stop switches shall be located immediately adjacent to the pit access ladder.
  - 1) Place one stop switch approximately 47" above the pit floor.
  - 2) Place the second stop switch 18" above the hoistway entrance sill on the lowest landing served.
  - 3) These switches shall be arranged so as to prevent the application of power to the hoist motor or machine brake when either one is placed in the "OFF" position.
- 3. Where a walk-in pit exists, each elevator shall be provided with a push/pull or toggle switch that is conspicuously numbered and designated "EMERGENCY STOP".
  - a. The location of this stop switch shall be approximately 47" above the pit floor at the nearest point of pit entry from the access door.
  - b. This switch shall be arranged so as to prevent the application of power to the hoist motor and machine brake when placed in the "OFF" position.
- 4. Provide an electric contact safety switch for the pit access door if any equipment attached to the car extends within the space of the hoistway pit when the car is level at the bottom terminal landing.
  - a. Opening the pit access door shall cause the electric contact switch to stop the elevator by interrupting electric power to the driving machine and brake.
  - b. Provide a sign on the pit door "**WARNING – OPENING OF PIT DOOR WILL STOP ELEVATOR**" using lettering a minimum of two (2) inches high.
- 5. Existing stop and/or pit door switch conforming to the requirements set forth herein may be refurbished to as new condition and reused subject to approval of the Consultant.

## 2.8 HOISTWAY ENTRANCES

### A. Hoistway Entrances (Reuse)

- 1. Hoistway entrance sills, sill supports, entrance frames, headers and header supports shall be reused and refurbished.
  - a. Hoistway entrances that have become distorted or bent shall be straightened, plumbed, reset to the proper width dimension and reinforced, as necessary.
  - b. Provide 14-gauge steel fascia plates that extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
    - 1) Reinforce fascia to allow not more than ½" of deflection.
    - 2) Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.
  - c. Provide 14-gauge steel toe guards that extend 12" below any sill not protected by fascia.

- 1) The toe guards shall extend the full width of the door and shall return to the hoistway wall at a fifteen (15) degree angle and be firmly fastened.
- d. Remove oil, dirt and impurities on new and existing apparatus and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.

**B. Slide Type Hoistway Entrance Door Panels (New)**

1. Hoistway entrance door panels shall be reused and refurbished.
  - a. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in existing sill grooves with a minimum clearance.
    - 1) The guide mounting shall permit their replacement without removing the door from the hangers.
    - 2) A steel wear indicator shall be enclosed in each guide.
  - b. Provide the meeting edge of center opening doors with necessary new continuous rubber astragal bumper strips.
    - 1) Astragal shall be relatively inconspicuous when the doors are closed.
    - 2) Provide rubber bumpers at the top and bottom of each section of door to stop them at their limit of travel in the opening direction.
2. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
3. Provide a special key so that an authorized person can open any landing door when the car is elsewhere.
  - a. The keyhole shall be not less than 3/8" in diameter and shall be fitted with a stainless steel or bronze ferrule to match related equipment.
  - b. Where applicable, plug the abandoned hoistway door access hole in each door panel, secured from the hoistway side of the door, finished to match existing or as otherwise directed by the Owner/Architect.
4. Where conditions warrant, or otherwise required by code, equip all hoistway landing doors with one-piece full height non-vision wings of material and finish to match hall side of door panels.

**C. Tracks / Hangers / Closers / Related Equipment (New)**

1. Formed or extruded steel landing door hanger tracks shall be provided.
2. Each landing door panel shall be suspended from a pair of door hanger assemblies that are compatible with the hanger tracks.
  - a. Hanger assemblies shall be directly mounted to the door panel using 3/8" diameter or better hardware.
  - b. Solid steel blocks shall be used where job-site conditions dictate the use of spacers between hanger assemblies and the landing door panel.

- c. Hanger assemblies shall be adjusted or shimmed so that door panels are suspended in a plumb manner with no more than 3/8" vertical clearance to the cab entrance threshold.
  - d. Upthrust rollers shall be adjusted for minimal operating clearance against the bottom edge of the hanger track.
  - e. Means shall be provided to prevent hangers from jumping the track.
  - f. Blocks shall be provided to prevent rollers from overrunning the end of the track.
3. Each set of center opening landing doors shall be provided with a cable driven relating mechanism which is compatible for use with the door hanger assemblies.
- a. The relating mechanism shall be properly tensioned and adjusted so as to equalize the relationship between the door panels and the hoistway entrance.
4. Each set of multi-speed center opening, or side slide landing doors shall be provided with a sill-mounted spring closing mechanism with necessary door panel relating hardware.
5. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
6. Each set of single speed side slide landing doors shall be provided with a sill-mounted spring closing mechanism.
- a. Spirator-type spring closers shall be acceptable should prevailing sill depth or runby clearance conditions require their use.
7. Where applicable, each hoistway door interlock assembly shall be provided with an emergency release mechanism utilizing manufacturers' standard type access key at all landings served.
- a. Drill each hoistway door to accommodate manufacturers standard lock release key and install escutcheon.
    - 1) Escutcheon shall be brushed stainless steel to match door panels where required.
    - 2) Stainless Steel shall be provided at all other typical floors.
8. Where multi-speed side slide door panels exist, provide a secondary interlocking device that will prevent separation of the panels should the sill closer or relating cable(s) fail.

**D. Interlocks / Unlocking Devices (New)**

1. Each set of landing doors shall be provided with a complete electromechanical interlock assembly.
- a. Each interlock assembly shall consist of:
    - 1) A switch housing with contacts.
    - 2) Lock keeper.
    - 3) Clutch engagement/release subassembly.
    - 4) Associated linkages.

- b. Arrange the lock so that individual leading door panels (side slide or center opening) are locked when in the closed position.
- 2. Non-typical mounting arrangements for interlocks and/or related mechanisms must receive prior approval from the Consultant.
- 3. Each hoistway door interlock assembly shall be provided with an emergency release mechanism utilizing a drop-leaf type access key at all landings served.
  - a. Each hoistway door shall accommodate manufacturers standard lock release key with escutcheon.
    - 1) The key hole shall be fitted with a metal ferrule that matches the door finish.
    - 2) Drilling key holes in the field will not be accepted.

E. Hoistway Door Bottom Guides / Safety Retainers (New)

- 1. The bottom of each side sliding type hoistway door panel shall be equipped with a minimum of two (2) guiding members.
  - a. Metal mounting angles shall be secured to the integral panel frame structure; and when conditions warrant, additional external metal support plates or angles shall be installed to ensure the integrity of the panel frame is not compromised.
  - b. Guides shall be manufactured of low friction non-metal material with sufficient strength to withstand forces placed on door panels per ASME A17.1 Standards.
  - c. Each guide assembly shall incorporate a steel wear indicator and be so designed to permit sliding member replacements without removal of door panel(s) from top hanger devices.
  - d. Panels shall be hung with a maximum vertical clearance of 3/8 inch between top of sill and bottom of panel and the guide shall engage the sill groove by not less than 1/4 inch.
- 2. The bottom of each side sliding type hoistway door panel shall be equipped with a guiding member safety retainer to prevent displacement in the event of primary guide means failure.
  - a. A metal reinforcement (12 gauge stainless or galvanized steel) shall be installed between the two (2) primary guiding members (a.k.a. "Z" bracket).
  - b. The reinforcement shall be designed with a minimum length of eight (8) inches or the maximum possible length that will fit between the primary members and a minimum overall height of two and one-half (2.5) inches secured on the internal face of the door panel. (Hoistway side)
  - c. The retainer shall be set with the supplemental safety angle 3/8 inch into the corresponding sill groove; and be capable of preventing displacement of the panel no more than 3/4 inch with an applied force of 1125 lbf at right angles over an area twelve (12) inches x twelve (12) inches at the approximate center of the door panel.

## 2.9 CAR EQUIPMENT / FRAME

A. Car Frame (Reuse)

1. The existing car frame assembly shall be refurbished to as new condition and reused.
2. Individual car frame members, platform isolation framework, door operator support structure, related bracing and hardware shall be inspected for any indication of damage or distortion.
  - a. Where damage is detected, the Contractor shall immediately inform the Consultant and then undertake corrective action deemed appropriate by the Consultant to remedy the condition.
3. Provide new elastomer isolation pads for all existing platforms where pads are presently installed.
4. The car frame, door operator support and related bracing shall be modified or reconfigured as necessary in order to accommodate new cab enclosure and/or master door operating equipment specified herein.
5. The elevator car shall undergo static balancing upon substantial completion of all work described in the project specifications and subsequent to any car interior refinishing or cab replacement work performed in conjunction with the project.

B. Car Platform (Reuse)

1. The existing platform shall be modified to accommodate the new apparatus specified herein.
  - a. Where necessary, the underside of platform shall be refurbished and treated with fire-rated material.
  - b. Top of platform shall be refurbished with a marine grade plywood set to receive new finished floor covering as selected by Owner.

C. Automatic Leveling / Releveling / Positioning Device (New)

1. Equip the elevator with a floor leveling device which shall automatically bring the car to a stop within 1/4" of any floor for which a stop has been initiated regardless of load or direction of travel.
2. This device shall also provide for releveling which shall be arranged to automatically return the elevator to the floor in the event the elevator should move below or above floor level in excess of 1/4".
3. This device shall be operative at all floors served and whether the hoistway or car door is open or closed provided there is no interruption of power to the elevator.
4. A positioning device shall be part of the controller microprocessor systems.
  - a. Position determination in the hoistway may be through fixed tape in the hoistway or by sensors fitted on each driving machine to encode and store car movement.
  - b. Design the mechanical features and electrical circuits to permit accurate control and rapid acceleration and retardation without discomfort.
5. Where there are consecutive floors/stops that are short stops, the system shall be capable of distinguishing between the two (2) landing zones without error.
6. All equipment and logic required for leveling system to properly function with short stops shall be included.

D. Top-of-Car Inspection Operating Station (New)

1. An inspection operating station shall be provided on top of the elevator car.
2. This station shall be installed so that the controls are plainly visible and readily accessible from the hoistway entrance without stepping on the car.
3. When the station is operational, all operating devices in the car shall be inoperative.
4. Provide the following control devices and features:
  - a. A push/pull or toggle switch designated “EMERGENCY STOP” shall be arranged so as to prevent the application of power to the hoist motor or machine brake when in the “off” position.
  - b. A toggle switch designated “INSPECTION” and “NORMAL” to activate the top of car Inspection Service Operation.
  - c. Push button designated “Up”, “Down” and “Enable” to operate the elevator on Inspection Service (the “Enable” button shall be arranged to operate in conjunction with either the “Up” or “Down” button).
  - d. An indicator light and warning buzzer that are subject to activation under Phase I - Fire Emergency Recall Operation.

E. Car Enclosure Work Light / Receptacle (New)

1. The top and bottom of each car shall be provided with a permanent lighting fixture and 110-volt GFI receptacle.
2. Light control switches shall be located for easy accessibility from the hoistway entrance.
3. Where sufficient overhead clearance exists, the car top lighting fixture shall be extended no less than 24” above the crosshead member of the car frame.
4. Light bulbs shall be guarded so as to prevent breakage or accidental contact.

F. Master Door Power Operator System – VVVF/AC

1. Provide a heavy-duty master door operator on top of the elevator car enclosure for power opening and closing of the cab and hoistway entrance door panels.
2. The operator may be of the pivot/lever or belted linear drive type.
3. Operator shall utilize an alternating current motor, controlled by a variable voltage, variable frequency (VVVF) drive and a closed-loop control with programmable operating parameters.
  - a. System may incorporate an encoder feedback to monitor positions with a separate speed sensing device or an encoderless closed-loop VVVF-AC control to monitor motor parameters and vary power applied to compensate for load changes.
4. The type of system shall be designated as a high-speed operator, designed for door panel opening at an average speed of two (2.0) feet per second and closing at approximately one (1.0) foot per second.
  - a. Reduce the closing speed as required to limit kinetic energy of closing doors to within values permitted by ASME A17.1 as may be adopted and/or modified by the AHJ.

5. The door shall operate smoothly without a slam or abrupt motion in both the opening and closing cycle directions.
  - a. Provide controls to automatically compensate for load changes such as:
    - 1) Wind conditions (stack effect).
    - 2) Use of different weight door panels on multiple landings.
    - 3) Other unique prevailing conditions that could cause variations in operational speeds.
  - b. Provide nudging to limit speed and torque in conjunction with door close signaling/closing and timing devices as permitted by ASME A17.1 as may be adopted and/or modified by the AHJ. Nudging shall be initiated by the signal control system and not from the door protective device.
6. In case of interruption or failure of electric power from any cause, the door operating mechanism shall be so designed that it shall permit emergency manual operation of both the car and corridor doors only when the elevator is located in the floor landing unlocking zone.
  - a. The hoistway door shall continue to be self-locking and self-closing during emergency operation.
  - b. The door operator and/or car door panel shall be equipped with safety switches and electrical controls to prevent operation of the elevator with the door in the open position as per ASME A17.1 Code Standards.
  - c. Provide zone-lock devices as required by ASME A17.1 as may be adopted and/or otherwise modified by the AHJ.
7. Construct all door operating levers of heavy steel or reinforced extruded aluminum members.
8. Belts shall be designed for long life and operate noise free.
9. All components shall be designed for stress and forces imposed on the related parts, linkages and fixed components during normal and emergency operation functions.
  - a. All pivot points, pulleys and motors shall have either ball or roller-type bearings, oilite bronze bushings or other non-metallic bushings of ample size.
10. Provide operating data / data tag permanently attached to the operator as required by applicable code and standards.

G. Emergency Exits / Top (New)

1. Ensure they operate as per code and have proper electrical contacts and mechanical locks on the exterior of the cab enclosure.
2. No other key to the building shall unlock the emergency exit lock except access switch keys which may be keyed alike.
  - a. Keys shall be assigned in accordance with ASME A17.1 Group 1 Security requirements.

H. Car Door Zone Lock Restrictor (New)

1. Retrofit the existing car door operator to incorporate a car door zone lock restrictor.
2. In case of interruption or failure of electric power from any cause, the door operating mechanism shall permit emergency manual operation of both the car door and the hoistway door within the floor landing zone.
  - a. The hoistway door shall continue to be self-locking and self-closing.
  - b. The door operator shall operate in conjunction with or be equipped with all gate switches and safety contacts required by ASME A17.1 Code.

I. Car Door Hangers / Tracks / Gate Switch (New)

1. Provide sheave type two-point suspension hangers and track for each car door.
  - a. Sheaves shall be hardened steel, not less than 3-1/4 inches in diameter with sealed grease packed precision ball bearings.
  - b. The upthrust shall be taken by a roller mounted on the hanger and arranged to ride on the underside of the track.
2. The track shall be of formed cold rolled steel or cold drawn steel and shall be rounded on the track surface to receive the hanger sheaves.
  - a. The track shall be removable and shall not be integral with the header.
3. Provide a gate switch that mounts directly to the car door track.
  - a. The gate switch shall prevent movement of the elevator until such time as it signals the control equipment that the car door has physically closed.

J. Car Door Panel(s) (New)

1. Provide standard 1" thick, 14-gauge hollow metal flush construction panel(s), reinforced for power operation and insulated for sound deadening.
2. Paint the hoistway side of each panel black and face the cab side with 16-gauge sheet steel matching the existing returns or in selected material and finish as otherwise directed by Owner/Architect.
3. The panels shall have no binder angles and welds shall be continuous, ground smooth and invisible.
4. Drill and reinforce panels for installation of door operator hardware, door protective device, door gibs, etc.
  - a. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in the sill grooves with minimum clearance.
  - b. The guide mounting shall permit their replacement without removing the door from the hangers.
5. Provide the meeting edge of center opening doors with necessary continuous rubber astragal bumper strips.

- a. These strips shall be relatively inconspicuous when the doors are closed.

K. Door Reopening Device (New)

- 1. Provide an infrared curtain door protection system.
- 2. The door shall be prevented from closing and reopen when closing if a person interrupts any one of the light rays.
- 3. The door shall start to close when the protection system is free of any obstruction.
- 4. The infrared curtain protective system shall provide:
  - a. Protective field not less than 71" above the sill.
  - b. Where a horizontal infrared light beam system is used:
    - 1) A minimum of forty-seven (47) light beams.
    - 2) Accurately positioned infrared lights to conform to the requirements of the applicable handicapped code.
  - c. Modular design to permit on board test operation and replacement of all circuit boards without removing the complete unit.
  - d. Controls to shut down the elevator when the unit fails to operate properly.
- 5. Existing infrared door protection systems, designed in accordance with the criteria specified herein, may be retained and refurbished for new subject to the Consultant's review and approval.

2.10 FINISH / MATERIALS / SIGNAGE

A. Material, Finishes and Painting

- 1. General
  - a. Cold-rolled Sheet Steel Sections: ASTM A366, commercial steel, Type B
  - b. Rolled Steel Floor Plate: ASTM A786
  - c. Steel Supports and Reinforcement: ASTM A36
  - d. Aluminum-alloy Rolled Tread Plate: ASTM B632
  - e. Aluminum Plate: ASTM B209
  - f. Stainless Steel: ASTM A167 Type 302, 304 or 316
  - g. Stainless Steel Bars and Shapes: ASTM A276
  - h. Stainless Steel Tubes: ASTM A269
  - i. Aluminum Extrusions: ASTM B221
  - j. Nickel Silver Extrusions: ASTM B155
  - k. Bronze Sheet: ASTM B36(36M) alloy UNS No. C2800 (Muntz Metal)
  - l. Structural Tubing: ASTM A500
  - m. Bolts, Nuts and Washers: ASTM A325 and A490
  - n. Laminated / Safety Tempered Glass: ANSI Z97.1
- 2. Finishes
  - a. Stainless Steel

- 1) Satin Finish: No. 4 satin, long grain.
- 2) Mirror Finish: No. 8 non-directional mirror polished.

b. Sheet Steel:

- 1) Shop Prime: Factory-applied baked on coat of mineral filler and primer.
- 2) Finish Paint: Two (2) coats of low sheen baked enamel; color as selected by the Architect.
- 3) Steel Equipment: Two (2) coats of manufacturer's standard rust-inhibiting paint to exposed ferrous metal surfaces in both the hoistway and pit that do not have galvanized, anodized, baked enamel, or special architectural finishes.

3. Painting

- a. Apply two (2) coats of paint to the machine room floor.
- b. Apply two (2) coats of clear lacquer to bronze or similar non-ferrous materials to prevent tarnishing during a period of not less than twelve (12) months after initial acceptance by the Owner or Agent.
- c. Identify all equipment including buffers, car apron, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
- d. Paint or provide decal-type floor designation not less than four (4) inches high on hoistway doors (hoistway side), fascias and/or walls as required by A17.1 as may be adopted and/or modified by the AHJ. The color of paint used shall contrast with the color of the surface to which it is applied.

B. Car Interior Finishes

1. Car interior finishes shall be as selected by Owner.
2. Contractor shall provide samples of finishes as required for approval prior to fabrication.
3. Refer to specifications for other design requirements where provided.
4. Special attention shall be given to flooring materials and suitability for intended duty.

C. Designation and Data Plates, Labeling and Signage.

1. Provide an elevator identification plate on or adjacent to each entrance frame where required by the AHJ.
  - a. The designation numeral shall be a minimum of 3" in height.
2. Provide floor designation cast plates at each elevator entrance, on both sides of the jamb at a height of sixty (60) inches to the baseline of floor indication.
  - a. Floor number designations and Braille shall be 2" high, 0.03" raised and stud mounted.
3. Identify the designated medical emergency services elevator with 3" high international symbol at each elevator entrance on both sides of the jamb.

4. Provide raised designations and Braille markings to the left of the car call and control buttons of the car operating panel(s).
  - a. Designations shall be a minimum of 5/8" high, 0.03" raised and stud mounted. Provide white characters on a black background
5. Provide elevators with data and marking plates, labels, signages and refuge space markings complying with A17.1 Elevator Safety Code as may be adopted and/or otherwise modified by the AHJ.
6. Owner/Consultant shall select the designation and data plates from manufacturer's premium line of plates.

## 2.11 FIXTURES / SIGNAL EQUIPMENT (New)

### A. General - Design and Finish

1. The design and location of the hall and car operating and signaling fixtures shall comply with the ADAAG and local requirements of the AHJ.
2. The operating fixtures shall be selected from the manufacturer's premium line of fixtures.
3. Custom designed operating and signaling fixtures shall be as shown on the drawings or as approved by the Owner.
4. The layout of the fixtures including all associated signage and engraving shall be as approved by the Owner.
5. Where no special design is shown on the drawings, the buttons shall be as follows:
  - a. Stainless steel type as selected by the Owner / Consultant from the manufacturer's premium line of push buttons.
  - b. The button shall have a collar/small round indicator on the outside of the button with LED call registered light.
6. Where no special design is shown on the drawings, the faceplates shall be as follows:
  - a. Passenger Elevators
    - 1) Ground Floor: stainless-steel faceplate with No. 4 finish.
    - 2) Typical Floors: 1/8" thick stainless-steel faceplate with No. 4 finish.
  - b. Service
    - 1) All Floors - 1/8" thick stainless steel with No. 4 finish and tamperproof screws.
7. Mount passenger elevator fixtures with tamperproof fasteners and service elevator fixtures with tamperproof screws. The screw/fastener and key switch cylinder finishes shall match faceplate finish.
8. Where key-operated switch and or key operated cylinder locks are furnished in conjunction with any component of the installation, four (4) keys for each individual switch or lock shall be furnished, stamped or permanently tagged to indicate function.

9. All caution signs, pictographs, code mandated instructions and directives shall be engraved and filled with epoxy in code required colors.

B. Main Car Operating Panel (New)

1. Provide a main car operating push button panel on the inside front return panel of the car
2. Car operating panel shall be flush mounted with swing type, one-piece faceplate with heavy-duty concealed hinges.
  - a. Mount all key switches that are required to operate and maintain the elevators exposed on the car station except those specified within a locked service cabinet.
3. The push buttons shall become individually illuminated as they are pressed and shall extinguish as the calls are answered.
4. The operating panel shall include:
  - a. A call button for each floor served, located not more than 48" above the cab floor.
  - b. "Door open" / "Door close" buttons.
  - c. "Alarm" button, interfaced with emergency alarm. The alarm button shall illuminate when pressed.
  - d. "Emergency Stop" switch per local law located at 35" above the cab floor.
  - e. Self-dialing, hands-free emergency communication system actuation button with call acknowledging feature and ASME A17.1. design provisions.
  - f. Three (3) position firefighter key operated switch, call cancel button and illuminated visual/audible signal system with mandated signage engraved per ASME A 17.1 Standards as modified by the AHJ.
5. Locked Firemen's' Service cabinet, keyed in accordance with local Code, containing required devices and signals in accordance with ASME A17.1 Standards.
  - a. Automatic opening of the locked cabinet door may be provided with signals initiated by the fire detection and alarm system where approved by the Authority Having Jurisdiction.
6. Provide a locked service cabinet flush mounted and containing the key switches required to operate and maintain the elevator, including, but not limited to:
  - a. Independent service switch.
  - b. Light switch.
  - c. Fan switch.
  - d. G. F. I. duplex receptacle.
  - e. Emergency light test button and indicator.
  - f. Inspection Service Operation key switch.
  - g. Port for hand-held service tool where applicable.
  - h. Dimmer for cab interior lighting.
7. Car operating panel shall incorporate:
  - a. An integral (no separate faceplate) digital L.E.D. floor position indicator.

- b. Black-filled engraved unit I.D. number or other nomenclature, as approved by Owner.
  - c. A “No Smoking” advisory.
  - d. Rated load capacity.
- 8. The main car operating panel with security car call keyed switches OR proximity card reader to disconnect the corresponding floor push button.
  - a. Security system shall be overridden by Phase II Firefighter’s Emergency Operations in accordance with code.
- 9. Where posting of an advisory is permitted by the Governing Authority in lieu of the inspection certificate, engrave the following advisory on the hinged cover of the service cabinet, or where otherwise directed by the Owner.
  - a. Elevator Certificate is On File in Building Management Office.
- 10. Post Inspection Certificate behind an opening in the car operating panel that is fitted with a flush-mounted clear Plexiglas without a frame.

C. Car Position Indicator (New)

- 1. The position of the car in the hoistway shall be indicated by the illumination of the position indicator numeral corresponding to the floor at which the car has stopped or is passing.
  - a. Provide 2” high, ten (10) segment LED type position indicator with direction arrows, integral with the car operating panel.
  - b. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
  - c. Provide audible floor passing signal per ADA standards where not provided by the elevator signal control.
  - d. Flush mount fixture with cover to match selected car front or car operating panel finish as directed by the Owner.

D. Car Direction Lantern (New)

- 1. Provide a car riding lantern with visual and audible signal in the edge of the strike and/or return post.
- 2. The lens shall project a minimum of 1/4” and shall be of solid Plexiglas.
- 3. Use tamperproof screws with for flush faceplate with hairline joint.
- 4. Car lantern shall indicate the direction of travel when doors are 3/4 open.
- 5. The unit shall sound once for the “up” direction and twice for the “down” direction.
  - a. Provide an electronic chime with adjustable sound volume.

E. Voice Annunciator (New)

- 1. Provide a voice annunciator in each elevator.
- 2. The device features shall comply with the requirements of ADAAG and local accessibility requirements.

3. Coordinate size, shape and design with Designer and other trades.
4. The system shall include, but not limited to:
  - a. Solid state digital speech annunciator.
  - b. A recording feature for customized messages.
  - c. Playback option.
  - d. Built-in voice amplifier.
  - e. Master volume control.
  - f. Audible indication for selected floor, floor status or position, direction of travel, floor stop, seismic operation, firefighter service and nudging.
5. Locate all associated equipment in a single, clearly labeled enclosure located either in the machine room and/or on car top.

F. Corridor Push Button Stations / Reuse Back Boxes

1. Push button signal fixtures shall be provided on each landing.
2. Each signal fixture shall consist of:
  - a. Up and down illuminating push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
  - b. A recessed mounting box, electrical conduit and wiring.
3. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
4. Include firefighter key switch in the main lobby level station or other designated recall landing.
5. Where existing fixtures are located greater than 48" above the floor:
  - a. The existing back boxes shall be retained and used to attach the oversized fixture faceplate to locate the new buttons with a centerline of 42" above the finished floor.
    - 1) The Contractor has the option of providing a single oversized back box in lieu of retaining existing for faceplate attachment.
  - b. Standardize the new centerline distance on all floors.
6. All cutting, patching, grouting and/or plastering of masonry walls resulting from the removal or installation of corridor fixtures shall be performed by the Contractor so as to maintain the fire rating of the hoistway.
  - a. Finished painting or decorating of wall surfaces shall be by Others.
7. All faceplates shall be engraved with fire logo and "In Case of Fire Use Stairs" to help fill the void created by the use of oversized covers.
8. Provide a digital floor position indicator with 1" high numerals at all landings served

G. Floor Position Indicator (New)

1. Provide a digital LED type floor position indicator at each landing.

2. Indicator shall include 2" high numerals with integral direction arrows that will indicate the direction in which the elevator is traveling.
3. Indicator shall be located directly above or adjacent to the hoistway entrance frames.

#### H. Hall Direction Lanterns (New)

1. Provide a visual and audible signal at each entrance to indicate the direction of travel and, where applicable, which car shall stop in response to the hall call.
  - a. Design the lantern with up and down indication at intermediate landings and a single indication at terminal landings.
  - b. Lanterns shall sound once for the up direction and twice for the down direction.
    - 1) Provide an electronic chime with adjustable sound volume.
  - c. Provide adjustable signal time (three [3] to ten [10] seconds, with one [1] second increments) to notify passengers which car shall answer the hall call and preset per ADAAG notification standards.
2. Main Lobby fixture shall incorporate a 2" high LED floor position indicator in the hall lantern fixture with direction arrows located on both sides of the indicator.
3. Locate the lantern above or adjacent to the corridor entrance.

#### I. Lobby Control Panel (New)

1. Provide a Lobby Control Panel for elevators adjacent to the Fire Command Center as directed by the Owner/Consultant.
2. Provide stainless steel faceplate with tamperproof screws.
3. The panel shall include:
  - a. 2" high LCD car position and travel direction indicators.
  - b. Master intercom station / telephone.
  - c. Three (3) position (on/car to lobby/off) switches.
  - d. Emergency power controls and indicators as per code requirements.
  - e. "Car at the designated floor with its doors open" indicator.
  - f. System trouble indications.
  - g. Car call floor lockout switches.
  - h. Floor lockout switches as herein further specified.

#### J. Closed Circuit TV Security System (New)

1. Provide a complete Closed Circuit TV Security System, including all hardware and wiring as necessary, in accordance with specifications provided by the Owner attached and made part of this specification.
2. Provide a corner mounted, high-resolution color camera with a wide angle for a Closed-Circuit Television (CCTV) security system.
3. The camera is to be mounted diagonally across from the strike plate of the elevator door and able to view the position indicator and passenger traffic.
4. The camera shall be of the wide-angle lens low light type.

5. Provide a fifteen (15) inch LCD color monitor in the Lobby or as otherwise directed by the Owner.
  - a. Monitor shall be capable of displaying all cameras on a split screen (via separate splitter) and switching to a single camera utilizing the entire screen.
6. The receiving monitor shall be a self-contained unit designed for wall or shelf mounting with all necessary brackets, hardware and fixture component accessories as required.
7. Provide a Digital Video Recorder (DVR) with CD/DVD burner capable of saving up to thirty (30) days of video and a six (6) month supply of applicable recordable media (DVD, Video CD).
8. Provide a lockable storage cabinet for the CCTV operating system to be located in a climate-controlled location as directed by the Owner.
9. The CCTV security system shall be energized by an independent source of current, other than the current supply to the main elevator operation to avoid the possibility of system failure due to an interrupted current supply to the elevator equipment.
10. Provide a battery back-up unit located at the DVR to provide a minimum of two (2) hours of back-up power in the event of building power loss.

## 2.12 CAR ENCLOSURES (Remodel)

### A. Elevator Car Enclosure(s) and the Five Percent (5%) Rule:

1. In accordance with A17.1, Section 8.7, as adopted and/or modified by the AHJ, entitled "Alterations", where a new or remodeled elevator car enclosure is included in the base scope of work, the Contractor shall, within thirty (30) days after execution of the contract, weigh the elevator, or one (1) elevator of each group of elevators included in the base scope of work, to determine the present deadweight of the platform/sling/cab assembly.
2. The Contractor shall, when necessary, weigh the interior materials of a single cab to better estimate the total existing weight of existing materials being removed as part of the alteration.
3. The Contractor shall make every effort to provide accurate weight measurements while taking into consideration all weights that may present themselves at the time the measurement is taken.
4. Measurements of actual cab weight shall be compared to the original deadweight of the car as stamped on the crosshead data tag.
5. Where no data tag exists, the Contractor shall make every effort to determine the original weight of the platform/sling/cab through calculations
6. The amount of weight that may be added to the car, so as to remain within the limits of the "Five Percent (5%) Rule", shall be calculated based on the following:
  - a.  $(\text{Original Deadweight} + \text{Capacity}) \times (0.05) = \text{Maximum Additional Weight Allowed}$
7. The Contractor shall document and notify the Owner and Consultant of the results of the measurements taken and what weight, if any, can be added or needs to be removed from the cab in order to maintain compliance with the Five Percent (5%) Rule.
8. The Contractor shall work diligently with the Owner and/or Owner's Representative and/or Architect as well as the manufacturer of the car enclosure to minimize additional weights of the new or remodeled car enclosure so as to maintain compliance with the 5% Rule.

9. Contractor shall be responsible for proper static balance of the platform/sling/car enclosure, upon completion of the car interior work.
10. Costs associated with this work shall be included in the base modernization price.
11. Provide a new data tag on the crosshead of the elevator indicating the new deadweight, the current percent counterbalance and the date of the alteration.

B. Elevator Cab Remodel

1. Refer to Appendix A

C. Elevator Cab Enclosure Fan (New)

1. Provide an exhaust type two (2) speed fan unit with cover grill, mounting accessories and necessary cab enclosure modifications.
2. Fan unit shall include self-lubricating motor with housing rubber mounted for sound vibration isolation.
3. Provide a key switch in the elevator cab enclosure for control of fan unit.
4. Provide necessary wiring and approved conduit to properly connect fan unit with power source and control key switch.

D. Elevator Cab Air Conditioning (New)

6. Provide an air conditioning unit on the top of each elevator cab capable of providing ventilation air to the car enclosure in accordance with Code.
  - a. The evaporator unit shall draw air from the hoistway and supply it to the car enclosure.
  - b. The condenser shall draw air from the hoistway and discharge it to the hoistway.
  - c. The unit shall be capable of operating with air entering at a maximum 103 deg F DB and 74 deg F WB while maintaining a car interior temperature at a maximum of 93 deg. F. DB when the outdoor ambient temperature is 93 deg. F DB.
  - d. The unit shall have an electric heater to maintain a cab temperature of 50 deg. F. during the winter months.
  - e. The unit shall be controlled by a thermostat located at the unit air return intake in the cab ceiling and shall switch the unit from cooling to heating mode or to fan only in accordance with the temperature of the air in the hoistway.
  - f. A condensate evaporator shall be provided to dispose of condensate during cooling mode operation. The condensate evaporator shall be provided with an overflow pipe discharging below the bottom of the cab.
7. The air conditioning unit and condensate evaporator shall be by Marvair Airxcel Inc., Liftaire I - Model ELA07ACB (minimum 7,100 BTU capacity) or approved equal.
8. The electrical contractor shall provide a dedicated 115V, 20amp disconnect switch per elevator in the elevator machine room, with pipe and wiring terminating in a junction box at the elevator controllers. Electrical contractor shall provide the junction box and coordinate the location with the elevator contractor.
9. The elevator contractor shall provide all necessary wiring from the elevator controllers to the air conditioning units on the car top. The elevator contractor shall be responsible for all wiring from the dedicated air conditioning feeders to the AC unit located on top of each

elevator car. Provide a separate traveling cable, as necessary to accommodate the required wiring.

10. Supply and return register locations shall be coordinated with the Architect and the manufacturer of the car enclosure and shown on the elevator contractors cab shop drawings.

E. Inspection Certificate and Frame

6. Provide the mandated inspection card frame for posting the required certificate or an alternate plaque as directed by the Owner designee.
7. The alternate plaque shall indicate the location of the certificate within the building, including floor and/or room designation, where access is available during normal business hours.

2.13 EMERGENCY LIGHTING / COMMUNICATIONS / SIGNALING Battery Back Up Emergency Lighting Fixture and Alarm

1. Provide a self-powered emergency light unit.
  - a. Arrange a minimum of two (2) of the cab LED light fixtures to operate as the emergency light system.
  - b. Where cab lighting is utilized for emergency lighting, Contractor shall coordinate the battery back-up equipment so that it is compatible with the type of cab lighting specified by the Owner or Architect.
2. Provide a car-mounted battery unit including solid-state charger and testing means enclosed in common metal container.
  - a. The battery shall be rechargeable nickel cadmium with a ten (10) year minimum life expectancy. Mount the power pack on the top of the car.
  - b. Provide a 6" diameter alarm bell mounted directly to the battery/charger unit and connected to sound when any alarm push button or stop switch in the car enclosure is operated.
  - c. The bell shall be configured to operate from power supplied by the building emergency power generator. The bell shall produce a sound output of between 80-90 dBa (measured from a distance of 10') mounted on top of the elevator car.
    - 1) Activation of this bell shall be controlled by the stop switch and alarm button in the car operating station.
    - 2) The alarm button shall illuminate when pressed.
3. Where required by Code for the specific application, the unit shall provide mechanical ventilation for at least one (1) hour.
4. The operation shall be completely automatic upon failure of normal power supply.
5. Unit shall be connected to normal power supply for car lights and arranged to be energized at all times, so it automatically recharges battery after use.

B. Common Alarm Bell (New)

1. Provide a common alarm bell located in the elevator pit.

- a. The bell shall be configured to operate when the alarm or stop switch of any elevator is activated, during both normal and battery back-up power conditions.
- b. Existing common alarm bells may be rehabilitated and reused providing they meet the intent of this section and applicable codes.

C. Emergency Voice Communication / Telephone (New)

1. A hands-free emergency voice communication system shall be furnished in each car mounted as an integral part of the car operating panel.
  - a. Necessary wires shall be included in the car traveling cable and shall consist of a minimum of one shielded pair of 20AWG conductors.
  - b. 120V power shall be provided to power the hands-free device.
2. The telephone shall be equipped with an auto-dialer and illuminating indicator which shall illuminate when a call has been placed and begin to flash when the call has been answered.
  - a. Engraving shall be provided next to the indicator which says, "When lit help is on the way".
3. In addition to the standard "Alarm" button, a separate activation button shall be provided on the car operating panel to initiate the emergency telephone and place a call.
  - a. The telephone must not shut off if the activating button is pushed more than once.
  - b. The telephone shall transmit a pre-recorded location message only when requested by the operator and be provided with an adjustable call time which can be extended on demand by the operator.
  - c. Once two-way communication has been established, voice prompts shall be provided which instruct the operator on how to activate these functions as well as alerting the operator when a call is being attempted from another elevator in the building.
4. The system shall be compatible with ring-down equipment and PBX switchboards.
5. The system shall be capable of serving as the audio output for an external voice annunciation system.
  - a. Conversation levels shall measure 60 dbA or higher and measure 10 dbA above ambient noise levels.
  - b. Each device shall be provided with a self-diagnostic capability in order to automatically alert building personnel should an operational problem be detected.
6. The phone shall be able to:
  - a. Receive incoming calls from any On-Site Rescue Station (when provided or required).
  - b. Receive incoming calls from other off-site locations via the public telephone system.
  - c. Acknowledge incoming calls and automatically establishing hands-free two-way communications.

- 1) If no On-Site Rescue Station is provided, each hands-free device shall have built in line consolidation which will allow up to six (6) elevators to be called individually from outside the building over a single telephone line and up to eighty (80) elevators if an On-Site Rescue Station is provided.
7. The emergency elevator communication system shall require a maximum of one (1) telephone line.
    - a. The system must provide line sharing capability to eliminate the need for a dedicated telephone line.
    - b. The line sharing function must ensure that the emergency telephones always receive dialing priority even if the line is in use and that the emergency telephones can be called into from an off-site location.
  8. The system shall provide its own four (4) hour backup power supply in case of a loss of regular AC power.
  9. The system must provide capability for building personnel to call into elevators and determine the charge state of any backup batteries provided for the emergency telephones.
  10. Pushing the activation button in any of the elevator car stations will cause any on-site Rescue Station (where provided or required) or security telephone to ring.
    - a. If the on-site call is not picked up within thirty (30) seconds, the call will be automatically forwarded to a twenty-four (24) hour off-site monitoring service.
    - b. The arrangements and costs of the off-site monitoring and telephone line shall be by others.
  11. All connections from the junction box to the telephone system shall be done by the Elevator Contractor where existing provisions can be reused.
  12. New telephone lines, where required, shall be provided and interfaced by others.
  13. All connections from the junction box to the security room's main telephone system shall be done by others.
  14. All electrical work shall conform to Division 16 requirements.
  15. Existing phone systems removed shall be returned to the Owners for installation by others in other areas.
- D. Firefighters' Two-Way Telephone Communications System (New)
1. Provide a complete two-way telephone communications system for point-to-point communications between authorized personnel.
  2. Provide firefighter telephone jack in the car operating panel in accordance with the requirements of the local authorities. The box shall be fitted with a flush mounted door having hairline joints.
  3. Connection devices (jacks) and all associated wiring shall be provided by the elevator Contractor as part of the base bid.
  4. The handsets shall be self-powered and not require an external power source for operation.
    - a. The firefighter phone shall be furnished under Division 16.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Inspection

1. Study the Contract Documents with regard to the work as specified and required so as to ensure its completeness.
2. Examine surface and conditions to which this work is to be attached or applied and notify the Owner in writing if conditions or surfaces are detrimental to the proper and expeditious installation of the work. Starting the work shall imply acceptance of the surfaces and conditions to perform the work as specified.
3. Verify, by measurements at the job site, dimensions affecting the work. Bring field dimensions which are at variance with those on the accepted shop drawings to the attention of the Owner. Obtain the decision regarding corrective measures before the start of fabrication of items affected.
4. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

### 3.2 INSTALLATION / PROJECT PHASING

#### A. Installation

1. Modernize the elevators, using skilled personnel in strict accordance with the final accepted shop drawings and other submittals.
2. Comply with the code, manufacturer's instructions and recommendations.
3. Coordinate work with the work of other building functions for proper time and sequence to avoid delays and to ensure right-of-way of system. Use lines and levels to ensure dimensional coordination of the work.
4. Accurately and rigidly secure supporting elements within the shaftways to the encountered construction within the tolerance established.
5. Provide and install motor, switch, control, safety and maintenance and operating devices in strict accordance with the submitted wiring diagrams and applicable codes and regulations having jurisdiction.
6. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
7. Arrange door tracks and sheaves so that no metal-to-metal contact exists.
8. Reinforce hoistway fascias to allow not more than 1/2" of deflection.
9. Sound isolate cab enclosure from car structure. Allow no direct rigid connections between enclosure and car structure and between platform and car structure.
10. Isolate cab fan from canopy to minimize vibration and noise.
11. Remove oil, dirt and impurities and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.
12. Prehang traveling cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting after installation.
13. Pack openings around oil line with fire resistant, sound isolating glass or mineral wool.
14. Provide isolation pad between platen head and car structure.
15. Sound isolate pump units and controllers from building structure.
16. After installation, touch up in the field, surfaces of shop primed elements which have become scratched or damaged.
17. Lubricate operating parts of system as recommended by the manufacturer.

## B. Project Phasing

1. Phase I - Final design development and contractors' preliminary work procedures to be completed within four (4) weeks from date of contract award.
  - a. Prevailing conditions review and layout.
  - b. Selection meeting for aesthetic design and finishes with Owners' designee.
  - c. Filing for required permits or other governing authorities work procedure requirements.
2. Phase II - Submittal approvals and confirmations shall be completed within eight (8) weeks from date of contract award.
  - a. Selection confirmations.
  - b. Manufacturer's shop drawings applicable, i.e., fixtures, cab, machine room layouts, doors, etc.
  - c. Engineering data acknowledgment applicable, i.e., power, heat, structural loads.
  - d. Delivery dates for major component suppliers, i.e., controls, machinery, fixtures, cabs, etc.
  - e. Posting of permits or other governing agency authorizations to proceed.
  - f. Proposed work implementation schedule based on the aforementioned procedures/confirmations.
3. Phase III - Mobilization of Final Design Approvals
  - a. Revision confirmations. (Equipment, etc.)
  - b. Preliminary work procedures.
  - c. Schedule confirmations.
4. Contractor shall provide a project schedule as part of the Bid based on the following:
  - a. Include three (3) days of simulated operation, with or without door operation, while not allowing passenger use.
  - b. Consultant punch list inspection report shall be performed after acceptance testing by the AHJ for each individual elevator.
  - c. Contractor shall complete all punch list items issued by both the AJH and the Consultant prior to turn-over for beneficial use by the Owner and removal of the next elevator for modernization.

## C. Removal of Elevators

1. If extenuating circumstances (i.e., separating controller interconnections, inspection, testing, etc.), require that multiple cars of a single elevator group be removed from service simultaneously, the work shall be performed outside of the normal business hours at a time mutually agreed to by the Owner and Contractor.
2. A minimum of five (5) days advance written notice shall be given to the Owner and Elevator Consultant by the Contractor detailing the reasons for the simultaneous removal of the elevators from service along with the estimated out-of-service time.
3. The request shall be subject to review by the Elevator Consultant and approved by the Owner prior to the commencement of the work.

4. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

D. Transfer of Hall Button Risers

1. Transfer of the hall button riser(s) to the new signal control systems shall be performed on a not-to-interfere basis and shall not interrupt building operations or inconvenience building occupants.
2. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

### 3.3 FIELD QUALITY CONTROL

A. Inspection and Testing

1. Upon completion of each work phase or individual elevator specified herein, the Contractor shall, at its own expense, arrange and assist with inspection and testing as may be required by the A.H.J. in order to secure a Certificate of Operation.

B. Substantial Completion

1. The work shall be deemed “Substantially Complete” for an individual unit or group of units when, in the opinion of the Consultant, the unit is complete, such that there are no material and substantial variations from the Contract Documents, and the unit is fit for its intended purpose.
2. Governing authority testing shall be completed and approved in conjunction with inspection for operation of the unit; a certificate of operation or other required documentation issued; and remaining items mandated for final acceptance completion are limited to minor punch list work not incorporating any life safety deficiencies.
3. The issuance of a substantial completion notification shall not relieve the Contractor from its obligations hereunder to complete the work.
4. Final completion cannot be achieved until all deliverables, including but not limited to training, spare parts, manuals, and other documentation requirements, have been completed.

C. Contractor’s Superintendent

1. The Contractor shall assign a competent project superintendent during the work progress and any necessary assistant, all satisfactory to the Owner. The superintendent shall represent the Contractor and all instructions given to him shall be as binding as if given to the Contractor.

### 3.4 PROTECTION / CLEANING

A. Protection and Cleaning

1. Adequately protect surfaces against accumulation of paint, mortar, mastic and disfiguration or discoloration and damage during shipment and installation.

2. Upon completion, remove protection from finished surfaces and thoroughly clean and polish surfaces with due regard to the type of material. Work shall be free from discoloration, scratches, dents and other surface defects.
3. The finished installation shall be free of defects.
4. Before final completion and acceptance, repair and/or replace defective work, to the satisfaction of the Owner, at no additional cost.
5. Remove tools, equipment and surplus materials from the site.

B. Barricades and Hoistway Screening

1. The Contractor shall provide barricades where necessary in order to maintain adequate protection of areas in which work specified by the Contract Documents is being performed, including open hoistway entrances. Fabrication and erection as all barricades shall be in compliance with applicable OSHA regulations.
2. As required, the Contractor shall provide temporary wire mesh screening in the hoistway and of any elevator undergoing work specified in the Contract Documents. This screening shall be installed in such a manner as to completely segregate the hoistway from that of adjacent elevators. Screening shall be constructed from .041" diameter wire in a pattern that rejects passage of a 1" diameter ball.

### 3.5 DEMONSTRATION

A. Performance and Operating Requirements

1. Passenger elevators shall be adjusted to meet the following performance requirements:
  - a. Speed within five percent (5%) of rated speed in the up direction under any loading condition.
  - b. Leveling: within  $\pm 1/4$ " as measured between the car entrance threshold and the landing sill on any given floor under any loading condition.
  - c. Typical Floor-to-Floor Time: (Recorded from the doors start to close on one floor until they are 3/4 open at the next floor) under various loading conditions.

Group Passenger Elevators	17.5 seconds.
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d. Door Operating Times

Door Type	Opening	Closing
42" center opening	1.7 sec.	2.4 sec.

- e. Door dwell time for hall calls: 4.0 sec with Advance lantern signals.
- f. Door dwell time for hall calls: 5.0 sec without Advance lantern signals.
- g. Door dwell time for car calls: 3.0 seconds.
- h. Reduced non-interference dwell time: 1.0 seconds.

2. Maintain the following ride quality requirements for the passenger elevators:

- a. For speeds up to 1400 fpm, the speed of the car roller guides shall not exceed 500 rpm.

- b. Where pit permits, extend bottom roller guides by not less than one half the distance from the centerline of the upper roller guides to the platform.
- c. Noise levels inside the car shall not exceed the following:
  - 1) Car at rest with doors closed and fan off - 40 dba.
  - 2) Car at rest with doors closed, fan running - 55 dba.
  - 3) Car running at high speed, fan off - 50 dba.
  - 4) Door in operation - 60 dba.
- d. Vertical accelerations shall not exceed 14 milli-g and horizontal accelerations shall not exceed 20 milli-g.
  - 1) The accelerometer used for this testing shall be capable of measuring and recording acceleration to nearest 0.01 m/s<sup>2</sup> (1 milli-g) in the range of 0-2 m/s<sup>2</sup> over a frequency range from 0-80 Hz with ISO 8041 filter weights applied. Accelerometer should provide contact with the floor similar to foot pressure, 60 kPa (8.7psi).
- e. The amplitude of acceleration and deceleration shall not exceed 2.6 - 2.8 ft./sec<sup>2</sup> for geared and MRL traction, and 3.5 - 4 ft./sec<sup>2</sup> for gearless traction elevators.
- f. The maximum jerk rate shall be 1.5 to 2.0 times the acceleration and deceleration.
- g. The maximum velocity which the elevator achieves in either direction of travel while operating under load conditions that vary between empty car and full rated load shall be within  $\pm$  three percent (3%) of the rated speed.

#### B. Acceptance Testing

- 1. Comply with the requirements of Division 01.
- 2. The Contractor shall provide at least five (5) days prior written notice to the Owner and Consultant regarding the exact date on which work specified in the Contract Documents will reach completion on any single unit of vertical transportation equipment.
- 3. In addition to conducting whatever testing procedures may be required by local inspecting authorities in order to gain approval of the completed work, and before seeking approval of said work by the Owner, the Contractor shall perform certain other tests in the presence of the Consultant.
- 4. The Contractor shall provide test instruments, test weights, and qualified field labor as required to safely operate the unit under load conditions that vary from empty to full rated load and, in so doing, to successfully demonstrate compliance with applicable performance standards set forth in the project specifications with regard to:
  - a. Operation of safety devices.
  - b. Sustained high-speed velocity of the elevator in either direction of travel.
  - c. Floor-to-floor time between adjacent floors.
  - d. Floor leveling accuracy.
  - e. Door opening/closing and dwell times.
  - f. Ride quality inside the elevator car.
  - g. Communication system.
- 5. Upon completion of work specified in the Contract Documents on the last car in any group of elevators, and in conjunction with the aforementioned testing procedures, the Contractor

- shall carry out additional testing of group dispatch/supervisory control features in the presence of the Consultant.
6. The Contractor shall provide test instruments and qualified field labor as required to successfully demonstrate:
    - a. The back-up operating mode for group dispatch failure.
    - b. Simulated and actual emergency power operation.
    - c. Firefighter and independent service operations.
    - d. Restricted access security features and card reader controls.
    - e. Zoning operations and floor parking assignments.
    - f. Up/down peak operation.
  7. Upon completion of the modernization of each individual elevator, emergency power testing shall be conducted by the Building Management after normal business hours and/or weekends.
  8. After hour tests of systems such as emergency generators, fire service, and security systems shall be conducted at no extra cost to the Owner.

END OF SPECIFICATION

Appendix A						
Bldg. No.	WSU Bldg. ID	WSU Bldg. Address	WSU ID #	Elevator Type	Cab Flooring Material (per specifications)	Interior Wall Finishes (per specifications)
5	Science Hall	5045 Cass Avenue, Detroit, MI 48202	005 01	Traction	Seamless Resilient Rubber	5WL hanging panels ???
34	Student Center Center	5221 Gullen Mall Detroit, MI 48202	034 03	Traction	diamond plate	5WL hanging panels ???
36	Reuther Library	5401 Cass Avenue, Detroit, MI 48202	036 01	Hydraulic	Seamless Resilient Rubber	Plastic laminate panels
42	Alumni House	441 Gilmour Mall Detroit, MI 48202	042 01	Hydraulic	Porcelain tile	Wood Veneer panels
45	Parking Structure 5	5501 Anthony Wayne Drive, Detroit, MI 48202	045 01 045 02	Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
51	Parking Structure 1	450 West Palmer, Detroit, MI 48202	051 03 051 04	Traction Traction	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
71	5057 Woodward	5057 Woodward, Detroit, MI 48202	071 01 071 02 071 03 071 03 071 03	Traction Traction Traction Traction Traction	Seamless Resilient Rubber	Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels
88	Parking Structure 6	61 Putnam Avenue, Detroit, MI 48202	088 01 088 03 088 02	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels 5WL hanging panels
89	Biological Sciences	5047 Gullen Mall, Detroit, MI 48202	089 01 089 02	Traction Traction	Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels 5WL hanging panels
130	Faculty / Administration Building	656 West Kirby Avenue, Detroit, MI 48202	130 03 130 02 130 01	Hydraulic Hydraulic Hydraulic	Existing to remain	Plastic laminate panels Plastic laminate panels Plastic laminate panels
629	Elliman Clinical Research	421 East Canfield Avenue	629 01 629 02 629 03	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels Plastic laminate panels 5WL hanging panels

## APPENDIX A

### WAYNE STATE UNIVERSITY CAR ENCLOSURE AND INTERIOR FINISH STANDARDS

#### CAR ENCLOSURE AND INTERIOR FINISHES

- A. Passenger Elevator: Retain existing car enclosure and provide new interior finishes.
1. Check and tighten all fastenings.
  2. Provide new interior finishes as specified herein.
  3. Modify car enclosure for application of new signal and pushbutton fixtures.
  4. Post modernization weight not to exceed code allowable limits.
  5. Provide the following features:
    - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
    - b. Stationary Return Panels: Retain.
    - c. Entrance Columns: Retain.
    - d. Transom: Retain.
    - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
    - f. Base: Stainless steel with concealed ventilation cutouts.
    - g. Interior Wall Finish:
      - 1) Removable panels, faced and edged, with color core plastic laminate. Plastic laminate (HPDL) shall meet or exceed NEMA Standard LDI-1964 for Type 1, 1/16" high pressure general purpose laminate.
      - 2) Color and finish as selected by Purchaser.
      - 3) 5WL hanging panels with #4 stainless steel reveals between panels.
    - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
    - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
    - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
    - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
    - l. Cab Flooring, provide floor covering per below:
      - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
      - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
      - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
      - 4) Seamless resilient non-slip rubber or vinyl with sealed edges

- 5) Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

B. Service Elevator: Retain existing car Shell enclosure and provide new interior finishes.

1. Check and tighten all fastenings.
2. Provide new interior finishes as specified herein.
3. Modify car enclosure for application of new signal and pushbutton fixtures.
4. Post modernization weight not to exceed code allowable limits.
5. Provide the following features:
  - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
  - b. Stationary Return Panels: Retain.
  - c. Entrance Columns: Retain.
  - d. Transom: Retain.
  - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - f. Base: Textured stainless steel with concealed ventilation cutouts.
  - g. Interior Wall Finish: Removable panels made of 5WL.
  - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
  - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - l. Cab Flooring: Provide a heavy vinyl cab floor covering as selected by the Purchaser.
  - m. Pads and Buttons: 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.

C. Passenger Elevator: New Car Enclosure and Interior Finishes.

1. Remove all existing interior finishes and shell components, weigh, and document.
2. Provide complete new car enclosure and interior finishes as specified herein.
3. Post modernization weight not to exceed code allowable limits.
4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel stainless steel formed panels Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - d. Entrance Columns: Reinforced 14 gauge satin finish stainless steel.
  - e. Transom: Reinforced 14 gauge satin finish stainless steel full width of enclosure.
  - f. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.

- g. Base: Stainless steel with concealed ventilation cutouts.
- h. Interior Wall Finish: Removable panels, faced and edged, with color core plastic laminate. Color and finish as selected by Architect/Purchaser.
- i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
- k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
- l. Subfloor; 5/8" thick marine grade plywood.
- m. Cab Flooring: Provide floor covering per below:
  - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
  - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
  - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
  - 4) Seamless resilient non-slip rubber or vinyl with sealed edges
- n. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
- o. Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

D. Service Elevator: New Car Enclosure and Interior Finishes.

- 1. Remove all existing interior finishes and shell components, weigh, and document.
- 2. Provide complete new car enclosure and interior finishes as specified herein.
- 3. Post modernization weight not to exceed code allowable limits.
- 4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel textured stainless steel formed panels with baked enamel interior finish as selected. Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Car Sill:
  - d. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - e. Entrance Columns: Reinforced 14 gauge textured satin finish stainless steel.
  - f. Transom: Reinforced 14 gauge textured satin finish stainless steel full width of enclosure.
  - g. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - h. Base: Textured stainless steel with concealed ventilation cutouts.
  - i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.

- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - l. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - m. Guardrails:
    - 1) Solid stainless steel flat stock bars, 4" x 3/8", mounted across rear and side walls.
    - 2) Locate guardrail line at 8" above car floor.
    - 3) Bolt rails through car walls from back and mount on 1½" deep solid round stainless steel standoff spacers no more than 18" O.C.
    - 4) Return guardrail ends to car walls.
    - 5) Pads and Buttons: 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.
  - n. Cab Flooring:
    - 1) Seamless resilient non-slip rubber or vinyl with sealed as selected by the Owner.
- E. Freight Elevator Enclosure: Car weight to be verified prior to removal of interior cab finishes/cab enclosure. Post modernization weight not to exceed code allowable limits. Provide the following features:
- 1. Enclosure Walls: Reinforced 10-gauge furniture steel formed panels no more than 20" wide with light-proof joints.
    - a. Baked enamel finish as selected.
    - b. Provide recess in car side wall for recessed mounting of car operating panel.
  - 2. Enclosure Canopy:
    - a. Reinforced 12-gauge furniture steel formed panels no more than 20" wide with light-proof joints and Hinged emergency exit.
    - b. Interior finish white reflective baked enamel.
    - c. Lighting: Recessed LED down lights with on/off switch in car operating panel. Recess mount fixture flush with inside surface of car top. Provide steel guard on car top over fixture.
    - d. Bumper Rails: Two rows of 2" x 12" oak or maple bumpers mounted on both sides and rear of the car.
      - 1) Locate bottom rail at floor level and top rail at 36" above the car floor.
      - 2) Bolt rails through car walls with bolt and captive nuts on exterior of wall panel sections on 18" centers.
      - 3) Finish both upper and lower top edges with a 45-degree chamfered edge to eliminate collection of trash.
      - 4) Finish ends of upper and lower bumpers on side walls to 45° chamfer to eliminate carts and people from hitting blunt ends.
      - 5) Flooring: Provide cab flooring which is 1/8" aluminum diamond plate.

**DIVISION 14**

**SECTION 14 21 23**

**TECHNICAL SPECIFICATIONS FOR**

**FIVE (5) ELEVATORS**

**AT**

**WSU**

**5057 WOODWARD**

**DETROIT, MI**

**ADDENDUM #2**

DATE: February 26, 2024

VDA No. 69965/BM

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## DIVISION 14 – CONVEYING SYSTEMS

### 14 00 00 Conveying Equipment

#### 14 21 00 – Traction Elevators

##### 14 21 23 – Electric Traction Passenger Elevators

## PART 1 - GENERAL

### 1.1 SUMMARY AND DEFINITIONS

#### A. Related Documents

1. Division 01 - Supplementary General Conditions
2. 14 21 23 - Electric Traction Passenger Elevators
3. Request for Proposal

#### B. Intent

1. This section includes:
  - a. Electric traction passenger
2. The following outlines the scope of work covered in this Section:
  - a. Comprehensive “Turn-key” modernization of five (5) 2,500 lbs. capacity gearless traction passenger elevators operating at 600 fpm.
  - b. Completion of Related Work identified herein Item 1.5.A.
  - c. This is a "TURN-KEY" project with the Elevator Contractor designated the "PRIME CONTRACTOR" for all related and non-related work specified and required unless specifically excluded or referenced to be done by others.

As this is a “Turn-Key” project, with the Elevator Contractor being the “Prime” Contractor, it is the Elevator Contractor’s responsibility to perform a detailed survey of the existing jobsite conditions to determine applicability and detailed scope for related work completion.

The Elevator Contractor is required to retain the services of trade sub-contractors that are either experienced in working as subcontractors on elevator modernization projects or that have relevant experience on similar projects. The trade sub-contractors shall be required to complete a detailed survey of related work / building conditions at this location(s) alongside the Elevator Contractor as a requirement to provide cost proposals for the related scope of work. At a minimum, trade sub-contractors that are required to be included on the Elevator Contractors project team should include:

Electrical Contractor

Mechanical Contractor

Fire / Life Safety Contractor

The Elevator Contractor is required to identify in their proposal the Trade sub-contractors utilized to compile their cost estimates included in their Base Bid.

It is the intent of this specification that the Elevator Contractor include in their Base Bid the cost to complete all elevator and related work that will be required to return each of the units to public use with no Code violations or punch-list items identified by the local Authority Having Jurisdiction (AHJ) as remaining to be completed. As such, the items Identified in Section 1.5.A of the Technical Specifications are intended to be as accurate a listing as can be compiled at the time of preparation of these documents.

However, should other related building work items be necessary to be completed to meet the requirements of the AHJ for issuance of permanent elevator operating certificates / permits, it will be the responsibility of the Elevator Contractor to complete the additional items under the scope of their Base Bid amount, with no additional costs to the Owner.

3. Related equipment shall be designed, constructed, installed and adjusted to produce the highest results with respect to smooth, quiet, convenient and efficient operation, durability, economy of maintenance, and the highest standard of safety.
4. It is not the intent of these specifications to detail the construction and design of all parts of the equipment, but it is expected that the type, materials, design, quality of work and construction of each part shall be adequate for the service required, durable, properly coordinated with all other parts, and in accordance with the best commercial standards applicable and of the highest commercial efficiency possible.
5. Electric and magnetic circuits and related parts shall be of proper size, design and material to avoid heating and arcing, and all other objectionable effects which may reduce the efficiency of operation, economy of maintenance and/or net-useful life of the apparatus.
6. Minimum requirements for design, materials, etc., are for certain parts of the equipment. Equivalent requirements approved by the Consultant shall apply to such parts as are of special design, construction or material and to which the specified requirements are not directly applicable. These minimum requirements as a whole shall be considered as establishing proportionate general minimum standards for all parts of the equipment.
7. The Consultant may permit variations from the requirement of these specifications to permit use of the Contractor's standard equipment, provided such standard equipment is in every way adequate for the intended use and meets the full intent of these specifications. All such variations proposed by the manufacturer shall be called to the attention of the Consultant and shall only be made if approved in writing prior to the award of the contract.
8. General requirements for design, materials and construction are intended primarily to apply to the heavy-duty and important parts of the equipment specifically mentioned and to other parts of similar duty and importance. Less important and light-duty parts may be of the standard design, materials and construction provided that, in the opinion of the Consultant, such standards are in accordance with the best commercial practice and are fully adequate

- for the purpose of use. All such variations shall be made only on the Consultant's written approval.
9. All equipment and component parts installed, supplied or provided under this contract shall be manufactured and distributed by a third-party, non-installer company servicing the vertical transportation industry.
    - a. Apparatus shall conform to the design and construction standards referenced herein and shall be rated the best commercial grade suitable for this application.
    - b. Equipment and component systems shall not employ any experimental devices or proprietary designs that could hamper and/or otherwise prohibit subsequent maintenance repairs or adjustments by all qualified contractors.
    - c. Manufacturers of the apparatus shall provide technical support and parts replacements for their equipment and component systems for a minimum of twenty (20) years and issue such guarantee of support to the purchaser with written certification naming the final Owner of their product(s) to ensure the apparatus or systems remain maintainable regardless of who may be selected for future service.
  10. All equipment provided shall be factory and field tested with a history of design reliability and net-useful life established.
    - a. Contractor must be able to demonstrate the apparatus to be installed has been used successfully in a substantially similar manner under comparable conditions.
    - b. If the apparatus proposed differs substantially in construction, material composition, design, size, capacity, duty or other such rating from the equipment previously used for the same purpose by the manufacturer, the Consultant may reject the apparatus or require the vendor test and demonstrate the adequacy and suitability for this particular situation. Any necessary tests shall be performed at the sole expense of the Contractor with no prior guarantee of acceptance after the testing procedure.
  11. The Contractor shall not use as part of the permanent equipment any experimental devices, proprietary design, components, construction of materials which have not been fully tried out in at least substantially similar or under comparable service, except as may be especially approved by the Consultant. If any important equipment or devices to be used on this installation differ substantially in construction, materials, design, size, capacity or duty from corresponding items previously used for the same purpose by the manufacturer, they shall pass such tests as the Consultant may require to fully show their adequacy and suitability. These tests shall be in addition to tests herein specified and shall be made at the expense of the Contractor.
  12. Certain design limitations, tests, etc., are herein specified as a partial check of the adequacy of design, construction and materials used. These requirements do not cover all features necessary to ensure satisfactory and approved operation, etc., of the equipment.
  13. It is understood, the entire system shall be designed, fabricated, modified and/or upgraded in full compliance with applicable local laws and code standards. The absence of a particular item or requirement shall not relieve the Contractor of the full and sole responsibility for such equipment, features and/or procedures.
  14. With the exception of only those items specifically identified as being performed by others, the Specifications are intended to include all engineering, material, labor, testing, and inspections needed to achieve work specified by the Contract Documents. Inasmuch as it is understood that any incidental work necessary to complete the project is also covered by the Specifications, bidders are cautioned to familiarize themselves with the existing job site

conditions. Additional charges for material or labor shall not be permitted subsequent to execution of the Contract.

15. Bidders must report discrepancies or ambiguities occurring in the Specifications to the Consultant for resolution prior to the bidding deadline, otherwise the Specifications shall be deemed acceptable in their existing form.
16. Fixtures, Operating Devices and Signage Survey
  - a. Upon award of the Contract, Contractor shall perform a survey of the existing elevator operating fixtures and devices, including signage, and present a report to the Building Management. The report shall include photographs of the following existing items:
    - 1) Hall call push buttons
    - 2) "You are Here" signage if integral with the hall call fixture cover plate
    - 3) Floor identification / Braille signage in entrance jambs
    - 4) Lobby directional lanterns at all floors
    - 5) Applicable wall surfaces
  - b. The Contractor shall submit, as part of the report, pictures or catalog cuts of the new devices intended to be installed under the modernization project at the various locations including any additional signage either new or replacing existing.

#### C. Abbreviations and Symbols

1. The following abbreviations, Associations, Institutions, and Societies may appear in the Project Manual or Contract Documents:

ADA	Americans with Disabilities Act
AHJ	Authority Having Jurisdiction
AIA	American Institute of Architects
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
IBC	International Building Code
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
OSHA	Occupational Safety and Health Act

#### D. Codes and Ordinances / Regulatory Agencies

1. Work specified by the Contract Documents shall be performed in compliance with applicable Federal, State, and municipal codes and ordinances in effect at the time of Contract execution. Regulations of the Authority Having Jurisdiction shall be fulfilled by the Contractor and Subcontractors. The entire installation, when completed, shall conform with all applicable regulations set forth in the latest editions of:
  - a. Local and/or State laws applicable for logistical area of project work.

- b. Building Code applicable to the AHJ.
  - c. Elevator Code applicable to the AHJ.
  - d. Safety Code for Elevators and Escalators, ASME A17.1 and all supplements as modified and adopted by the AHJ.
  - e. Safety Code for Elevators and Escalators, A17.1S supplement to A17.1 as modified and adopted by the AHJ for Machine Room Less installations (MRL).
  - f. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2.
  - g. Safety Code for Existing Elevators and Escalators, ASME A17.3 as modified and adopted by the AHJ.
  - h. Guide for emergency evacuation of passengers from elevators, ASME A17.4.
  - i. National Electrical Code (ANSI/NFPA 70).
  - j. American with Disabilities Act - Accessibility Guidelines for Building and Facilities and/or A117.1 Accessibility as may be applicable to the AHJ.
  - k. ASME A17.5/CSA-B44.1 - Elevator and escalator electrical equipment.
  - l. ECC (Energy Conservation Code) as may be applicable to the AHJ.
2. The Contractor shall advise the Owner's Representative of pending code changes that could be applicable to this project and provide quotations for compliance with related costs.

#### E. Reference Standards

- 1. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
- 2. ANSI/AWS D1.1 - Structural Welding Code, Steel.
- 3. ANSI/NFPA 80 - Fire Doors and Windows.
- 4. ANSI/UL 10B - Fire Tests of Door Assemblies.
- 5. ANSI/IEEE - 519-Latest Edition
- 6. ANSI/IEEE - Guide for Surge Withstand Capability (SWC) Tests
- 7. ANSI Z97.1 – Laminated/Safety Tempered Glass

#### F. Definitions

- 1. Defective Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
- 2. Provide: Where used in this document, provide shall mean to install new device, apparatus, system, equipment or feature as specified in this document.
- 3. Definitions in ASME A17.1 as amended or modified by the AHJ apply to work of this Section.

### 1.2 PERMITS AND SUBMITTALS

#### A. Permits

- 1. Prior to commencing work specified by the Contract Documents, the Contractor shall, at its own expense, obtain all permits or variances as may be required by the AHJ and provide satisfactory evidence of having obtained said permits and variances to both the Owner's Representative and Consultant.

2. File necessary drawings for approval of all Authorities Having Jurisdiction.
  3. The Elevator Contractor shall undertake the necessary review and search procedure to identify open applications and/or outstanding violations for this property; and close-out such applications and/or expunge such violations relative to the project scope as required for final acceptance by the AHJ.
  4. Outstanding applications and violations must be indicated on the request for permit filing for this procedure to ensure such applications and/or violations are dismissed accordingly.
- B. All relative costs shall be included in the base bid proposal with the understanding that corrective actions are covered under the specified scope of work.
- C. Submittals
1. Prior to beginning the work, the Contractor shall submit and have approved copies of layout drawings, shop drawings and standard cuts. These items shall include:
    - a. A plan and section view of the hoistway, pit and machine room
    - b. Machine assembly, controller, door equipment, signal fixtures Door panels, car and counterweight guides, travel cable, and cab enclosures/ interiors.
    - c. All specified additional accessories.
  2. The Consultant and the Owner's Representative shall pass on the submittals with reasonable promptness and the Contractor shall be responsible to ensure that there will be no delay in their work or that of any other trade involved.
  3. Approved filing and submittal requirements must be completed before equipment and related materials are ordered.
  4. Copies of Department of Buildings' permits and/or governing authority's documents will be posted at the job site with copies issued to the Owner's Agent, Owner's Representative and Consultant.
  5. Samples of wood, metal, plastic, paint or other architectural finish material applicable to this project shall be submitted for approval by the Owner's designee.
  6. It shall be understood that approval of the drawings and cuts by Owner's designee, Architect and/or Consultant shall be for general arrangement only and does not include measurements which are the Contractor's responsibility or approval of variations from the contract documents required by the AHJ.
  7. The Contractor shall prepare a record log and maintain all submittals, shop drawings, catalog cuts and samples.
- D. Measurements and Drawings
1. Drawings or measurements included with the bidding material shall be for the convenience of the bidders only and full responsibility for detailed dimensions lies with the Contractor.
  2. In the execution of the work on the job, the Contractor shall verify all dimensions with the actual conditions.
  3. Where the work of the Elevator Contractor is to join other trades, the shop drawings shall show the actual dimensions and the method of joining the work of the various trades.
- E. Substitutions

1. Requests for substitutions will be considered under the following time limitations and situations:
  - a. Not less than ten (10) calendar days before bids are due.
  - b. Work or equipment specified becomes unavailable through unforeseen events such as strikes, loss of manufacturer's plant through fire, flood or bankruptcy.
2. Requested substitutions will be reviewed and adjudged. Failure of the Owner to raise objection shall not constitute a waiver of any of the requirements of the Contract Documents.
3. Request for substitutions shall include complete data with drawings and samples as required, including the following:
  - a. Quality Comparison - Proposed substitution versus the specified product.
  - b. Changes required in other work because of the substitution.
  - c. Effect on the construction schedule.
  - d. Cost Data - Resulting from the proposed substitution versus the specified product. The Contractor shall certify that the cost data presented is complete and includes all related costs under this Contract.
  - e. Safety Comparison – Proposed substitution shall provide equivalent or greater safety, with certification data provided where relevant.
4. When proposing a substitution, the Contractor represents that:
  - a. They have investigated the proposed substitution and have determined that it is equal to or better than the product specified.
  - b. They will guarantee the substitution in the same manner as the product specified.
  - c. They will coordinate and make other changes as required in the work as a result of the substitution.
  - d. They waive all claims for additional costs as a result of the substitution, with the exception of those identified above under "cost data".
5. The Owner will be sole judge of the acceptability of the proposed substitution.
6. The Owner and Consultant will have authority to approve or reject substitutions or to change the specified standards of quality. However, neither this authority to act under this provision nor any decision made in good faith, either to exercise or not to exercise this authority, shall give rise to any duty or responsibility of the Owner to the Contractor, any Subcontractor, any Sub-Subcontractor, any of their agents or employees or any other persons performing the work or offering to perform the work.

F. Changes in Scope and Extra Work

1. The Owner may at any time make changes in the specifications, plans and drawings, omit work, and require additional work to be performed by the Contractor.
  - a. Each such addition or deletion to the Contract shall require the Owner and the Contractor to negotiate a mutually acceptable adjustment in the contract price, and, for the Contractor to issue a change order describing the nature of the change and the amount of price adjustment.

- b. The Contractor shall make no additions, changes, alterations or omissions or perform extra work except on written authorization of the Owner.
- c. Each change order shall be executed by the Contractor, Owner, and the Consultant.

G. Keys

- 1. Upon the initial acceptance of work specified by the Contract Documents on each unit, the Contractor shall deliver to the Owner, six (6) keys for each general key-operated device that is provided under these specifications in accordance with ASME A17.1, Part 8 standards as may be adopted and modified by the AHJ.
- 2. All other keying of access or operation of equipment shall be provided in accordance with ASME A17.1 Part 8 as may be adopted and modified by the AHJ.

H. Diagnostic Tools

- 1. Prior to seeking final acceptance of the project, the Contractor shall deliver to the Owner any specialized tools required to perform diagnostic evaluations, adjustments, and/or programming changes on any microprocessor-based control equipment installed by the Contractor. All such tools shall become the property of the Owner.
  - a. Owner's diagnostic tools shall be configured to perform all levels of diagnostics, systems adjustment and software program changes which are available to the Contractor.
  - b. Owner's diagnostic tools that require periodic re-calibration and/or re-initiation shall be performed by the Contractor at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the project.
  - c. The Contractor shall provide a temporary replacement, at no additional cost to the Owner, during those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation or repair.
- 2. Contractor shall deliver to the Owner, printed instructions, access codes, passwords or other proprietary information necessary to interface with the microprocessor-control equipment.

I. Service Support Requirements / Spare Parts

- 1. Software / Firmware Updates
  - a. During the life of the equipment and subject to the term of the maintenance agreement, where revisions to firmware and/or software are issued by the control manufacturer or manufacturer of solid state and microprocessor-based subsystems subsequent to the beneficial use of the equipment, updates shall be provided so that the installation and spare circuit boards are current with respect to software and firmware versions.

J. Wiring Diagrams, Operating Manuals, and Maintenance Data

- 1. Deliver to the Owner two (2) identical volumes of printed information organized into neatly bound manuals prior to seeking final acceptance of the project.

2. The manuals shall also be submitted in electronic format on non-volatile media, incorporating raw 'CAD' and/or Acrobat 'PDF' file formats. Electronic manuals shall be properly indexed, bookmarked, and searchable.
3. Manuals, as well as electronic copies, shall contain the following:
  - a. Step-by-step adjusting, programming and troubleshooting procedures that pertain to the solid-state microprocessor-control and motor drive equipment.
  - b. Passwords or identification codes required to gain access to each software program in order to perform diagnostics or program changes.
  - c. A composite listing of the individual settings chosen for variable software parameters stored in the software programs of both the motion and dispatch controllers.
  - d. Method of control and operation.
4. Provide two (2) sets of "AS INSTALLED" straight-line wiring diagrams in both hard and electronic format in accordance with the following requirements:
  - a. Displaying name and symbol of each relay, switch or other electrical component utilized including identification of each wiring terminal.
  - b. Electrical circuits depicted shall include all those which are hard wired in both the machine room and hoistway.
  - c. Supplemental wiring changes performed in the field shall be incorporated into the diagrams in order to accurately replicate the completed installation.
5. Furnish two (2) sets of bound instructions and recommendations for maintenance, with special reference to lubrication and lubricants along with the full Maintenance Control Program as required Part 8 of ASME A17.1.
6. Manuals or photographs showing controller replacement parts with part numbers listed.

K. Training

1. Prior to seeking final acceptance of the project, the Contractor shall conduct an eight-hour training program on-site with building personnel selected by the Owner.
2. The focus of the session shall include:
  - a. Instructions on proper safety procedures and who to contact for the purpose of assisting passengers that may become entrapped inside an elevator car.
  - b. Explain each control feature and its correct sequence of operation.
3. Control features covered shall include but not be limited to:
  - a. Independent Service Operation.
  - b. Attendant Service Operation.
  - c. Emergency Fire Recall Operation - Phase I.
  - d. Emergency In-car Operation - Phase II.
  - e. Emergency Power Operation.
  - f. Emergency Communications Equipment.
  - g. Security Operating Features.
  - h. Interactive Systems Management.
  - i. Remote Monitoring/Controls.

L. Patents

1. Patent licenses which may be required to perform work specified by the Contract Documents shall be obtained by the Contractor at its own expense.
2. The Contractor agrees to defend and save harmless the Owner, Consultant and agents, servants, and employees thereof from any liability resulting from the manufacture or use of any patented invention, process or article of appliance in performing work specified in the Contract Documents.

M. Advertising

1. Advertising privileges shall be retained by the Owner.
2. It shall be the responsibility of the Contractor to keep the job site free of posters, signs, and/or decorations.
3. Contractor's logo shall not appear on faceplates or entrance sills without the approval of the Owner.

1.3 QUALITY ASSURANCE

A. Materials and Quality of Work

1. All materials are to be new and of the best quality of the kind specified.
2. Installation of such materials shall be accomplished in a neat manner and be of the highest quality.
  - a. Should the Contractor receive written notification from the Owner stating the presence of inferior, improper, or unsound materials or quality of installation, the Contractor shall, within twenty-four (24) hours, remove such work or materials and make good all other work or materials damaged.
  - b. Should the Owner permit said work or materials to remain, the Owner shall be allowed the difference in value or shall, at its election, have the right to have said work or materials repaired or replaced as well as the damage caused thereby, at the expense of the Contractor, at any time within one (1) year after the completion of the work; and neither payment made to the Contractor, nor any other acts of the Owner shall be construed as evidence of acceptance and waiver.

B. Electrical Design Requirements (General)

1. The following typical requirements shall apply to all parts of the work and are supplementary to other requirements noted under the respective headings.
  - a. The design and construction of the motors shall conform to the requirements of these specifications and to the ASME Standards for Rotating Electrical Machinery with revisions issued to the first day when the work of this Contract was advertised.
    - 1) Motors shall operate successfully under all loads and speeds and during acceleration and deceleration.
    - 2) Motors shall be designed for quiet operation without excessive heat.

- 3) Insulation on motor coils and windings and on all insulated switch, relay, brake and other coils shall conform to the requirements of minimum Class "F" insulation, as defined in ANSI Standards for Rotating Electrical Machinery. All motors shall be impregnated twice.
- 4) Switches, relays, etc., on the controller, starter and signal panels and similar items on other parts of the equipment shall be the latest improved type for the condition of use. They shall function properly in full accordance with the requirements of the machines controlled and with the specified operating requirements of the elevator. Any of these parts showing wear or other injurious effects during the guarantee period to the extent that abnormal maintenance is required or indicated shall be replaced with proper and adequate parts by the Contractor.
- 5) Contacts in elevator motor circuits which are intended to be opened by governors or other safety devices shall be copper to carbon or other approved non-fusing type.
- 6) Where required, controllers and other component parts of the installation shall be labeled in accordance with the latest codes and standards as adopted and/or otherwise modified by the AHJ.
- 7) Electrical equipment, motors, controllers, etc., installed under this contract shall have necessary CSA/US or UL/US listing as may be required by the AHJ. Equipment shall be labeled or tagged accordingly.

#### C. Energy Conservation Code

1. The Contractor shall comply with the requirements set forth in the Energy Conservation Code as may be applicable to the AHJ.
2. Except for equipment or systems under the purview of other disciplines, elevator and escalator equipment provided by the Contractor requiring compliance shall include, but not be limited to:
  - a. Gear ratio efficiencies in geared machines
  - b. Energy efficiencies of gearless motors
  - c. Absorption of regenerated power for elevators
  - d. Energy efficiencies of car interior lighting and ventilation
  - e. Automatic operation of car interior lighting and ventilation through the individual car controller

#### D. Materials, Painting and Finishes

1. Two (2) coats of rust inhibiting machinery enamel shall be applied to exposed ferrous metal surfaces in the pit that do not have a galvanized, anodized, baked enamel, or special architectural finishes.
2. Two (2) coats of rust inhibiting enamel paint to the machinery located within the machine room and secondary level (where applicable) as well as to the machine room floors.
3. Architectural metal surfaces of bronze or similar non-ferrous materials which are specified to be refinished, re clad and/or provided new, shall be sufficiently clear coated so as to resist tarnishing during normal usage for a period of not less than twelve (12) months after final acceptance by the Owner.
4. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the

background to which it is applied. The identification shall be either decalcomania or stencil type.

5. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by Code at intervals not exceeding 7'-0". The color of paint used shall contrast with the color of the surface to which it is applied.

#### E. Accessibility Requirements

1. Locate door reopening devices at 5" and 29" above the finish floor when individual contact projection apparatus is employed.
2. Locate the alarm button and emergency stop switch at 35", and floor and control buttons not more than 48" above the finished floor. The alarm button shall illuminate when pressed for visual acknowledgement to user.
3. Provide raised markings in the panel to the left of the car call and other control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons and cover plate.
4. The centerline of new hall push button shall be 42" above the finished floor.
5. The hall arrival lanterns, or cab direction lantern provided shall sound once for the "up" direction and twice for the "down" direction. Design and locate fixtures per Federal standards.
6. Provide floor designations at each entrance on both sides of jamb at a height of 60" above the floor.
  - a. Use cast metal plates and polished numbers secured with tamper-proof hardware.
  - b. Designations shall be 2" high, raised .03" on a contrasting color background as selected by the Owner.
7. Provide an audible signal within the elevator to tell passenger that the car is stopping or passing a floor served by the elevator.
8. Where elevators operate at a speed greater than 200 fpm, provide a verbal annunciator to announce the floor at which the elevator is stopping where required by the AHJ.
9. Provide signal control timing for passenger entry/exit transitions per Federal and/or Local standards.
10. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
11. Provide visual call acknowledgment signal for car emergency intercommunication device.

#### F. Qualifications

1. The work shall be performed by a company specialized in the business of manufacturing, installing and servicing conveying systems of the type and character required by these specifications with a minimum of ten (10) years of experience.
2. Prior written acceptance is required for manufacturers other than those listed, before quoting this project. Requests for acceptance will not be considered unless they are submitted before bid date and are accompanied by the following information:
  - a. List of five (5) similar installations having exact equipment being proposed for this project arranged to show name of project, system description and date of completed installation. The list shall include the names, position and resumes of the construction team and field supervisor of the installations.

- b. Complete literature, performance and technical data describing the proposed equipment. Include the names, position and resumes of the proposed construction team and field supervisor.
- c. List of ten (10) service accounts by building name, building manager or owner, including phone numbers.
- d. Location of closest service office from which conveying system will be maintained.
- e. Location of closest parts inventory for this installation.
- f. List of the names, positions and resumes of the construction teams and field supervisor for the installation.

G. Structural, Mechanical and Electrical Design Parameters

- 1. The mechanical and electrical systems and the building structure have been designed for the following design loads:
  - a. Structural Loads:
    - 1) The pit, machine room and rail loads are shown on the drawings.
- 2. Power supply: 208 / 460V-3PH-60Hz (EE to verify)
- 3. Electrical Loads: (EE to verify) (ID Unit)
- 4. Heat Release: (EE to verify)
- 5. Submit a written statement with the bid that the above design loads and the clearance requirements shown on the Architectural drawings are acceptable for the proposed equipment. If not, specifically state the design variances.
- 6. After the award, if the type of equipment provided requires structure, mechanical and electrical system changes and/or revisions, the Elevator Contractor shall be responsible for all additional design and construction costs.
- 7. Electrical equipment, motors, controllers, etc., installed under this contract shall have necessary CSA/US or UL listing as may be required by the AHJ. Equipment shall be labeled or tagged accordingly.

1.4 DELIVERY / STORAGE / HANDLING / COORDINATION

A. Delivery and Storage of Material and Tools

- 1. Comply with the requirements of Division 01.
- 2. Delivery, Storage and Handling:
  - a. Deliver materials to the site ready for use in the accepted manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name. Delivered materials shall be identical to accepted samples.
  - b. Store materials under cover in a dry and clean location, off the ground.
  - c. Remove delivered materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
- 3. The Owner shall bear no responsibility for the materials, equipment or tools of the Contractor and shall not be liable for any loss thereof or damage thereto.

4. The Contractor shall confine storage of materials on the job site to the limits and locations designated by the Owner and shall not unnecessarily encumber the premises or overload any portion with materials to a greater extent than the structural design load of the Facility.

B. Work with Other Trades / Coordination

1. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are embedded in concrete or masonry for the applicable equipment. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
2. Coordinate sequence of installation with other work to avoid delaying the Work.
3. Coordinate locations and dimensions of other work relating to the equipment scheduled for installation including pit ladders, sumps, and floor drains in pits; entrance subsills; machine beams; and electrical service, electrical outlets, lights, and switches in pits and machine rooms, secondary levels, overhead sheave rooms and hoistways as it relates to the specific equipment.

C. Removal of Rubbish and Existing Equipment

1. On a scheduled basis, the Contractor shall remove all rubbish generated in performing work specified in the Contract Documents from the job site.
2. Any component of the existing elevator plant that is not reused under the scope of work specified in the Contract Documents shall become property of the Contractor and, as such, shall be removed from the premises at the Contractor's sole expense.
3. The Contractor agrees to dispose of the aforementioned equipment and rubbish in accordance with any and all applicable Federal, State, and municipal environmental regulations, and further accepts all liability that may result from handling and/or disposing of said material.

D. Protection of Work and Property

1. The Contractor shall continuously maintain adequate protection of all their work from damage and shall protect the Owner's property from injury or loss arising out of this contract.
2. The Contractor shall make good any such damages, injury or loss, except such as may be directly caused by agents or employees of the Owner.
3. The Contractor shall provide all barricades required to protect open hoistways or shafts per OSHA regulations. Such protection shall include any necessary guards or other barricades for employee protections during and after the modernization procedure.

## 1.5 RELATED WORK

A. Work by Elevator Contractor Included in the Base Bid

1. The following requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.
  - a. Provide hoist rope guards at the car and counterweight drop side of the hoisting machine sheave to prevent accidental contact with the hoisting ropes. The guard

shall extend from the point where the hoisting ropes penetrate the machine room floor slab to a point beyond where the ropes contact the traction and deflector sheaves. The guards shall be constructed so as to conceal pinch-points between ropes and sheave grooves.

- b. The top surface of any setback or projection in the hoistway that measures 2" or more in width shall be beveled at an angle of not less than seventy-five (75) degrees from horizontal. Each bevel plate shall be constructed from prime painted 14-gauge cold-rolled steel and installed so as to conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
- c. Provide the following signage, plates and tags:
  - 1) Provide each walk-in pit entrance door with a sign reading "Danger Elevator Pit" or the equivalent thereof. Letters shall be not less than 2" high.
  - 2) In addition to (1) above, walk-in pits with pit door stop switches shall be provided with a sign that reads "WARNING – Opening the Pit Door Will Stop the Elevator".
  - 3) Provide access doors to each electrical control room, secondary or machinery space with signs that read "ELEVATOR MACHINE ROOM". Letters shall be not less than 2" high.
  - 4) Provide all required manufacturer data plates and installation-specific tags and signs of the types and styles containing information as required by applicable Codes and Standards as adopted and/or modified by the AHJ.
- d. Where the pit extends more than three (3) feet below the sill of the pit access door, provide a permanent fixed metal ladder.
  - 1) Ladder shall extend no less than 48" above the sill of the access door. Handgrips shall extend from the ladder to a point no less than 48" above the sill of the access door where the ladder does not comply.
  - 2) The rungs shall be a minimum of 16" wide. Where prevailing conditions prevent a 16" wide rung, the rung may be reduced to no less than 9".
  - 3) The rungs shall be spaced 12" on center.
  - 4) A clear distance of no less than 4-1/2" from the centerline of the rungs and handgrips to the nearest permanent object in back of the ladder shall be provided.
    - a) Where prevailing conditions prohibit the installation of the required ladder as specified above, the Elevator Contractor shall coordinate requirements necessary for compliance with the Authority Having Jurisdiction.
- e. Provide a standard railing conforming to Code on the outside perimeter of the car top on all sides where the perpendicular distance between the edges of the car top and the adjacent hoistway enclosure exceeds 300 mm (12 in.) horizontal clearance or as otherwise required by the Authority Having Jurisdiction.
- f. Provide necessary patching, repairing and installation of masonry and/or dry wall for smooth and legal elevator hoistways.
- g. Provide any required repair of smoke holes with subway grating covers in the machine rooms and/or secondary levels where applicable. All smoke ventilation

- provisions, including duct work, dampers, fans, fire control interfaces, in accordance with local codes, shall be reviewed for proper operation.
- h. Installation of HVAC provisions inside the machine room so as to maintain ambient temperature and humidity levels that are within the range specified by the microprocessor-control equipment manufacturers.
  - i. Subsequent to the contract execution, the Contractor shall perform the following procedures and engineering tasks relative to balance loading of system and cab work included under base specification requirements and alternative/optional upgrades:
    - 1) Perform balance load testing to determine existing conditions and requirements applicable to new/modified equipment.
    - 2) Provide data for Purchaser and/or their agents to evaluate any limitations that may be placed on design/finish options due to prevailing conditions or total suspended loading.
  - j. Subsequent to the contract execution, the Contractor shall perform a Violation search and review of all open Applications in conjunction with the filing procedure. Subsequently, any and all outstanding Violations and/or open Applications shall be indicated on the Request for Permit; and such outstanding Violations shall be expunged, and open Applications closed out as part of this filing procedure.
    - 1) If requirements and/or work necessary to satisfy outstanding Violation or Applications are not included in the contracted scope of work, the Elevator Contractor shall prepare an itemized listing with relative extra costs to cure the condition(s) and expunge and/or close out the Violation or Application for the Owners' and Consultants' review/approval prior to executing such work procedures.

B. Work by Others

- 1. The following requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.
  - a. Installation of new main line power feed with related disconnect switch designed and located per local law requirements.
  - b. Provide remote/auxiliary disconnects where new or existing disconnect switches are not in line-of-sight of the controller.
  - c. Installation of auxiliary power feed with related distribution panel(s) and disconnect(s) designed and located per local law requirements.
    - 1) Voltage shall be 110 VAC with one (1) 15 Amp circuit breaker or fuse for lighting of each individual elevator car enclosure.
    - 2) Circuit breakers and/or fused disconnects shall be lockable in the "OFF" position in accordance with applicable code.
  - d. The top surface of any setback or projection in the hoistway that measures 2" or more in width shall be beveled at an angle of not less than seventy-five (75) degrees from horizontal, constructed from prime painted 14 gauge cold-rolled steel and installed so as to conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.

- e. Installation of new permanent dual lamp LED lighting fixtures with protective guards and 110-volt duplex GFI receptacles inside the machine room. Illumination shall be no less than thirty (30) foot-candles at floor level. A light control switch shall be provided immediately adjacent to the machine room entrance door. Provide necessary receptacles as required by Elevator Contractor to supply power to auxiliary elevator equipment and/or remotely located monitors.
- f. Provide machinery spaces of the secondary level directly below the machine room with permanent dual lamp LED lighting fixtures having protective guards and a duplex GFI receptacle. Illumination shall be no less than nineteen (19) foot-candles at floor level. A light control switch shall be provided immediately adjacent to the secondary level entrance door/ladder in accordance with code.
- g. Provide each elevator pit with a 110-volt GFI duplex receptacle and a permanent dual lamp LED lighting fixture equipped with protective guard. Illumination shall be no less than ten (10) foot-candles at pit floor level. A light control switch shall be provided and so positioned as to be readily accessible from the pit entrance door or ladder.
- h. Installation of hoistway and machine room smoke relief provisions in accordance with local laws.
- i. Provide each machine room, secondary space and pit with a self-closing, self-locking, fire-labeled access door. Locking means shall be spring-type arranged to permit the doors to be opened from the inside without a key.
- j. Provide a smoke detector system meeting the requirements of A17.1 and/or the Local Governing Authority.
- k. Installation of new or modification of existing fire emergency control interface provisions for automatic recall of the elevator(s) through operation of the fire detection system. Provisions shall be made for primary, alternate and third-zone (Fire-Hat) designated fire recall landing with connection contingent on Codes recognized by the local governing authority. The interfacing contacts shall be wired to an electrical junction box located inside each elevator machine room for connection to the elevator control systems by the Elevator Contractor. Each wire shall be clearly labeled with its control function. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.
  - 1) Installation of heat / smoke detecting devices in the elevator machine room, elevator lobbies, top of shaft and / or pit as required for elevator fire recall operation to meet current requirements of A17.1 and/or the local Governing Authority. Connection and programming of these new devices to existing building fire alarm control panel.
  - 2) Modification of existing fire alarm control panel and interface / wiring to panel as required to accommodate new heat / smoke detecting devices or new elevator fire recall zones, including installation of expansion panel and new power supply(s) (if required) to existing FACP.
  - 3) Software modifications as required to the existing fire alarm control panel as required to accommodate new smoke / heat detecting devices, new elevator fire recall zones, or expansion panel (if required).
  - 4) All wiring, piping, coring, cutting, patching, as required for new ducts / conduits to connect new or modified components of the fire alarm control system to operate elevator fire recall to meet current requirements of ASME A.17.1 and/or the local Governing Authority.

- l. Installation of fire emergency control interface provisions for automatic recall of the elevator(s) through operation of the fire detection system. Provisions shall be made for alternate designated fire recall landing with connection contingent on Codes recognized by the local governing authority. The interfacing contacts shall be wired to an electrical junction box located inside each elevator machine room for connection to the elevator control systems by the Elevator Contractor. Each wire shall be clearly labeled with its control function. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.
- m. Where sprinkler fire protective systems are provided inside any elevator hoistway, machine room or associated machinery space, provisions shall be made for the disconnecting of the main line power supply from the affected elevator prior to activation. This means of disconnect shall be manually reset in accordance with code.
- n. Installation of emergency power control interface provisions to signal the elevator control apparatus of a transfer from normal (utility) power to the building emergency (generator) power supply. Also, provide additional control interface to give advanced notification to the elevator control apparatus that the power source will transfer from emergency (generator) power to normal (utility) power. Interfacing contacts shall be wired to an electrical junction box located inside each machine room for connection to the elevator control equipment by the Elevator Contractor. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.
  - 1) On the line side of each main line disconnect switch, provide some means to absorb power that may be regenerated by the elevator hoist motor during emergency power operation.
  - 2) Normal Power/Emergency Power Control Signals consisting of two (2) dry contacts provided by others to function as follows:
    - a) One (1) dry contact normally open to make when Normal Power is available. (Logic state of dry contact is to be confirmed by the Manufacturer of the Elevator Control Equipment).
    - b) One (1) dry contact normally open to make when emergency power is available. (Logic state of dry contact is to be confirmed by the Manufacturer of the Elevator Control Equipment).
- o. Installation of HVAC provisions inside the machine room so as to maintain ambient temperature and humidity levels that are within the range specified by the microprocessor-control equipment manufacturers.
- p. Provide a class “ABC” fire extinguisher in electrical machinery and control spaces. Locate the extinguisher in close proximity to the access door.
- q. Provide necessary telephone wiring with connection to local telephone service for remote elevator monitoring and/or two-way voice emergency communications systems.
  - 1) Terminate the telephone wiring in junction boxes or standard phone jack terminals in the machine room.
  - 2) Coordinate the quantity and termination method of individual phone connections with the Elevator Contractor.

- 3) Identify each phone line for connection by the Elevator Contractor to the appropriate elevator device(s).
  - 4) Telephone wiring, where required by applicable codes, shall be installed in conduit.
- r. Sumps in pits where provided, shall be covered. The cover shall be level with the pit floor so as not to produce a tripping hazard.
  - s. Where the pit extends more than three (3) feet below the sill of the pit access door, provide a permanent fixed metal ladder.
    - 1) Ladder shall extend no less than 48" above the sill of the access door. Handgrips shall extend from the ladder to a point no less than 48" above the sill of the access door where the ladder does not comply.
    - 2) The rungs shall be a minimum of 12" wide. Where prevailing conditions prevent a 12" wide rung, the rung may be reduced to no less than 9".
    - 3) The rungs shall be spaced 12" on center.
    - 4) A clear distance of no less than 4-½" from the centerline of the rungs and handgrips to the nearest permanent object in back of the ladder shall be provided.
  - t. Provide Ethernet connection terminals in elevator machine rooms and location of elevator monitoring system.

## 1.6 WARRANTY / MAINTENANCE SERVICES

### A. Contract Close-Out, Guarantee and Warranties

1. The Contractor agrees to certify that work performed in accordance with the Contract Documents shall remain free of defects in materials and quality of work for a period of one (1) year after final acceptance of the completed project, or acceptance thereof by beneficial use on a unit-by-unit basis, whichever occurs first.
2. The sole duty of the Contractor under this warranty is to correct any non-conformance or defect and all damages caused by such defect without any additional cost to the Owner and within fifteen (15) days of notification.
3. The express warranty contained herein is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.
4. In the event the Contractor fails to fulfill its obligations defined herein, the Owner shall have the express right to perform the Contractor's obligations and to charge the Contractor the cost of such performance or deduct an equal amount from any monies due the Contractor.

### B. Maintenance Coverage

1. The following maintenance coverage apply:
  - a. Interim Maintenance

- 1) Provide full protective maintenance services and equipment coverage for one (1) month prior to the commencement of work, and during the work implementation procedure, until final acceptance of the finished project.
- 2) Interim full comprehensive maintenance services shall be provided in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.
- 3) Costs related to interim maintenance shall be included in the base bid quotation indicated on the bid form provided with a deduction for unit(s) out of service for upgrading.

b. Guarantee Maintenance

- 1) Provide full comprehensive preventative maintenance services for a period of twelve (12) months after the final completion and acceptance of the entire project.
- 2) Guarantee maintenance and related services shall be provided in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.
- 3) Costs related to guarantee maintenance shall be included in the base bid quotation indicated on the bid form in the space provided.

c. Long-Term Maintenance

- 1) Long-term full comprehensive maintenance and related services shall be turned over to the incumbent provider secured by the Owner.

## 1.7 AUXILIARY SYSTEMS / TESTING PROCEDURES (New)

### A. Smoke Detector System

1. The Elevator Contractor shall provide a complete smoke detector system for elevator recall complying with the governing authority's requirements and ASME A17.1 as approved or modified under local law.
  - a. Smoke detectors shall be installed in the elevator lobby at each floor, top of hoistway, in pit areas, and associated elevator machine room in accordance with NFPA and/or other applicable codes and standards of the authority having jurisdiction.
  - b. The activation of a smoke detector in any elevator lobby or associated elevator machine room other than the designated level (1st Floor) shall cause all cars in all groups that serve that lobby to return non-stop to the designated level (1st Floor).
  - c. The activation of a smoke detector at the designated level (1st Floor) shall cause the cars to return to an alternate level as required and/or allowed by applicable code unless the Phase I key-operated switch is in the "firemen service" position.
  - d. Smoke detectors and/or smoke detector system shall not be self-resetting.
  - e. Elevator Recall System shall incorporate a minimum number of zones as follows:
    - 1) Zone 1, First Floor
    - 2) Zone 2, Alternate Floor

- 3) Zone 3, Machine Room
- 4) Zone 4, Top of Shaftway
- 5) Zone 5, Pit
- 6) Zone 6, Spare
- 7) Zone 7 to All Typical Landings serviced

- f. The system shall be independent of the existing building systems and shall contain the following:
  - 1) Modular LED control panel/annunciator, located at the 1st Floor Lobby in a specially designed tamperproof station, shall be custom designed for each individual system and location.
  - 2) Smoke detectors shall be photoelectric type or approved equal.
  - 3) Primary power supply shall be provided by Elevator Contractor.
  - 4) Minimum twenty-four (24)-hour emergency power failure battery back-up with automatic recharging apparatus and signal status indicators.
- g. Elevator Contractor shall provide all wiring, conduit and make final connections. Conduit may run in elevator hoistway as part of elevator control signal systems provided such circuitry is installed per local code requirements.

## 1.8 ALTERNATES AND VALUE ENGINEERING:

The following alternatives are elective upgrades which constitute changes to the base scope of work specified. Pricing for each alternate upgrade is requested from the bidder with costs indicated in the appropriate space in the Request for Proposal (RFP). Contractor shall take into consideration, as part of the alternative pricing, alternate work that is required either in lieu of, or in addition to, work specified in the base scope and shall not duplicate costs.

### A. Contractor's Value Engineering Options

1. This alternative is provided for individual contractors to propose optional equipment or otherwise offer cost saving suggestions that will provide the same desired results or further enhance the safety, durability or performance of the elevator systems.
2. Each suggestion must be fully detailed on the contractor's own letterhead with the associated price change specified on the form of proposal provided.

## PART 2 - PRODUCTS

### 2.1 GENERAL DESCRIPTION

### 2.2 Traction Elevator

#### A. WSU 5057 Woodward, Detroit, MI 48202 US - Traction Elevator PE1-PE5

- |             |          |
|-------------|----------|
| 1. Quantity | Five (5) |
|-------------|----------|

2.	Type	Traction Elevator Passenger
3.	Capacity (lbs)	2500
4.	Speed (fpm)	600
5.	Travel in Feet	Existing
	a. Roping\Hoisting	New
	b. Roping\Governor	New
	c. Roping\Compensating	Reuse
	d. Roping/Ropes	1:1
6.	Compensation Sheave	Reuse
7.	Compensation	
	a. Compensation Ropes	Reuse
	b. Compensation Chains	Not Applicable
8.	Number of Landings	Fifteen (15)
9.	Number of Openings	Fifteen (15)
10.	Front Openings	Fifteen (15)
11.	Rear Openings	None (0)
12.	Side Openings	None (0)
13.	Operation	Automatic Group Operation / Conventional Dispatch
14.	Controller	Control Equipment (New); Controller / Group Dispatcher (New)
15.	Machine Room, Secondary, Pit Lighting and GFI	
16.	Machine Type	Gearless (New)
17.	Power Drive	New ACVF
18.	Machine Location	Overhead
19.	Governor	New
20.	Car Platform / Frame / Safety	Car Frame (Reuse); Car Platform (Reuse)
21.	Counterweight	Counterweight Assembly (Reuse)
22.	Counterweight Safety	N/A
23.	Guide Rails	Reuse
24.	Guides	Roller Guides (New)
25.	Buffers	Car and Counterweight Buffers (New)
26.	Buffer Ladder / Platform	(New)
27.	Car Door Type	
	a. Front Door	Two (2) Speed Center Opening (field verify)
	b. Rear Door	N/A
	c. Side Door	N/A
28.	Car Door Size	
	a. Front Door	42" wide x 84" height (Field verify)
	b. Rear Door	N/A
	c. Side Door	N/A
29.	Hoistway Door Type	Single Speed Center Opening (field verify)
30.	Hoistway Door Size	42" wide x 84" height (field verify)
31.	Master Door Operator	Car Door Zone Lock Restrictor (New); Master Door Power Operator System - VVVF/AC (New)
32.	Hoistway Entrance Sills	Retain/Recondition
33.	Sill Finish	Cast Iron
34.	Hoistway Entrances	Reuse

35.	Tracks / Hangers / Interlocks / Closers	Interlocks / Unlocking Devices (New); Tracks / Hangers / Closers / Related Equipment (New)
36.	Emergency Access Doors	(New)
37.	Emergency Exits / Top and Side	(New)
38.	Keyed Access	Not Applicable
39.	Pit Ladder	(New)
40.	Power Supply	480V-3-60 (Field verify)
41.	Electrical Conduit / Wiring / Traveling Cable (New)	(New)
42.	CCTV	(New)
43.	Card Reader	(New)
44.	Floor Lockout Feature	Keyless - Card Reader Control / Wiring Provisions; Keyed Security Control / Car and Hall
45.	Number of Push Button Risers	Two (2)_
46.	Inconspicuous Riser	None (0)
47.	Car Operating Fixtures	(New)
48.	Emergency Communication	(New)
49.	Door Reopening Device	Door Reopening Device (New)
50.	Emergency Cab Lighting	New incorporated into cab lighting
51.	Car Ventilation	(New)
52.	Elevator Cab Enclosure	Remodel
53.	Car Doors / Gate Panels	Car Door Panel(s) (New)
54.	Car Flooring	(New)
55.	Car Sill	New (Nickel silver)
56.	Platform Size	Retain (field verify)
57.	Door Operation	Power Car / Slide Hoistway
58.	Emergency Access Doors	(New)
59.	Intercom / Central Exchange	(New)

## 2.3 MANUFACTURERS

### A. Pre-Approved Equipment Manufacturers

1. The following manufacturer's equipment and materials have been pre-approved by Wayne State University for use on all their traction and hydraulic elevator modernization project.
2. Other equipment not specifically mentioned shall be considered for approval on an individual basis.
  - a. Controller - GAL (GALaxy), Elevator Controls Corporation, Smartrise
  - b. Tracks, Hangers, Interlocks and Door Operators - G.A.L., ECI.
  - c. Fixtures - Innovation, PTL, MAD.
  - d. Door Protective Device - Janus, T.L. Jones, Tri-Tronics.
  - e. Cabs and Entrances/Entrance Door Panels - Tyler, Velis, Gunderlin, Columbia Elevator Products, United Cabs.
  - f. Cab interiors refurbish/remodel – Architectural Metals, A better Elevator Co., Weir inc.
  - g. Machines - Hollister-Whitney, Titan, Imperial, Torin.

- h. Motors - Imperial Electric, General Electric, Baldor, Reuland Electric.
  - i. SCR Power Drives - MagneTek, KEB, Nidec.
  - j. VVVF Power Drives - Mitsubishi, MagneTek, Yaskawa, TorqMax.
  - k. Guide Rails - AFD Industries, Savera, Monteferro.
  - l. Electrical Traveling Cables - Draka, James Monroe.
  - m. Hydraulic Systems/Components - Canton, Elevator Equipment Corporation, MEI, Schumacher.
  - n. Freight Doors and Systems - Courion, EMS Group, Peelle.
  - o. Guide Shoes/Rollers – ELSCO, G.A.L.
  - p. Wire Ropes - Paulsen, Bethlehem, Wayland, Draka.
  - q. Intercommunications/Telephones -K-Tec, Rath Microtec, Wurtec, Janus, Kings three.
  - r. Compensation Chains - Draka
  - s. Compensation Chain Guides - Draka
  - t. All specialized tools, equipment, software, and passwords, required to maintain, repair, adjust the operation, and perform code mandated inspections are provided to the Owner as part of the base installation.
- 1) Updates to these items shall be available via the parts supply facility referenced above.
- u. Technical support of the product(s) shall be available to the Owner's elevator service provider.

3. Original Equipment Manufacturers are not accepted.

## 2.4 CONTROL FEATURES / OPERATION (New)

### A. Cross Cancellation

- 1. A temporary dispatch signal control interface shall be provided during the interim modernization period between the existing dispatching control panel and the new microprocessor supervisory control system.
- 2. The overlay interface shall allow either system to cross cancel corridor calls registered in both systems and maintain an acceptable level of group dispatching operations.
- 3. The existing equipment that is retained on a temporary basis shall undergo a complete maintenance restoration to ensure improved reliability and performance during the primary work implementation period.

### B. Cross Registration

- 1. In conjunction with the installation of the first new controller, the new dispatcher shall be installed and interfaced with the existing dispatcher to allow controlled cross registration of hall calls in both systems.
  - a. The existing temporary apparatus that is retained shall undergo a complete preventive maintenance restoration to ensure improved reliability and performance during the primary work period.

2. Registered hall calls shall be immediately registered in the new dispatcher and assigned to the modernized elevator(s) for response.
  - a. The new dispatcher shall continuously calculate the ETA (Estimated Time of Arrival) of the modernized elevator(s) response to the registered calls.
  - b. Should the calculated ETA exceed the pre-determined time limit, (field adjustable from 0 to 199 seconds), the registered calls with excessive wait times shall be transferred from the new dispatcher to the original dispatcher for assignment to the existing elevator(s).
  - c. Registered hall calls assigned to the original dispatcher shall be returned to the new dispatcher should excessive wait times occur in the original system.
  - d. Hall call demands shall not be dumped, deleted or ignored for any long-hall call scenario in either the new or old dispatching systems.
3. Initial long-wait timer values shall be adjusted at a low setting when less than thirty-three percent (33%) of the total group is modernized and shall be increased as additional modernized elevators are added to the group.
4. Timer values shall be manipulated to achieve the best group performance based on the ratio of both modernized and existing elevators.

C. Motion Control (New)

1. Smooth stepless acceleration and deceleration of the elevator car shall be provided in either direction of travel during both single and multiple floor runs.
2. Use digital logic to calculate optimum acceleration and deceleration patterns during each run.
3. Acceleration, deceleration, jerk, maximum velocity, leveling accuracy and elapsed flight time, for a typical elevator one (1) floor run, shall not exceed values as further specified.

D. Automatic Group Operation / Conventional Dispatch (New)

1. Provide a microprocessor-based group supervisory control system for the operation of the elevators.
2. Elevators shall be arranged to operate with or without attendants as an automatic group.
  - a. The group shall remain capable of sustaining balanced service and continuing operation with one (1) or more cars removed from the system.
  - b. Elevators shall operate from pushbutton panels located inside each car and from a riser of corridor pushbutton fixtures located on each landing served.
3. Elevators shall automatically travel to landings for which a call demand exists.
  - a. Stops in response to calls that are registered at either the car or hall push button stations shall occur in the natural order of progression in which the floors are encountered, depending on the direction of car travel, and irrespective of the order in which calls are registered.
4. Call acknowledgment lights provided in both the car and hall push button fixtures shall become extinguished as the car responding to a particular call begins its slowdown approach to the corresponding landing.

5. In the event no demand for elevator service exists, the first car to satisfy its assigned calls shall be dispatched to park at the main landing.
  - a. In the event additional cars should also complete their call assignments, those cars shall be individually dispatched to previously designated parking floors.
  - b. Parking assignments shall be accomplished without door operation.
  - c. Should the elevator parked at the main landing receive a call assignment, another free car in the group shall immediately assume that parking assignment.
  - d. The number of elevators assigned to park at any particular landing shall be programmable.
6. The group supervisory controller shall, through a dispatching algorithm along with artificial intelligence parameters, continuously scan the system in order to determine the load each car is transporting and to monitor the number of corridor calls registered, the duration of each call, and the intended direction of travel, the number of loaded lifts, etc.
  - a. Based upon that data, the supervisory system shall automatically devise a strategy for call assignment with preference given to calls registered in the following order:
    - 1) lobby demand.
    - 2) long waiting times – down.
    - 3) long waiting times – up.
    - 4) up calls.
  - b. Long wait calls shall be considered those which have remained unanswered for at least forty (40) seconds. The long wait call threshold time shall be programmable.
7. If a car with no car calls arrives at a landing where both up and down hall calls are registered, it will answer the call in the direction of travel.
  - a. If no car call is registered, the car shall be assigned to respond to the call registered for opposite direction.
  - b. The doors shall close and immediately re-open when responding to this call.
  - c. Hall lantern operation shall always correspond to direction of service.
8. In the event that any car is delayed for more than a predetermined time interval after it received a start signal, the system shall automatically permit the remaining cars in the group to respond to signals and be dispatched in the specified manner.
9. In the event the group dispatching, or supervisory system should malfunction so that elevators are not assigned to calls within a predetermined interval and in accordance with the conditions of the operating strategy in effect, the system shall automatically assume a back-up mode of operation whereby the elevators shall be arranged to provide continuous service to each landing in a predetermined pattern without regard to actual corridor demand.
  - a. Failure of the automatic dispatching system will be indicated by an illuminated signal in the Lobby Elevator Control Panel or Elevator Information and Management System where applicable.

10. In the event of failure of the landing call button circuit, provide a means to enable the elevators to service each floor without registration of a call within the elevators.
    - a. When emergency operation is in effect, provide an illuminated signal in the Lobby Elevator Control Panel or Elevator Information and Management System where applicable.
  11. When a car arrives at its last stop and reverses direction of travel, all previously registered car calls shall be automatically cancelled.
  12. When a car has responded to the highest or lowest call, and hall calls are registered for the opposite direction, the car shall reverse direction automatically and respond to those registered calls.
  13. When an empty car reverses direction at a landing with no hall calls, doors shall not open, and the hall lantern shall not operate.
  14. Main Lobby Operation:
    - a. Only the "Next" designated car shall have its hall lantern illuminated and its doors open.
    - b. When a "down" traveling car which is not designated "Next" arrives at the main lobby with a lobby car call registered, it will open its door to discharge the passengers, close the doors, and shall not illuminate its lantern.
    - c. When a "down" traveling car with no car calls arrives at the main lobby and is not designated "Next", it shall park without opening its doors.
  15. Coincident Calls:
    - a. The dispatching system shall be designed with a twenty (20) second parameter whereby an elevator with a car call will receive priority to answer a corresponding corridor call if it can do so within twenty (20) seconds.
    - b. If the elevator cannot answer the call within the prescribed time, the first available car shall be assigned.
    - c. A continuous reassessment of calls shall be made.
- E. Attendant Service Operation (New)
1. Arrange the elevator for operation with or without an attendant.
  2. The transfer from automatic to attendant operation shall be by means of a key operated switch in the car operating panel.
    - a. Locate this switch behind a locked cover in the car station, which shall also contain an "up" and a "down" direction button and a "pass" button.
      - 1) A service demand buzzer and up and down signal lights shall also be included in the car station.
  3. When the transfer switch is in the attendant position, the car shall answer calls normally except that the attendant, operating either the "Up" or the "Down" button, shall establish the direction of travel, close the doors and start the car after each stop.
  4. The car and landing door opening shall be completely automatic.

- a. The doors shall remain open until a direction is initiated by the attendant.
  - b. If the button is released before the doors are fully closed the doors shall reopen.
  - c. Continuous pressure on one of the direction buttons or the “pass” button shall cause the car to bypass hall calls and respond only to pre-registered car calls in the direction of travel.
  - d. The bypassed calls shall remain registered to be answered by another car or by the same car on another trip.
- 5. The up and down signal lights shall indicate that an unanswered corridor call is above or below the car and shall remain illuminated until all calls for that direction are answered.
  - 6. Operation of an "Up" or "Down" hall push button shall momentarily sound the service demand buzzer in the car if it is stopped at a floor with its doors open.
  - 7. Announced calls by entering passengers shall be registered by the attendant.

F. Independent Service Operation (New)

- 1. The car operating station shall be equipped with a key-operated switch labeled “IND SER”.
- 2. Locate the switch in the locked service compartment.
- 3. When placed in the “on” position the following shall occur:
  - a. Group elevator - the elevator shall bypass corridor calls and travel directly to any floor chosen by registration of a car call. Hall calls shall remain registered for service by another elevator in the group.
  - b. Simplex elevator - existing hall call registrations shall extinguish and hall buttons shall remain inoperative as an indication to passengers that there is no elevator service.
- 4. During Independent Service Operation, the elevator doors shall remain open at any landing until the door close or a car call push button is pressed and maintained until the doors are fully closed.
- 5. If more than one (1) car call is registered, all registered car calls shall extinguish when the elevator stops in response to the first call.
- 6. Fire Emergency Recall shall automatically override Independent Service Operation and engage Phase I - Fire Emergency Recall Operation following a period of approximately forty-five (45) seconds.

G. Inspection Service Operation (New)

- 1. Provide a key operated switch in the main car operating panel locked service panel that, when turned to the ‘ON’ position, shall cause the elevator to be removed from service and placed in Inspection Service Operation.
- 2. Limited operation of the car shall be provided through pressing the Attendant Service up and down push buttons (if provided) or the highest or lowest car call push buttons (if up and down buttons are not provided) in the main car operating panel only.
- 3. The car shall move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with both the hall and car door panels in the closed and locked position.
- 4. The Inspection Service switch shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.

5. The top of the elevator car shall be equipped with a control for limited operation of the car during repairs, maintenance and inspection conducted in the hoistway. The transfer of control to the top of car operating device shall cause that device to be the sole means of control for the elevator.
  - a. Visual and audible indication shall be provided on the top of the car when Firefighters' Emergency Operation is initiated.
6. Power door operating equipment shall be rendered inoperative while the car is being operated in the Inspection Service mode with the exception of power closing of the door. The control system shall maintain closing power on the door while the elevator is moving under Inspection Service Operation.
7. The in-car Inspection Service switch shall be rendered ineffective when the top of car inspection control is activated.
8. Machine Room Inspection Operation and Inspection Operation with open door circuits shall be provided in accordance with A17.1 Safety Code, as modified and adopted, where required or allowed by the AHJ.

H. Hoistway Access Operation (New)

1. Provisions shall be made to allow access to the hoistway through the use of hoistway access switches.
2. Operating the access switch shall permit the car to move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with the hall and car doors in the open position to obtain access to the top of the car or climb-in pit.
3. The car shall automatically stop motion when the car top is level with the hoistway door sill for access to top of car.
4. The access key switch(es) shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. Access operation shall be disabled when top of car inspection operation is in effect.

I. Load Weighing Operation (New)

1. A positive means shall be provided to continuously monitor the amount of load being transported by the elevator car.
2. The system shall be used to:
  - a. Preload static motor drives.
  - b. Activate control features that include:
    - 1) anti-nuisance operation.
    - 2) load dispatch operation.
    - 3) load dependent non-stop operation where applicable.
3. The anti-nuisance feature shall operate at loads not exceeding 200 lbs., whereas load dispatch and load non-stop shall be set to function at sixty-five percent (65%) of the rated loading capacity for the initial set up and adjustment procedure.

J. Anti-Nuisance Operation (New)

1. In the event car loading is not commensurate with the number of car calls registered, all car calls shall be canceled.
  - a. The system shall monitor the door protection device to determine if passenger transfer has occurred.
  - b. If after the third (3<sup>rd</sup>) stop a passenger transfer has not occurred, the system shall cancel all remaining registered car calls and respond to assigned hall call demand.
  - c. The number of calls registered with no passenger transfer that will trigger anti-nuisance shall be adjustable and initially set to three (3) calls.

K. Out-of-Service Control Operation (New)

1. Provide an unidentified key-operated switch, engraved with “ON” and “OFF” only, that shall remove the elevator from service when placed in the “ON” position and the car is not in motion. Locate the switch in the service cabinet of the car operating panel.
  - a. When the key-switch is turned to the “ON” position while the elevator is in motion, the car shall proceed to the next call and be removed from service after leveling operations are completed and the doors have opened.
  - b. When engaged, the Out-of-Service Control feature shall cause the car door to remain open and the car call buttons rendered inoperative.
  - c. The elevator shall not respond to hall call assignments from dispatching systems when the Out-of-Service Control feature is active.
2. Firefighters’ Emergency Operation shall override this feature.

L. Firefighters’ Emergency Operation / National (New)

1. Phase I Emergency Recall Operation shall be provided for each car in accordance with ASME A17.1 code as modified under the applicable local or State law.
2. Each main or auxiliary car operating station shall be provided with an indicator light and warning buzzer, each of which shall become activated whenever Phase I Operation is engaged.
  - a. The warning buzzer shall cease to function once the car has completed the recall sequence and is positioned at the designated recall landing.
  - b. The indicator light shall remain illuminated as long as Phase I Operation is activated.
3. A three-position, key-operated switch shall be provided on the designated recall landing to manually activate Phase I Operation.
  - a. When activated, Phase I Operation shall be arranged so that in order to reset normal service, all cars must first be returned to the designated recall landing, after which the Phase I key-switch must be turned to the “OFF” position.
4. A standardized Fire Recall Key shall be used where required by the codes and standards applicable to the AHJ.
5. A “Standardized Fire Recall Key” shall be used in accordance with the applicable Chapter of the Public Law. This key shall be a FEOK1.

- a. Multiple elevators within a group or building that are not affected by the scope of work specified herein, shall be upgraded to the “Standardized Fire Recall Key”.
  - b. The “Standardized Fire Recall Key” shall apply to both Phase I and Phase II Operation.
- 6. Phase II Emergency Recall In-Car Operation shall be provided for each car in accordance with ASME A17.1 code as modified under local or State law.
- 7. Locate controls required for Phase II In-Car Operation in a locked access cabinet in the main car operating panel.
  - a. The cover of the locked access panel shall be engraved as required by local or State law.
  - b. The locked access panel shall contain:
    - 1) Phase II key switch.
    - 2) Fire indicator light.
    - 3) Call cancel push button.
    - 4) Door open push button.
    - 5) Door close push button.
    - 6) Run/Stop switch.
    - 7) Other devices as may be required by local law.
  - c. Engrave the Firefighters’ Service operating Instructions on the inside of the locked cabinet door.

M. Floor Lockout Feature / Keyless - Card Reader Control / Wiring Provisions (New)

- 1. Wiring: Provide eight (8) pair of 20 gauge two (2) flexible conductor low voltage cables with an overall braided shield in the traveling cable of all elevators for card reader interface.
  - a. The cables shall extend from the security interface terminal cabinet in the elevator machine room to behind the elevator return panel above the space allotted for the card reader.
  - b. Terminate the cable to dual screw barrier terminal strips on each end.
- 2. Card Reader Space: Allocate card reader space in each main car station as directed by the Consultant. Provide a flush Lexan lens and mounting provisions for the card reader unit which is provided by others.
- 3. Interface: For floor programmable card access control in all elevators, provide a pair of terminals for all floors such that application of a momentary dry (no voltage present) contact closure across those terminals by the security system shall enable the selection of the corresponding floor from the floor selector button in the elevator cab.
  - a. Locate the terminals inside an interface terminal cabinet in the elevator machine room.
  - b. Provide all relays required to interface the elevator control system to the momentary dry contact closures provided for under another section of these specifications.
  - c. If applicable, the card reader shall be operable and compatible with the issued card keys used building wide.

- d. Coordinate system requirements with the manufacturer of the issued card key system.
- 4. Card Reader "Secure/Bypass" Switch: Provide separate card reader control bypass key switches for each elevator.
  - a. The bypass key switches shall be located in the Lobby Control Panel.
  - b. The bypass key switches shall be a maintained contact type key switch with the key removable in the secure or bypass position.
    - 1) When the key switch is in the secure position, the card reader control mode shall be initiated.
    - 2) When in the bypass position, the card reader control mode shall be bypassed and the elevator shall return to normal operation, permitting free access to any floor.
- 5. The card reader operation shall bypass floor cut-out switches.
- 6. Firefighters' Service Operation shall override Floor Lockout Feature.
- 7. Provide a label on the door of the individual car controller cabinet identifying that the control system utilizes Floor Lockout Feature.
  - a. Firefighters' Emergency Operation override of Floor Lockout Feature shall be tested in accordance with applicable requirements.

N. Door Operation (New)

- 1. Car and hoistway doors shall be arranged to operate in unison without excessive noise or slamming in either direction of travel.
  - a. Door opening speeds of two (2) feet per second shall be provided in conjunction with closing speeds of one (1) foot per second in accordance with governing code.
  - b. Door operation shall commence as the car stops level at the floor and the machine brake is applied. Pre-door opening shall not be permitted.
- 2. Where the hoistway door and the car door are mechanically coupled, the kinetic energy of the closing door system shall be based upon the sum of the hoistway and the car door weights, as well as all parts rigidly connected thereto, including the rotational inertia effects of the door operator and the connecting transmission to the door panels.
- 3. The force necessary to prevent closing of the car and hoistway door from rest shall not exceed thirty (30) lbf. This force shall be measured on the leading edge of the door with the door at any point between one-third and two-thirds of its travel.
- 4. Door open and door close time shall be measured between the moment car door operation in either direction begins and the instant at which that cycle is completed.
- 5. When responding to either a car or corridor call, the amount of time that the elevator door remains stationary in the open position shall be adjustable up to sixty (60) seconds.
  - a. Door open dwell time for a corridor call shall be separate of that for a car call, and in both cases, dwell time shall be canceled whenever the car door protection device is momentarily interrupted by passenger transfers, followed by a reduced door open

dwelt time of approximately one (1) second (adjustable) after the door protection device is cleared of obstructions.

6. The operation of the door protective device by interruption of one or more infrared light beams (dual or multi-beam non-contact) during the close cycle shall cause the immediate reversing of the doors to the full open position.
7. The door closing cycle shall be arranged so that, in the event the door protective devices become continually obstructed after the normal door open dwell time has expired and following a time interval of approximately thirty (30) seconds (adjustable), a warning tone shall sound and the door closing cycle shall commence at reduced speed and torque per applicable Code requirements.
8. Each car operating station shall be provided with a “door open” and “door close” push button.
  - a. Pressure on the “door open” button shall cause doors in the full open position to remain so, and doors engaged in the close cycle to reverse direction and assume the full open position so long as pressure remains applied to the button.
  - b. The “door open” buttons shall also control the open cycle during Phase II - Emergency In-car Operation.
  - c. The “door close” push button shall function on Independent Service, Attendant Service and Phase II - Emergency In-car Operation as well as during normal automatic operations.
9. Repeated attempts by the power door operator to open or close the door at any landing shall be monitored by the control system.
  - a. In the event the door fails to cycle properly after a preset (adjustable) number of attempts, the car shall either travel to the next stop or remove itself from service, depending upon whether the malfunction is in the open or close cycle.
10. Each hoistway door shall be provided with an automatic self-closing mechanism arranged so that the door shall close and lock if the car should leave the landing while the hoistway door is unlocked.
11. Car doors shall be arranged to prevent their being manually opened from inside the car unless the elevator is positioned within a floor landing zone.

## 2.5 MACHINE ROOM / SECONDARY EQUIPMENT (New)

### A. Control Equipment (New)

1. Provide a microprocessor-based elevator control system.
2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.
3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
4. System operating software shall be stored in non-volatile memory.
  - a. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, circuit boards, static motor drive units,

wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.

- b. The motor drive may be located in its own cabinet where the physical size of the drive prohibits installation within the elevator signal controller cabinet.
- c. Mechanical ventilation of the cabinet shall be provided and shall be adequate to dispose of the full load heat losses without exceeding 40° C (104° F) ambient temperature.
  - 1) Control equipment cabinets shall be provided with forced air ventilation to prevent overheating of the electrical components housed therein.
- d. All electrical wiring inside the control equipment cabinet shall be performed in a neat manner with field wiring terminated at stud blocks provided inside the control cabinet.
- e. Each wiring terminal shall be clearly identified according to the nomenclature used on the “as built” wiring diagrams. No more than two (2) field wires may be connected to any single terminal stud.
- f. Spare wires shall be tagged according to their point of termination, bundled, and placed at the bottom of the control equipment cabinet.
- g. Each electrical component within the cabinet shall be permanently identified with symbols identical to those used on the “as-built” wiring diagrams.
- h. A data plate that indicates the edition of the Code in effect at the time of installation and/or alteration shall be provided in accordance with applicable code and requirements of ASME A17.1 Code. The data plate shall be in plain view and securely attached on the mainline disconnect or on the controller.
- i. Control equipment shall comply with requirements of all applicable Sections of the ASME A17.1 Code as approved and adopted by the AHJ.
- j. The manufacturer’s standard on-board “LCD” display shall be incorporated on the main processor board and/or otherwise incorporated in the controller cabinet. The “LCD” shall be capable of providing alpha-numeric characters to view the operational status of the elevator and/or group functions depending on the application. The display shall provide the user with necessary information for troubleshooting and reprogramming of the basic system parameters.
  - 1) Where the “LCD” is not an integral part of the controller and troubleshooting/reprogramming requires the use of a separate tool, the tool shall be maintained in the machine room and accessible to service personnel. This tool, along with all technical documentation for the correct use of the tool, shall remain the property of the Owner.
  - 2) Password protection of critical programming features is required to prevent accidental changes to life-safety and other non-typical control settings.
  - 3) Where a separate dispatch or group control panel is provided, a separate “LCD” display shall be provided to view group functions.

**B. Controller / Dispatcher (New)**

- 1. The elevators shall have generic microprocessor-based controller/dispatchers.
- 2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.

3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
4. System operating software shall be stored in non-volatile memory.
5. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, electronic circuit boards, microprocessors, static motor drive units, wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.
  - a. Provide natural or mechanical ventilation for the controller cabinets.
  - b. Equip the vent openings and exhaust fans with filters.
6. Mount equipment to moisture-resistant, noncombustible panels supported from the steel frame.
7. Provide "noise filter" between hoistway wiring and controller/dispatchers to eliminate interference.
8. Optically isolate communication cables between components.
9. Wiring: Wiring on the units, whether factory or field wiring, shall be done in neat order, and all connections shall be made to studs and/or terminals by means of grommets, solderless lugs or similar connections. All wiring shall be copper.
10. Terminal Blocks: Provide terminal blocks with identifying studs on units for connection of board wiring and external wiring.
11. Marking: Identifying symbols or letters shall be permanently marked on or adjacent to each device on the unit, and the marking shall be identical with marking used on the wiring diagrams. In addition to the identifying marks, the ampere rating shall be marked adjacent to all fuse holders.
12. The manufacturer's standard on-board "LCD" display shall be incorporated on the main processor board and/or otherwise incorporated in the controller cabinet. The "LCD" shall be capable of providing alpha-numeric characters to view the operational status of the elevator and/or group functions depending on the application. The display shall provide the user with necessary information for troubleshooting and reprogramming of the basic system parameters.
  - a. Where the "LCD" is not an integral part of the controller and troubleshooting/reprogramming requires the use of a separate tool, the tool shall be maintained in the machine room and accessible to service personnel. This tool, along with all technical documentation for the correct use of the tool, shall remain the property of the Owner.
  - b. Password protection of critical programming features is required to prevent accidental changes to life-safety and other non-typical control settings.
  - c. Where a separate dispatch or group control panel is provided, a separate "LCD" display shall be provided to view group functions.
13. In the event diagnostics and monitoring is accomplished via Field Service Tools, provide the required Field Service Tools with related control system appurtenances for diagnostic evaluations, system monitoring and field adjustments.
  - a. Provide instructions for proper use of such diagnostic tools and/or equipment with all coding and other operational requirements.
  - b. Maintain and calibrate the diagnostic tools and update the associated instructions and other related documents under the service agreement.

- 1) Should the agreement be cancelled for any reason by either party, maintenance and updating of diagnostic tools shall be provided to the Owner at the Contractor's cost without the need to purchase or lease additional diagnostic devices, special tools or instructions from the original equipment provider.
- 2) The Owner may request field and technical instructions be provided by the original installation contractor or manufacturer for proper servicing by other qualified elevator company personnel.
- 3) The established cost-plus profit, as previously specified, shall be applicable for the life of the system.
  - a) 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.
  - b) Such device shall be in possession of and become property of the Owner.

#### 14. Microprocessor Documentation (New)

- a. Provide and/or obtain complete information on systems' design, component parts, installation and/or modification procedures, adjusting procedures and associated computer conceptual logic circuitry and field connection.
- b. Provide microprocessor upgrading and/or modifications to programs that have been assigned to enhance the operation of the equipment for a period of ten (10) years after project approval.

#### C. Machine Beams (Existing)

1. Provide additional support beams, angles, plates, bearing plates, blocking steel members, etc., to support new machine, governors, dead end hitches, deflector and overhead sheaves from existing machine beams where applicable.
2. Contractor shall verify adequacy of all existing supports scheduled to be reused and report any potential issues to the Owner.

#### D. Gearless Elevator Hoisting Machine (New)

1. Provide a permanent magnet synchronous motor (PMSM) alternating current (AC) gearless traction machine, specially designed and manufactured for elevator service. The machine shall have high starting torque and low starting current, rated for 50<sup>0</sup> C (90<sup>0</sup> F) continuous operation, and a minimum of 240 starts per hour.
  - a. The traction driving sheave and brake drum shall be cast integral and bolted securely to the main armature shaft.
  - b. Securely mount the machine frame, including motor fields, bearing stands and brake on a heavy steel bedplate.
  - c. The armature shaft shall be supported in ball or roller type bearings.
  - d. Minimum class "F" (or approved equal) insulation shall be used to ensure long-term reliability.

- e. The driving sheave shall be cast from the best grade of metal with a Brinell hardness of 215 to 230 and shall be machined with grooves, providing maximum traction with a minimum of rope and sheave wear.
  - 1) Roping requirements and type of steel rope used as suspension means shall be engineered by the contractor and manufacturer of the equipment for maximum life of ropes and sheave.
- f. Ensure that adequate ventilation of internal stator windings and rotating element is provided to prevent overheating with thermal overload protection. (Constant velocity fan for constant cooling.)
- g. Equip housing with eyebolt(s) for lifting.
- h. Provide the machine with an electro-mechanical brake.
  - 1) Brakes shall be drum or disk-type.
  - 2) The brake shall be spring applied and electrically released.
  - 3) Design the brake electro-magnet for quick release and application of the brake.
  - 4) The brake lining material shall be non-asbestos.
- i. Design the brake for quick release to provide smooth and gradual application of the brake shoes or pads.
  - 1) An emergency brake shall be an integral part of the machine design.
- j. Provide 14-gauge hoist cable guards at the car-drop and counterweight-drop side of the machine sheave.
  - 1) Guards shall cover cables from the point of slab penetration to the point where the hoist cables contact the sheave.
  - 2) Guards shall prevent access to cables at pinch points.
  - 3) Guards shall have no sharp edges.
  - 4) Guards shall be properly mounted to prevent vibration.
- k. Provide a raised machine arrangement so that the deflector sheave is located above the machine room slab. Provide adequate steel blocking members to support the machine assembly.
  - 1) Provide service platforms, grating, handrails, ladders and required accessories to service and maintain the hoisting machines.
- l. Where a secondary level exists, span the distance between the car and counterweight with an accurately grooved deflector sheave mounted in the secondary level.
- m. Provide a sheave guard to prevent hoisting rope from jumping off grooves and to prevent possible entrapment on both sides of the floor penetrations.
- n. Design and construct the hoisting machine based on passenger elevator cab enclosure weight as specified and as shown on the architectural drawings.

E. Deflector Sheave (New)

1. Provide overhead and hoisting machine wire rope deflector sheave(s) with related apparatus and structural mounting supports.
  - a. Locate and size new sheave to maximize use of available clearances maintaining the present car and counterweight hitch drops.
  - b. New support bearings shall be of a roller type designed for a minimum of twice the total load calculation.
  - c. The sheaves shall be equipped with suitable lubrication devices.
  - d. The deflector sheave shall be provided with means to guard the hoist ropes, so they do not jump out of their respective grooves during a slack rope condition.
  - e. Required new mounting beams and structural supports shall be interfaced with existing building structures as may be modified under the terms of this contract for the new design rated loading where applicable.

F. Machine Brake (New)

1. Provide an electro-mechanical brake.
  - a. Drum or disk-type brakes shall be spring applied and electrically released.
  - b. Design the brake electro-magnet for quick release and application of brake shoes.
  - c. Swivel type brake shoes shall be applied to the braking surface (pulley or disk).
  - d. The brake lining material shall be non-asbestos and shall be attached to two (2) cast iron shoes.
  - e. The brake pulley or disk shall act as the coupling between the drive motor shaft and the worm shaft.
2. The brake shall be designed and adjusted to safely hold 125% of rated full load capacity in accordance with applicable code.

G. VVVF AC Drive - Regenerative Module (New)

1. The system shall provide full regenerative capabilities to control overhauling motor speed and reduce hoist motor deceleration time by allowing overhaul power to be discharged back into the power lines.
  - a. The regenerative section may be an integral part of the drive, or a stand-alone unit mounted in a separate cabinet with proper ventilation as required by the manufacturer.

H. Overspeed Governor (New)

1. Provide a speed governor, located overhead, to operate the car safety.
  - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
    - 1) Springs used to develop the tension are not acceptable.
  - b. Provide rope grip jaws, designed to clamp the governor rope to actuate the car safety upon a predetermined overspeed downward.

- 1) The centrifugal type governor shall trip and set rope jaws within sixty (60) degrees of governor sheave rotation after reaching rated tripping speed.
- c. Design the governor rope tripping device so that no appreciable damage to or deformation of the governor rope shall result from the stopping action of the device in operating the car safety.
- d. Provide an electrical governor overspeed protective device which shall remove power from the driving machine motor and brake before or at the application of the safety.
  - 1) The setting for the overspeed switch shall be as prescribed in the ASME A17.1 Safety Code.
  - 2) Locate and enclose the switch to ensure that excess lubrication will not enter the switch enclosure.
  - 3) Overspeed switch shall operate in both direction of travel on systems employing a static power drive unit.
- e. Seal and tag the governor with the running speed, tripping speed and date last tested.
- f. Design the governor to prevent false tripping due to conditions caused by rope dynamics.

I. Equipment Isolation (New)

1. Provide sound reducing vibration isolation elements at all support points of elevator controller, solid-state motor drives, isolation transformers, reactance units, hoisting motors and machines.
2. The elements for controllers, solid-state motor drives and isolation transformers shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries, Type ND, with 0.35" static deflection under design load ratings.
3. Elements between the hoisting machine unitized base and machine support beams shall be similar to triple layer ribbed neoprene pads, separated by appropriate steel shims as manufactured by Mason Industries, Type W pads, at 50 durometer, loaded for 40 psi or approved equal.
4. All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.
5. Isolation of existing hoisting machine and motor is contingent on the OEM design of the apparatus.
  - a. Existing isolation pads shall be replaced with new.

J. Overhead / and Governor Stop Switches(New)

1. Provide a positive action stop switch at the following locations as required by applicable code:
  - a. Overhead machine/sheave space.
  - b. Secondary level.
  - c. Overhead governor access panel or space as may be mandated by the AHJ.

2. The switch shall be arranged to prevent the application of power to the hoist motor and machine brake when placed in the “OFF” position.
  - a. Clearly identify the switch with permanent marking on the switch cover that indicates “RUN” and “STOP” positions.

K. Emergency Brake (New)

1. Ascending Car Overspeed Protection Device
  - a. Provide a device designed to prevent an ascending elevator from striking the hoistway overhead structure.
  - b. The device shall decelerate the car with any load up to the rated capacity by applying an emergency brake.
    - 1) The device shall detect an ascending car overspeed condition of not greater than ten percent (10%) higher than the speed that the car governor is set to trip.
    - 2) The device, when activated, shall prevent operation of the car until the device is manually reset.
    - 3) The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.
2. Unintended Car Movement Protection Device
  - a. Provide a device to prevent unintended car movement away from the landing when the car and hoistway doors are not closed and locked.
    - 1) The device shall prevent such movement in the event of failure of:
      - a) The electric driving machine motor.
      - b) The brake.
      - c) The machine shaft or shaft coupling.
      - d) Machine gearing.
      - e) Control system.
      - f) Any component upon which the speed of the car depends.
      - g) Suspension ropes and the drive sheave of the traction machine are excluded.
    - 2) The device shall prevent operation of the car until the device is manually reset.
    - 3) The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.
3. Where the installation of the Emergency Brake involves the raising of existing hoisting machines or modifications to the machine room slab, the contractor shall provide necessary engineering data, structural review and drawings as part of the submittal process.

L. Machine Room Guarding

1. Elevator machine room equipment must be guarded as required by the Occupational Health and Safety Act.
2. The guarding must:
  - a. Meet the requirements of Occupational Health and Safety Act for Industrial Establishments Ontario Regulation 851 (O Reg 851) - Machine Guarding and Maintenance and Repairs.
  - b. Include a Professional Engineer, with the expertise and knowledge of the Occupational Health and Safety Act.
    - 1) The Professional Engineer is to review each elevator machine room equipment guarding installed.
  - c. Provide Health and Safety Review of the completed work for each elevator, signed and stamped by the Professional Engineer.
    - 1) The Health and Safety review must note the approval of the installed elevator machine room equipment guarding and certify compliance with the Occupational Health and Safety Act for Industrial Establishments Ontario Regulation 851 (O Reg 851).
  - d. If a Ministry of Labor inspector does not approve the machine guarding as originally installed and certified by the Professional Engineer, the Contractor shall make all necessary changes to comply with the Occupational and Safety Act at no additional charge.
  - e. Meet the requirements of ASME A17.1/CSA B44 - 07 - Safety Code for Elevators and Escalators.
3. Costs associated with this work shall be included in the base lump-sum modernization price.

M. Hoisting Machine Brake Inspection Platforms and Ladders (New)

1. Provide platforms, grating, handrails, ladders and required accessories to service and maintain the hoisting machine brake assemblies where their height above the floor exceeds that mandated by the AHJ.
2. The design, fabrication and installation shall be by the Elevator Contractor and shall be in compliance with all applicable Codes.
3. Submit drawings showing details for the assembly for approval by the Owner and structural engineer.
4. Apply two (2) coats of rust inhibiting paint to exposed ferrous metal surfaces.

2.6 HOISTWAY EQUIPMENT (New where specified otherwise retain/recondition)

A. Guide Rails / Inserts / Brackets (Reuse/Recondition)

1. Car and counterweight guide rails, fishplates, rail brackets, backing support and related attachments shall be inspected to determine if unfavorable conditions exist that diminish the structural integrity of any component.

- a. In the event substandard conditions are disclosed by means of this inspection, the Contractor shall immediately inform the Consultant as to the exact nature of said problems and then undertake whatever repairs and/or replacements the Consultant may deem appropriate to remedy the situation.
2. Each stack of guide rails shall be individually examined to determine if excessive compression has occurred from building settlement.
  - a. In the event such conditions are found to exist, each affected stack shall be cut off enough to relieve pressure.
  - b. Jacking bolts shall be provided underneath each stack of both car and counterweight guide rails.
3. Each stack of guide rails shall be realigned so that total deviation from plumb in any direction does not exceed 1/8" over the entire length of the hoistway and that DBG measurements never vary more than .030".
4. As required, car guide rails joints shall be individually filled, filed and sanded in order to eliminate minor variations in adjoining machined surfaces.

**B. Counterweight Assembly (Reuse/Recondition)**

1. The existing counterweight assembly shall be refurbished to as new condition and reused.
2. Individual counterweight frame members shall be inspected for any indication of damage and to determine if the overall assembly is twisted, racked, or otherwise distorted.
  - a. All fastenings between counterweight frame members shall be individually examined, tightened and if necessary renewed.
  - b. In case any of these conditions are found to exist, the Contractor shall immediately inform the Consultant about the exact nature of the problem and undertake whatever corrective action the Consultant may deem appropriate to remedy the situation.
3. The amount of filler weight placed within the counterweight frame shall be adjusted so the weight of the entire counterweight assembly is equal to that of the renovated elevator car, plus forty to forty-two percent (40-42%) of its rated loading capacity unless otherwise required by a manufacturer where new hoisting machinery is employed.
  - a. Filler weights shall be held securely in place at all times with tie rods passing through holes in both the weights and the counterweight frame with tie rods secured on each end with double lock nut and a cotter pin arrangement.

**C. Roller Guides (New)**

1. Provide roller guide shoes with adjustable mounting base, rigidly bolted to the top and bottom of each side of the car and counterweight frame.
  - a. Roller guides shall consist of a set of sound reducing polyurethane wheels in precision bearings held in contact with the three (3) finished rail surfaces by adjustable stabilizing springs.
  - b. The bearings shall be sealed or provided with grease fittings for lubrication.
  - c. Equip roller guides with adjustable stops to control postwise float.

- d. Fit the top car roller guides with galvanized, painted or powder coated steel guards.
- 2. Approved applications and manufacturers:
  - a. Geared traction elevators: ELSCO Model B for car roller guides and ELSCO Model D for counterweight guides or approved equal.
  - b. Gearless traction elevators with speeds below 1000 fpm: ELSCO Model A for car roller guides and ELSCO Model C for counterweight guides or approved equal.
  - c. Gearless traction elevators with speeds 1000 fpm and 1200 fpm: ELSCO Model Express High Speed Roller guides for car guides, ELSCO Model A for counterweight guides, or approved equal.
  - d. Gearless traction elevators with speeds greater than 1200 fpm: Use 12" diameter wheels on the car roller guides and ELSCO Model A for counterweight guides or approved equal.
- 3. Roller guides shall not be installed on counterweight frames where traveling buffers with separate guide shoes are employed, and lubrication of the rails is necessary for proper guide operation.
- 4. Roller guides shall not be installed on counterweight frames where counterweight safeties are employed, and prevailing conditions prohibit installation due to limitations in clearances or in cases where rollers will interfere with the operation of the safety plank.

#### D. Hoist Ropes (New)

- 1. Pre-formed traction steel wire rope, specifically constructed for elevator applications, shall be provided for suspension of the elevator car and counterweight assembly.
  - a. Fastenings shall be accomplished by use of individual tapered rope sockets (wedge clamp) with adjustable shackles.
  - b. General design requirements for rope shackles and the method of securing wire rope shall conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
  - c. Provide hoisting and compensation ropes having steel cores for all elevators PE1-PE5.
  - d. Properly select rope for the application and compatibility with the machine drive sheave hardness and groove profile. Design shall provide for a minimum service life of ten (10) years and shall be substantiated by calculations during the submittal phase.
- 2. New ropes shall be identical in number and construction to those which are currently in use.
- 3. Broken rope shackle springs shall be replaced on an as needed basis.
- 4. New rope shackles shall be provided.
- 5. Existing hitch plates shall be inspected for wear. Hitch plates with elongated holes or other conditions that may damage shackles shall be replaced with new.
- 6. Provide anti-spinout as required by applicable code at all shackles where applicable.

#### E. Governor Rope (New)

1. Pre-formed wire rope specifically constructed for elevator applications, shall be provided for governor ropes.
  - a. Rope shall be traction steel or iron in accordance with OEM design requirements.
  - b. Rope diameter and method of fastening shall be in accordance with ASME A17.1 Safety Code as adopted and/or otherwise modified by the AHJ.

F. Compensating Ropes (Conditional Reuse) (New)

1. Existing wire compensation ropes shall be examined and evaluated for replacement.
  - a. All ropes demonstrating significant wear, dry lubrication cores or any deterioration, reducing the projected life to less than three (3) years, shall be renewed in conjunction with the modernization procedure.
    - 1) Necessary new pre-formed traction steel wire ropes, specifically constructed for elevator applications, shall be provided for compensating ropes.
    - 2) Ropes shall be of sufficient diameter and number so as to offset the unbalanced weight of hoist ropes and traveling ropes.
2. Fastenings shall be accomplished by use of individual tapered rope sockets with adjustable shackles.
  - a. Where O.E.M. method of fastening does not employ shackles, duplicate the original design method.
  - b. Where shackles are required, general design requirements for rope shackles and the method of securing wire rope shall conform with ASME A17.1 Safety Code as adopted and/or otherwise modified by the AHJ.
3. Provide anti-spinout as required by applicable code at all shackles.

G. Electrical Conduit / Wiring / Traveling Cable (New)

1. Electrical wiring shall be provided. (New)
  - a. All wiring shall be stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
  - b. Electrical wiring provided for hoistway interlock shall be of a flame-retardant type, capable of withstanding temperatures of at least 392 degrees Fahrenheit. Conductors shall be Type SF or equivalent.
  - c. Each run of electrical conduit or duct shall contain no less than ten percent (10%) spare wires and, in any case, no fewer than two (2) spare wires.
  - d. Crimp-on type wire terminals shall be used where possible.
2. Traveling cable shall be provided. (New)
  - a. Each traveling cable shall be provided with a flame- and water-resistant polyvinyl chloride jacket.

- b. Electrical wiring shall consist of stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
  - c. Each traveling cable shall contain no less than ten percent (10%) spare wires.
  - d. Traveling cable exceeding 100' in length shall be provided with a steel wire rope support strand from which the cable shall be suspended.
  - e. Traveling cable must be contained within an approved electrical conduit to within 6' of the final suspension point in the hoistway.
  - f. Each traveling cable shall be arranged to provide no fewer than six (6) individually shielded pairs of 20-gauge wire and arranged to contain no less than one (1) coaxial cable for CCTV remote monitoring.
  - g. Traveling cable conductors that terminate at a hoistway center box shall be connected to stud blocks provided for that purpose.
    - 1) Each wiring terminal shall be clearly identified by its nomenclature as shown on the "as built" wiring diagrams and solderless, crimp-on type wire terminals shall be used where possible.
  - h. The attachment of a traveling cable to the underside of the elevator car shall be performed so that a minimum loop diameter of thirty times (30x) the cable diameter is provided.
  - i. Pre-hang the cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting during operation.
3. Rigidly supported EMT conduit, flexible metal conduit and galvanized steel trough shall be utilized throughout the hoistway.
- a. Both EMT and flexible conduit shall be connected on either end by use of compression fittings and secured in place with metal clamps sized in accordance with the diameter of conduit utilized.
    - 1) Wire or plastic wire ty-raps shall not constitute an acceptable means of fastening.
  - b. The use of flexible metal conduit shall be limited to runs not greater than three feet (3') in length.
  - c. All abandoned or unused electrical conduit shall be removed from the hoistway.
  - d. Existing conduit and wiring duct may be reused if suitable for the application.
    - 1) Reuse of existing conduit/duct shall be at the discretion of the Consultant.

#### H. Normal and Final Terminal Stopping Devices (New)

- 1. Provide normal terminal stopping devices to stop the car automatically from any speed obtained under normal operation within the top and bottom overtravel, independent of the operating devices, final terminal stopping device and the buffers.
- 2. Provide final terminal stopping devices to stop the car and counterweight automatically from the speed specified within the top clearance and bottom overtravel.

3. The terminal stopping devices shall have rollers with rubber or other approved composition tread to provide silent operation when actuated by the cam fixed to the top of the car.
  - a. Terminal stopping devices that are not mechanically operated (i.e.: magnetic proximity) shall be provided by the manufacturer of the control equipment, intended for use as a terminal limit, and designed for reliable operation in the hoistway environment.
4. Final terminal limits shall be pinned so as to prevent movement after final adjustment where required by the AHJ.

I. Emergency Terminal Speed Limiting Device (New)

1. Provide necessary emergency terminal speed limiting devices where reduced stroke buffers are used.
  - a. Operation of the device shall be independent of the operation of the normal terminal stopping device.
  - b. Arrange the device to automatically reduce the car and counterweight speed by removing power from the driving machine motor and brake so that the rated striking speed of the buffer is not exceeded at the time of impact.
  - c. The sensing device shall be independent of the normal speed control system.
  - d. Short circuits caused by grounds or other conditions shall not prevent the operation of the device.

J. Emergency Terminal Stopping Device (New)

1. Provide necessary emergency terminal stopping devices where static motor control is used at speeds over 200 feet per minute.
  - a. Operation of the device shall be independent of the operation of the normal terminal stopping device.
  - b. Arrange the device to remove power from the driving machine motor and brake should the normal terminal stopping device fail to cause the car to slow down at the terminal as intended.

## 2.7 PIT EQUIPMENT (New)

A. Car and Counterweight Buffers (New)

1. Provide buffer with necessary blocking and horizontal steel braces under the car and counterweight.
2. Provide spring type buffers for elevators with operating speeds of up to and including 200 fpm.
3. Use oil buffers for elevators with operating speeds over 200 fpm.
4. Oil buffer shall bring the car and counterweight to rest from governor tripping speed at an average rate of retardation not exceeding gravity (32 ft/s<sup>2</sup>).
5. Oil buffer shall be of the spring return type and shall have means of checking oil supply level.

6. Use reduced stroke buffer with associated terminal slowdown devices where runby is restrictive.
  - a. Buffer and emergency terminal slowdown device shall operate in accordance with applicable codes.
7. The buffer shall be tested and approved by a qualified testing laboratory.
8. Provide a permanent buffer marking plate which indicates the manufacturer's name, identification number, rated impact speed, and stroke.
9. Provide a permanent data plate in the vicinity of the counterweight buffer indicating the maximum designed counterweight runby.
10. Support buffers from the pit floor level with all required blocking and bracing steel members.
11. Coordinate the installation of the buffer inspection platform and ladder with the Architect and Construction Manager.

**B. Inspection Platforms, Ladders, Guard Rails, Screens and Guards (New)**

1. Provide the following secondary metal work in the pit, hoistway and in elevator machine room in accordance with bid documents.
  - a. Wire mesh separator screen between two (2) adjacent elevator pits located at different elevations.
  - b. Counterweight shall be guarded by means of a fixed screen from the pit floor to a position of at least 2450 mm (96") above pit floor.
  - c. Pit access ladders.
  - d. Buffer inspection platforms and ladders.
  - e. Guard rails and sixty (60) degree ships ladders in machine room.
  - f. Guard around machine, ropes and rope holes.
2. Submit detailed shop drawings of all miscellaneous metal items for Consultant's approval.
3. Provide painted sheet steel covers for all dead-end hitches.
4. The pit ladder shall have continuous steel flat bar side rails 12 mm (1/2") x 75 mm (3"), with eased edges, spaced a minimum of 400 mm (16") apart. Rungs shall be steel bars 18 mm (3/4") in diameter, spaced 300 mm (12") apart with top to have a non-slip surface. Rungs shall be located along centerline of side rails, located not less than 180 mm (7") from the nearest permanent object or structure. Plug weld and grind smooth on outer rails faces. Support each ladder at top and bottom and at intermediate points spaced not more than 1500 mm (60"). Extend side rails 1200 mm (48") above top rung.
5. Prime paint and apply two (2) coats of rust inhibiting machinery enamel to metal work specified above as approved by the Consultant.

**C. Compensating Sheave Assembly (Reuse/Recondition)**

1. The compensating sheave assembly shall be washed clean of accumulated grease and oil, then examined for any indication of bearing or bearing seal failure.
2. Bearings shall be replaced.
3. Defective grease retention seals shall be replaced as part of this scope of work.

4. Compensating sheave guide rails, supports and fastenings shall be inspected for damage and to determine if the structural integrity of any component is diminished by the effects of rust or other unfavorable conditions.
  - a. Where necessary, the Contractor shall undertake whatever repairs and/or replacements are necessary to remedy the situation.
5. Surface rust shall be removed from all reused components of the compensating sheave assembly prior to repainting.
6. The compensating sheave assembly shall be provided with manually reset electrical safety switches to trip prior to the sheave reaching the normal limit of its travel in either vertical direction.
  - a. When in the tripped position, the electrical safety switch shall remove power from the hoist motor and machine brake.
  - b. An existing electrical safety switch that meets the requirement set forth herein may be refurbished to as new condition and reused.
7. Where applicable, the existing compensating sheave tie-down shall be dismantled and inspected for any indication of damage or other unfavorable conditions that might interfere with their proper operation.
  - a. Where necessary, the Contractor shall undertake repairs and/or replacements to remedy the situation.
8. Tie-down shall be lubricated as necessary and set to O.E.M. specifications upon completion of repairs.

D. Governor Rope Tension Assembly (New)

1. Provide a governor rope tension assembly.
  - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
    - 1) Springs used to develop the tension are not acceptable.
  - b. The sheave shall be of proper diameter and set directly plumb with the governor rope drop to prevent the rope from pulling off of the sheave at an angle.
  - c. Lubrication fittings shall be provided on the assembly.
  - d. The assembly shall have necessary rope guards to prevent accidental contact of the rope/sheave by service personnel and to prevent the governor rope from jumping off of the sheave.

E. Pit Stop Switch (New)

1. Where pit depth does not exceed 67", each elevator pit shall be provided with a push/pull or toggle switch that is conspicuously designated "EMERGENCY STOP" and located so as to be readily accessible from the hoistway entrance on the lowest landing served at a height of approximately 18" above the floor.

- a. This switch shall be arranged to prevent the application of power to the hoist motor and machine brake when placed in the “OFF” position.
2. Where climb-in pit depth exceeds 67”, each pit shall be provided with two (2) push/pull or toggle switches conspicuously designated “EMERGENCY STOP”.
  - a. Both of these stop switches shall be located immediately adjacent to the pit access ladder.
    - 1) Place one stop switch approximately 47” above the pit floor.
    - 2) Place the second stop switch 18” above the hoistway entrance sill on the lowest landing served.
    - 3) These switches shall be arranged so as to prevent the application of power to the hoist motor or machine brake when either one is placed in the “OFF” position.
3. Where a walk-in pit exists, each elevator shall be provided with a push/pull or toggle switch that is conspicuously numbered and designated “EMERGENCY STOP”.
  - a. The location of this stop switch shall be approximately 47” above the pit floor at the nearest point of pit entry from the access door.
  - b. This switch shall be arranged so as to prevent the application of power to the hoist motor and machine brake when placed in the “OFF” position.
4. Provide an electric contact safety switch for the pit access door if any equipment attached to the car extends within the space of the hoistway pit when the car is level at the bottom terminal landing.
  - a. Opening the pit access door shall cause the electric contact switch to stop the elevator by interrupting electric power to the driving machine and brake.
  - b. Provide a sign on the pit door “**WARNING – OPENING OF PIT DOOR WILL STOP ELEVATOR**” using lettering a minimum of two (2) inches high.
5. Existing stop and/or pit door switch conforming to the requirements set forth herein may be refurbished to as new condition and reused subject to approval of the Consultant.

## 2.8 HOISTWAY ENTRANCES

### A. Hoistway Entrances (Reuse/Refurbish)

1. Hoistway entrance sills, sill supports, entrance frames, headers and header supports shall be reused and refurbished.
  - a. Hoistway entrances that have become distorted or bent shall be straightened, plumbed, reset to the proper width dimension and reinforced as necessary.
  - b. Provide 14-gauge steel fascia plates that extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
    - 1) Reinforce fascia to allow not more than ½” of deflection.

- 2) Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.
- c. Provide 14-gauge steel toe guards that extend 12" below any sill not protected by fascia.
  - 1) The toe guards shall extend the full width of the door and shall return to the hoistway wall at a fifteen (15) degree angle and be firmly fastened.
- d. Remove oil, dirt and impurities on new and existing apparatus and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.

**B. Slide Type Hoistway Door / New in Existing Frame**

1. Provide a new non-Architectural elevator hoistway entrance doors reusing existing entrance frame. (field verify)
2. Retain/Refurbish all Architectural elevator hoistway entrance doors reusing existing entrance frame. (field verify)
3. Each new door shall be as follows:
  - a. Hollow metal construction.
  - b. 1-1/2-hour fire-rated test approved with required label.
  - c. Manufactured of cold rolled furniture steel.
  - d. Flush design both sides.
  - e. Rigidly reinforced.
  - f. Sound deadened.
4. Where conditions warrant, and where otherwise required by code, equip all hoistway landing doors with one-piece full height non-vision wings of material and finish to match hall side of door panels.
5. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in existing sill grooves with a minimum clearance.
  - a. The guide mounting shall permit their replacement without removing the door from the hangers.
  - b. A steel fire stop shall be enclosed in each guide.
6. Provide the meeting edge of center opening doors with necessary new continuous rubber astragal bumper strips.
  - a. Astragal shall be relatively inconspicuous when the doors are closed.
  - b. Provide rubber bumpers at the top and bottom of each section of door to stop them at their limit of travel in the opening direction.
7. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
8. Provide a special key so that an authorized person can open any landing door when the car is elsewhere.

- a. The keyhole shall be not less than 3/8" in diameter and shall be fitted with a stainless steel or bronze ferrule to match related equipment.
- 9. Finish all door panels to match elevator entrances.
- 10. Where conditions require, provide necessary new masonry around existing entrance frames to maintain fire rating. Painting or other wall surface decorating will be by Others.

C. Tracks / Hangers / Closers / Related Equipment (New)

- 1. Formed or extruded steel landing door hanger tracks shall be provided.
- 2. Each landing door panel shall be suspended from a pair of door hanger assemblies that are compatible with the hanger tracks.
  - a. Hanger assemblies shall be directly mounted to the door panel using 3/8" diameter or better hardware.
  - b. Solid steel blocks shall be used where job-site conditions dictate the use of spacers between hanger assemblies and the landing door panel.
  - c. Hanger assemblies shall be adjusted or shimmed so that door panels are suspended in a plumb manner with no more than 3/8" vertical clearance to the cab entrance threshold.
  - d. Upthrust rollers shall be adjusted for minimal operating clearance against the bottom edge of the hanger track.
  - e. Means shall be provided to prevent hangers from jumping the track.
  - f. Blocks shall be provided to prevent rollers from overrunning the end of the track.
- 3. Each set of center opening landing doors shall be provided with a cable driven relating mechanism which is compatible for use with the door hanger assemblies.
  - a. The relating mechanism shall be properly tensioned and adjusted so as to equalize the relationship between the door panels and the hoistway entrance.
- 4. Each set of multi-speed center opening, or side slide landing doors shall be provided with a sill-mounted spring closing mechanism with necessary door panel relating hardware.
- 5. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
- 6. Each set of single speed side slide landing doors shall be provided with a sill-mounted spring closing mechanism.
  - a. Spirator-type spring closers shall be acceptable should prevailing sill depth or runby clearance conditions require their use.
- 7. Where applicable, each hoistway door interlock assembly shall be provided with an emergency release mechanism utilizing manufacturers' standard type access key at all landings served.
  - a. Drill each hoistway door to accommodate manufacturers standard lock release key and install escutcheon.
    - 1) Escutcheon shall be brushed stainless steel to match door panels where required.

- 2) Aluminum shall be provided at all other typical floors.
  - 3) All unused keyholes shall be plugged.
8. Where multi-speed side slide door panels exist, provide a secondary interlocking device that will prevent separation of the panels should the sill closer or relating cable(s) fail.

D. Interlocks / Unlocking Devices (New)

1. Each set of landing doors shall be provided with a complete electromechanical interlock assembly.
  - a. Each interlock assembly shall consist of:
    - 1) A switch housing with contacts.
    - 2) Lock keeper.
    - 3) Clutch engagement/release subassembly.
    - 4) Associated linkages.
  - b. Arrange the lock so that individual leading door panels (side slide or center opening) are locked when in the closed position.
2. Non-typical mounting arrangements for interlocks and/or related mechanisms must receive prior approval from the Consultant.
3. Each hoistway door interlock assembly shall be provided with an emergency release mechanism utilizing a drop-leaf type access key at all landings served.
  - a. Each hoistway door shall accommodate manufacturers standard lock release key with escutcheon.
    - 1) The keyhole shall be fitted with a metal ferrule that matches the door finish.
    - 2) Drilling key holes in the field will not be accepted.

E. Hoistway Door Bottom Guides / Safety Retainers (New)

1. The bottom of each side sliding type hoistway door panel shall be equipped with a minimum of two (2) guiding members.
  - a. Metal mounting angles shall be secured to the integral panel frame structure; and when conditions warrant, additional external metal support plates or angles shall be installed to ensure the integrity of the panel frame is not compromised.
  - b. Guides shall be manufactured of low friction non-metal material with sufficient strength to withstand forces placed on door panels per ASME A17.1 Standards.
  - c. Each guide assembly shall incorporate a steel wear indicator and be so designed to permit sliding member replacements without removal of door panel(s) from top hanger devices.
  - d. Panels shall be hung with a maximum vertical clearance of 3/8 inch between top of sill and bottom of panel and the guide shall engage the sill groove by not less than 1/4 inch.

2. The bottom of each side sliding type hoistway door panel shall be equipped with a guiding member safety retainer to prevent displacement in the event of primary guide means failure.
  - a. A metal reinforcement (12 gauge stainless or galvanized steel) shall be installed between the two (2) primary guiding members (a.k.a. “Z” bracket).
  - b. The reinforcement shall be designed with a minimum length of eight (8) inches or the maximum possible length that will fit between the primary members and a minimum overall height of two and one-half (2.5) inches secured on the internal face of the door panel. (Hoistway side)
  - c. The retainer shall be set with the supplemental safety angle 3/8 inch into the corresponding sill groove; and be capable of preventing displacement of the panel no more than 3/4 inch with an applied force of 1125 lbf at right angles over an area twelve (12) inches x twelve (12) inches at the approximate center of the door panel.

## 2.9 CAR EQUIPMENT / FRAME

### A. Car Frame (Reuse)

1. The existing car frame assembly shall be refurbished to as new condition and reused.
2. Individual car frame members, platform isolation framework, door operator support structure, related bracing and hardware shall be inspected for any indication of damage or distortion.
  - a. Where damage is detected, the Contractor shall immediately inform the Consultant and then undertake corrective action deemed appropriate by the Consultant to remedy the condition.
3. Provide new elastomer isolation pads for all existing platforms where pads are presently installed.
4. The car frame, door operator support and related bracing shall be modified or reconfigured as necessary in order to accommodate new cab enclosure and/or master door operating equipment specified herein.
5. The elevator car shall undergo static balancing upon substantial completion of all work described in the project specifications and subsequent to any car interior refinishing or cab replacement work performed in conjunction with the project.
6. The 2:1 rope sheave shall be refurbished:
  - a. The sheave shall be washed clean of accumulated grease and oil.
  - b. Bearings shall be replaced.
  - c. Defective grease retention seals shall be replaced as needed.
  - d. Provide means to ensure that hoist ropes cannot jump out of their respective grooves in case of a slack rope condition.

### B. Car Platform (Reuse)

1. The existing platform shall be modified to accommodate the new apparatus specified herein.

- a. Where necessary, the underside of platform shall be refurbished and treated with fire-rated material.
- b. Top of platform shall be refurbished with a marine grade plywood set to receive new finished floor covering as selected by Owner.
- c. Where necessary, provide a new safety access hole ring and cover assembly to match selected cab finishes.
- d. At Contractor's option or when conditions warrant, provide a totally new platform in lieu of repairs, modifications and upgraded specified above.

C. Car Safety (Reuse/Refurbish)

1. The existing governor actuated car safety device shall be retained, overhauled and upgraded for current code compliance.
2. Readjust safety for proper operation in accordance with current ASME A17.1 design standards.
3. Check the existing safety operated switch (plank-switch) for proper adjustment and operation.
  - a. Provide a new plank-switch where none currently exists.
4. A new safety shall be provided where the existing is not suitable for reuse due to overall condition or in conjunction with an increase in the elevator speed or full load capacity.

D. Automatic Leveling / Releveling / Positioning Device (New)

1. Equip the elevator with a floor leveling device which shall automatically bring the car to a stop within 1/4" of any floor for which a stop has been initiated regardless of load or direction of travel.
2. This device shall also provide for releveling which shall be arranged to automatically return the elevator to the floor in the event the elevator should move below or above floor level in excess of 1/4".
3. This device shall be operative at all floors served and whether the hoistway or car door is open or closed provided there is no interruption of power to the elevator.
4. A positioning device shall be part of the controller microprocessor systems.
  - a. Position determination in the hoistway may be through fixed tape in the hoistway or by sensors fitted on each driving machine to encode and store car movement.
  - b. Design the mechanical features and electrical circuits to permit accurate control and rapid acceleration and retardation without discomfort.
5. Where there are consecutive floors/stops that are short stops, the system shall be capable of distinguishing between the two landing zones without error.
6. All equipment and logic required for leveling system to properly function with short stops shall be included.

E. Top-of-Car Inspection Operating Station (New)

1. An inspection operating station shall be provided on top of the elevator car.
2. This station shall be installed so that the controls are plainly visible and readily accessible from the hoistway entrance without stepping on the car.

3. When the station is operational, all operating devices in the car shall be inoperative.
4. Provide the following control devices and features:
  - a. A push/pull or toggle switch designated “EMERGENCY STOP” shall be arranged so as to prevent the application of power to the hoist motor or machine brake when in the “off” position.
  - b. A toggle switch designated “INSPECTION” and “NORMAL” to activate the top of car Inspection Service Operation.
  - c. Push button designated “Up”, “Down” and “Enable” to operate the elevator on Inspection Service (the “Enable” button shall be arranged to operate in conjunction with either the “Up” or “Down” button).
  - d. An indicator light and warning buzzer that are subject to activation under Phase I - Fire Emergency Recall Operation.

F. Load Weighing Device (New)

1. Provide means to measure the load in the car within an accuracy of  $\pm 4\%$  of the elevator capacity.
2. Provide one of the following types of devices:
  - a. A device consisting of four (4) strain gauge load cells located at each corner of the car platform and supporting a free-floating car platform and cab with summing circuits to calculate the actual load under varying conditions of eccentric loading.
  - b. A strain gauge device located on the crosshead, arranged to measure the deflection of the crosshead and thus determine the load in the car.
  - c. A device consisting of four (4) strain gauge load cells, supporting the weight of the elevator machine with summing circuits to calculate the actual load under varying conditions of load.
  - d. A device to measure the tension in the elevator hoist ropes and thus determine the load in the car.
3. Arrange that the output signal from the load weighing device be connected as an input to the signal and motor control systems to pre-torque of the hoisting machine motors where applicable.
4. Provide audible and visual signals in connection with the load weighing device when used as an “overload” device.

G. Car Enclosure Work Light / Receptacle (New)

1. The top and bottom of each car shall be provided with a permanent lighting fixture and 110-volt GFI receptacle.
2. Light control switches shall be located for easy accessibility from the hoistway entrance.
3. Where sufficient overhead clearance exists, the car top lighting fixture shall be extended no less than 24” above the crosshead member of the car frame.
4. Light bulbs shall be guarded so as to prevent breakage or accidental contact.

H. Emergency Exits / Top (New)

1. Ensure they operate as per code and have proper electrical contacts and mechanical locks on the exterior of the cab enclosure.

2. No other key to the building shall unlock the emergency exit lock except access switch keys which may be keyed alike.
  - a. Keys shall be assigned in accordance with ASME A17.1 Group 1 Security requirements.

I. Master Door Power Operator System – VVVF/AC (New)

1. Provide a heavy-duty master door operator on top of the elevator car enclosure for power opening and closing of the cab and hoistway entrance door panels.
2. The operator may be of the pivot/lever [or belted linear] drive type.
3. Operator shall utilize an alternating current motor, controlled by a variable voltage, variable frequency (VVVF) drive and a closed-loop control with programmable operating parameters.
  - a. System may incorporate an encoder feedback to monitor positions with a separate speed sensing device or an encoderless closed-loop VVVF-AC control to monitor motor parameters and vary power applied to compensate for load changes.
4. The type of system shall be designated as a high-speed operator, designed for door panel opening at an average speed of two (2.0) feet per second and closing at approximately one (1.0) foot per second.
  - a. Reduce the closing speed as required to limit kinetic energy of closing doors to within values permitted by ASME A17.1 as may be adopted and/or modified by the AHJ.
5. The door shall operate smoothly without a slam or abrupt motion in both the opening and closing cycle directions.
  - a. Provide controls to automatically compensate for load changes such as:
    - 1) Wind conditions (stack effect).
    - 2) Use of different weight door panels on multiple landings.
    - 3) Other unique prevailing conditions that could cause variations in operational speeds.
  - b. Provide nudging to limit speed and torque in conjunction with door close signaling/closing and timing devices as permitted by ASME A17.1 as may be adopted and/or modified by the AHJ. Nudging shall be initiated by the signal control system and not from the door protective device.
6. In case of interruption or failure of electric power from any cause, the door operating mechanism shall be so designed that it shall permit emergency manual operation of both the car and corridor doors only when the elevator is located in the floor landing unlocking zone.
  - a. The hoistway door shall continue to be self-locking and self-closing during emergency operation.

- b. The door operator and/or car door panel shall be equipped with safety switches and electrical controls to prevent operation of the elevator with the door in the open position as per ASME A17.1 Code Standards.
    - c. Provide zone-lock devices as required by ASME A17.1 as may be adopted and/or otherwise modified by the AHJ.
  - 7. Construct all door operating levers of heavy steel or reinforced extruded aluminum members.
  - 8. Belts shall be designed for long life and operate noise free.
  - 9. All components shall be designed for stress and forces imposed on the related parts, linkages and fixed components during normal and emergency operation functions.
    - a. All pivot points, pulleys and motors shall have either ball or roller-type bearings, oilite bronze bushings or other non-metallic bushings of ample size.
  - 10. Provide operating data / data tag permanently attached to the operator as required by applicable code and standards.
- J. Car Door Zone Lock Restrictor (New)
- 1. Retrofit the existing car door operator to incorporate a car door zone lock restrictor.
  - 2. In case of interruption or failure of electric power from any cause, the door operating mechanism shall permit emergency manual operation of both the car door and the hoistway door within the floor landing zone.
    - a. The hoistway door shall continue to be self-locking and self-closing.
    - b. The door operator shall operate in conjunction with or be equipped with all gate switches and safety contacts required by ASME A17.1 Code.
- K. Car Door Hangers / Tracks / Gate Switch (New)
- 1. Provide sheave type two-point suspension hangers and track for each car door.
    - a. Sheaves shall be hardened steel, not less than 3-1/4 inches in diameter with sealed grease packed precision ball bearings.
    - b. The upthrust shall be taken by a roller mounted on the hanger and arranged to ride on the underside of the track.
  - 2. The track shall be of formed cold rolled steel or cold drawn steel and shall be rounded on the track surface to receive the hanger sheaves.
    - a. The track shall be removable and shall not be integral with the header.
  - 3. Provide a gate switch that mounts directly to the car door track.
    - a. The gate switch shall prevent movement of the elevator until such time as it signals the control equipment that the car door has physically closed.
- L. Car Door Panel(s) (New)

1. Provide standard 1" thick, 14-gauge hollow metal flush construction panel(s), reinforced for power operation and insulated for sound deadening.
2. Paint the hoistway side of each panel black and face the cab side with 16-gauge sheet steel matching the existing returns or in selected material and finish as otherwise directed by Owner/Architect.
3. The panels shall have no binder angles and welds shall be continuous, ground smooth and invisible.
4. Drill and reinforce panels for installation of door operator hardware, door protective device, door gibs, etc.
  - a. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in the sill grooves with minimum clearance.
  - b. The guide mounting shall permit their replacement without removing the door from the hangers.
5. Provide the meeting edge of center opening doors with necessary continuous rubber astragal bumper strips.
  - a. These strips shall be relatively inconspicuous when the doors are closed.

M. Door Reopening Device (New)

1. Provide an infrared curtain door protection system.
2. The door shall be prevented from closing and reopen when closing if a person interrupts any one of the light rays.
3. The door shall start to close when the protection system is free of any obstruction.
4. The infrared curtain protective system shall provide:
  - a. Protective field not less than 71" above the sill.
  - b. Where a horizontal infrared light beam system is used:
    - 1) A minimum of forty-seven (47) light beams.
    - 2) Accurately positioned infrared lights to conform to the requirements of the applicable handicapped code.
  - c. Modular design to permit on board test operation and replacement of all circuit boards without removing the complete unit.
  - d. Controls to shut down the elevator when the unit fails to operate properly.
5. Existing infrared door protection systems, designed in accordance with the criteria specified herein, may be retained and refurbished for new subject to the Consultant's review and approval.

## 2.10 FINISH / MATERIALS / SIGNAGE

A. Material, Finishes and Painting

1. General

- a. Cold-rolled Sheet Steel Sections: ASTM A366, commercial steel, Type B
- b. Rolled Steel Floor Plate: ASTM A786
- c. Steel Supports and Reinforcement: ASTM A36
- d. Aluminum-alloy Rolled Tread Plate: ASTM B632
- e. Aluminum Plate: ASTM B209
- f. Stainless Steel: ASTM A167 Type 302, 304 or 316
- g. Stainless Steel Bars and Shapes: ASTM A276
- h. Stainless Steel Tubes: ASTM A269
- i. Aluminum Extrusions: ASTM B221
- j. Nickel Silver Extrusions: ASTM B155
- k. Bronze Sheet: ASTM B36(36M) alloy UNS No. C2800 (Muntz Metal)
- l. Structural Tubing: ASTM A500
- m. Bolts, Nuts and Washers: ASTM A325 and A490
- n. Laminated / Safety Tempered Glass: ANSI Z97.1

## 2. Finishes

- a. Stainless Steel
  - 1) Satin Finish: No. 4 satin, long grain.
  - 2) Mirror Finish: No. 8 non-directional mirror polished.
- b. Sheet Steel:
  - 1) Shop Prime: Factory-applied baked on coat of mineral filler and primer.
  - 2) Finish Paint: Two (2) coats of low sheen baked enamel; color as selected by the Owner.
  - 3) Steel Equipment: Two (2) coats of manufacturer's standard rust-inhibiting paint to exposed ferrous metal surfaces in both the hoistway and pit that do not have galvanized, anodized, baked enamel, or special architectural finishes.

## 3. Painting

- a. Apply two (2) coats of clear lacquer to bronze or similar non-ferrous materials to prevent tarnishing during a period of not less than twelve (12) months after initial acceptance by the Owner or Agent.
- b. Identify all equipment including buffers, car apron, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
- c. Paint or provide decal-type floor designation not less than four (4) inches high on hoistway doors (hoistway side), fascias and/or walls as required by A17.1 as may be adopted and/or modified by the AHJ. The color of paint used shall contrast with the color of the surface to which it is applied.

## B. Car Interior Finishes

- 1. Car interior finishes shall be as selected by Owner.
- 2. Contractor shall provide samples of finishes as required for approval prior to fabrication.

3. Refer to specifications for other design requirements where provided.
4. Special attention shall be given to flooring materials and suitability for intended duty.

C. Designation and Data Plates, Labeling and Signage.

1. Provide an elevator identification plate on or adjacent to each entrance frame where required by the AHJ.
2. Provide an elevator identification plate on or adjacent to each entrance frame at the designated landing only as required by code.
3. Elevators shall be identified by "number" only. Where a "letter" is used to identify the elevator, the letter shall indicate the Bank the elevator is in.
  - a. The designation numeral shall be a minimum of 3" in height.
4. Provide floor designation cast plates at each elevator entrance, on both sides of the jamb at a height of sixty (60) inches to the baseline of floor indication.
  - a. Floor number designations and Braille shall be 2" high, 0.03" raised and stud mounted.
5. Identify the designated medical emergency services elevator with 3" high international symbol at each elevator entrance on both sides of the jamb.
6. Provide raised designations and Braille markings to the left of the car call and control buttons of the car operating panel(s).
  - a. Designations shall be a minimum of 5/8" high, 0.03" raised and stud mounted.
7. Provide elevators with data and marking plates, labels, signages and refuge space markings complying with A17.1 Elevator Safety Code as may be adopted and/or otherwise modified by the AHJ.
8. Architect shall select the designation and data plates from manufacturer's premium line of plates.

## 2.11 FIXTURES / SIGNAL EQUIPMENT (New)

A. General - Design and Finish

1. The design and location of the hall and car operating and signaling fixtures shall comply with the ADAAG and local requirements of the AHJ.
2. The operating fixtures shall be selected from the manufacturer's premium line of fixtures.
3. Custom designed operating and signaling fixtures shall be as shown on the drawings or as approved by the Owner.
4. The layout of the fixtures including all associated signage and engraving shall be as approved by the Owner.
5. Where no special design is shown on the drawings, the buttons shall be as follows:
  - a. Stainless steel / Bronze convex type as selected by the Owner / Consultant from the manufacturer's premium line of push buttons.

- b. The button shall have a collar/small round indicator around the outside of the button with LED call registered light.
- 6. Where no special design is shown on the drawings, the faceplates shall be as follows:
  - a. Passenger Elevators
    - 1) Ground Floor: Custom designed /stainless steel/bronze faceplate with matching finish.
    - 2) Typical Floors: 1/8" thick stainless steel/bronze faceplate with matching finish.
  - b. Service
    - 1) All Floors - 1/8" thick stainless steel with No. 4 finish and tamperproof screws.
- 7. Mount passenger elevator fixtures with tamperproof / concealed fasteners and service elevator fixtures with tamperproof screws. The screw/fastener and key switch cylinder finishes shall match faceplate finish.
- 8. Where key-operated switch and or key operated cylinder locks are furnished in conjunction with any component of the installation, four (4) keys for each individual switch or lock shall be furnished, stamped or permanently tagged to indicate function.
- 9. All caution signs, pictographs, code mandated instructions and directives shall be engraved and filled with epoxy in code required colors.

**B. Main Car Operating Panel (New)**

- 1. Provide a main car operating push button panel on the inside front return panel of the car
- 2. Car operating panel shall be flush mounted with swing type, one (1) piece faceplate with heavy-duty concealed hinges.
  - a. Mount all key switches that are required to operate and maintain the elevators exposed on the car station except those specified within a locked service cabinet.
- 3. The push buttons shall become individually illuminated as they are pressed and shall extinguish as the calls are answered.
- 4. The operating panel shall include:
  - a. A call button for each floor served, located not more than 48" above the cab floor.
  - b. "Door open" / "Door close" buttons.
  - c. "Alarm" button, interfaced with emergency alarm. The alarm button shall illuminate when pressed.
  - d. "Emergency Stop" switch per local law located at 35" above the cab floor.
  - e. Self-dialing, hands-free emergency communication system actuation button with call acknowledging feature and ASME A17.1. design provisions.
  - f. Three (3) position firefighter key operated switch, call cancel button and illuminated visual/audible signal system with mandated signage engraved per ASME A 17.1 Standards as modified by the AHJ.

5. Locked Firemen's' Service cabinet, keyed in accordance with local Code, containing required devices and signals in accordance with ASME A17.1 Standards.
  - a. Automatic opening of the locked cabinet door may be provided with signals initiated by the fire detection and alarm system where approved by the Authority Having Jurisdiction.
6. Provide a locked service cabinet flush mounted and containing the key switches required to operate and maintain the elevator, including, but not limited to:
  - a. Independent service switch.
  - b. Attendant service switch with associated operating buttons and signal indicators.
  - c. Light switch.
  - d. Fan switch.
  - e. G. F. I. duplex receptacle.
  - f. Emergency light test button and indicator.
  - g. Inspection Service Operation key switch.
  - h. Port for hand-held service tool where applicable.
  - i. Dimmer for cab interior lighting.
7. Car operating panel shall incorporate:
  - a. An integral (no separate faceplate) digital L.E.D. floor position indicator.
  - b. Black-filled engraved unit I.D. number or other nomenclature, as approved by Owner.
  - c. A "No Smoking" advisory.
  - d. The rated passenger load capacity in pounds.
  - e. 3/16" "push for alarm" engraving.
  - f. 3/16" communication device usage instructions.
8. Equip the main car operating panel with security car call keyed switches OR proximity card reader to disconnect the corresponding floor push button.
  - a. Security system shall be overridden by Phase II Firefighter's Emergency Operations in accordance with code.
9. Where posting of an advisory is permitted by the Governing Authority in lieu of the inspection certificate, engrave the following advisory on the hinged cover of the service cabinet, or where otherwise directed by the Owner.
  - a. Elevator Certificate is On File in Building Management Office.
10. Post Inspection Certificate behind an opening in the car operating panel that is fitted with a flush-mounted clear Plexiglas without a frame.

C. Car Position Indicator (New)

1. The position of the car in the hoistway shall be indicated by the illumination of the position indicator numeral corresponding to the floor at which the car has stopped or is passing.

- a. Provide 2" high, 10-segment LED type position indicator with direction arrows, integral with the car operating panel.
- b. Provide standard car information display system in each operating panel. The system shall include 2" high position indicators with direction arrows and a message downloaded from Elevator Information and Management System. Messages will be selected and/or composed by the Owner and may include time, floor directories, outside temperature, promotional announcements and stock market information. Display system shall have a screen with the diagonal measurements maximized using the standard 16:9 aspect ratio within the available space in the front return with a minimum of 120-degree view angle.
- c. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
- d. Provide audible floor passing signal per ADA standards where not provided by the elevator signal control.
- e. Flush mount fixture with cover to match selected car front or car operating panel finish as directed by the Owner.

D. Car Direction Lantern (New)

1. Provide a car riding lantern with visual and audible signal in the edge of the strike and/or return post.
2. The lens shall project a minimum of 1/4" and shall be of solid Plexiglas.
3. Use tamperproof screws / concealed fasteners with surface mount faceplate for flush faceplate with hairline joint.
4. Car lantern shall indicate the direction of travel when doors are 3/4 open.
5. The unit shall sound once for the "up" direction and twice for the "down" direction.
  - a. Provide an electronic chime with adjustable sound volume.

E. Voice Annunciator (New)

1. Provide a voice annunciator in each elevator.
2. The device features shall comply with the requirements of ADAAG and local accessibility requirements.
3. Coordinate size, shape and design with Designer and other trades.
4. The system shall include, but not limited to:
  - a. Solid state digital speech annunciator.
  - b. A recording feature for customized messages.
  - c. Playback option.
  - d. Built-in voice amplifier.
  - e. Master volume control.
  - f. Audible indication for selected floor, floor status or position, direction of travel, floor stop, seismic operation, firefighter service and nudging.
5. Locate all associated equipment in a single, clearly labeled enclosure located either in the machine room and/or on car top.

F. Signal Annunciator System (New)

1. Provide a single / double indication, surface-mounted, manually reset signal annunciator.
  - a. Annunciator cover shall have all necessary mounting plates and brackets.
  - b. Provide multi-conductor signal traveling cable and properly connect same to the annunciator and shaft wiring.
  - c. Provide new single / double hall push buttons at each landing served.
  - d. Provide new low-voltage hoistway wiring installed in a method required by the AHJ.
  - e. Provide new transformer to supply low voltage power.

G. Corridor Push Button Stations / Reuse Back Boxes

1. Push button signal fixtures shall be provided on each landing.
2. Each signal fixture shall consist of:
  - a. Up and down illuminating push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
  - b. A recessed mounting box, electrical conduit and wiring.
3. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
4. Include firefighter key switch in the main lobby level station or other designated recall landing.
5. Where existing fixtures are located greater than 48" above the floor:
  - a. The existing back boxes shall be retained and used to attach the oversized fixture faceplate to locate the new buttons with a centerline of 42" above the finished floor.
    - 1) The Contractor has the option of providing a single oversized back box in lieu of retaining existing for faceplate attachment.
  - b. Standardize the new centerline distance on all floors.
6. All cutting, patching, grouting and/or plastering of masonry walls resulting from the removal or installation of corridor fixtures shall be performed by the Contractor so as to maintain the fire rating of the hoistway.
  - a. Finished painting or decorating of wall surfaces shall be by Others.
7. All faceplates shall be engraved with fire logo and "In Case of Fire Use Stairs" to help fill the void created by the use of oversized covers.
8. Provide a digital floor position indicator with 1" high numerals at all landings served.

H. Floor Position Indicator (New)

1. Remove existing floor position indicator at each landing and provide new digital LED type unit.
2. New plate shall completely cover the present cutout and provide 2" numerals located on center.
3. Provide integral direction arrows that will indicate the direction in which the elevator is traveling.

I. Hall Direction Lanterns (New)

1. Provide a visual and audible signal at each entrance to indicate the direction of travel and, where applicable, which car shall stop in response to the hall call.
  - a. Design the lantern with up and down indication at intermediate landings and a single indication at terminal landings.
  - b. Lanterns shall sound once for the up direction and twice for the down direction.
    - 1) Provide an electronic chime with adjustable sound volume.
  - c. Provide adjustable signal time (three [3] to ten [10] seconds, with one [1] second increments) to notify passengers which car shall answer the hall call and preset per ADAAG notification standards.
2. Main Lobby fixture shall incorporate a 2" high LED floor position indicator in the hall lantern fixture with direction arrows located on both sides of the indicator.
3. Locate the lantern above / adjacent to the corridor entrance.

J. Car Arrival Advanced Hall Notification Device (New)

1. Provide a "car here" or approved equal signal in the hall call fixture which will illuminate only where the car is about to stop or has stopped at the specified landing.
2. The signal shall remain illuminated while the car remains at the landing and shall extinguish at the beginning of the door close cycle.

K. Lobby Control Panel/Remote Lobby Security System (New)

1. Provide a Lobby Control Panel, including a Remote Lobby Security System for the elevator in the main lobby as directed by the Consultant.
2. Provide stainless steel / bronze finish faceplate with tamperproof screws to match existing surrounding finishes.
3. Coordinate panel location with the Owner.
4. The panel shall include:
  - a. 2" high LED position and direction indicators.
  - b. Car On / Car to Lobby /Car Off three (3) position keyed switch with pilot light.
  - c. Security On / Off keyed switch.
  - d. Car push buttons duplicating the floor buttons that are located in the car push button station, excluding the alarm button and stop switch.

L. Remote Operation of Elevator (New)

1. Remote operation of the elevator by a lobby attendant will be controlled by a key switch located in panel identified as "Security" and labeled "on" and "off".
  - a. When the Security Switch is placed in the "on" position:

- 1) The corresponding car push button station in the cab becomes inoperative except for the “open”, “close”, “emergency alarm”, “stop” and “intercommunication / help” buttons.
- 2) The in-car Card Reader Security System will be deactivated.
- 3) The elevator shall respond only to floor registrations made from the Lobby Security System station as well as hall calls registered at floors.
- 4) The elevator will automatically take the passenger entering the car in response to hall calls to the main floor Lobby level only. The Lobby level car call shall remain active at all times.

b. When the Security Switch is in the “off” position:

- 1) The lobby station car call push buttons shall be deactivated.
- 2) Car calls shall be registered only with use of the proximity card / card reader.

- c. When the Security Switch is in the “off” position, and the Card Reader Bypass Switch is in the “off” position, calls can only be registered via proximity card.
- d. The lobby security station will be equipped with an adjustable timing device to delay the operation of the elevator for a period up to three (3) minutes. During the delay period, additional calls may be registered. The extra calls are responded to only when the preset delay period ends.
- e. Both the Security Control System, and Card Reader System shall be overridden by Firemen’s’ Emergency Operation.

M. Lobby Display Monitor (New)

1. A 17” color LCD flat panel monitor shall be provided at the Lobby security desk to graphically display the current position, direction of travel and operational status of each elevator on a per group basis.
2. The monitor shall display car and corridor calls registered within the system.
3. For bidding purposes, the LCD display monitor shall be shelf mounted.
4. The Contractor shall provide all necessary electrical conduit and wiring between the elevator machine room(s) and the display including power supply.

N. Remote Monitoring Panel (New)

1. Provide a remote monitoring panel for the elevators in the fire command center on the First Floor or as otherwise directed by the Architect / Owner. Include the following controls and monitoring features:
  - a. Manufacturer’s standard Elevator Management and Information System (EMIS) includes all optional features. Video display of elevator positions only from EMIS system specified.
  - b. A three (3) position (car to lobby/ on-off) switch for each elevator.
  - c. Emergency power operation controls and indicators.
2. The panel housing the key operated switches, controls and a 14" LCD (flat panel) shall have a 1/8" thick faceplate. The switch positions, legends and labels shall be directly engraved to the panel.

O. Remote Lobby Security Control System (New)

1. Provide a remote car push button station duplicating the car push button panel excluding the alarm button and stop switch.
2. Remote operation of the elevator by a lobby attendant will be controlled by a key switch located in panel identified as "Security".
3. When the Security Switch is placed in the "on" position, the corresponding car push button panel becomes inoperative except for the "open", "close", "emergency alarm/stop and intercommunication / help" buttons.
4. The elevator shall respond only to floor registrations made from Lobby security control panel as well as hall calls registered at floors.
5. When the system is placed on Security mode, the elevator will automatically take the passenger entering the car in response to hall calls only to the main floor Lobby level.
6. The lobby security station will be equipped with an adjustable timing device to delay the operation of the elevator for a period up to three (3) minutes. During the delay period, additional calls may be registered. The extra calls are responded to only when the preset delay period ends.
7. The Security Control System shall be overridden by Firemen's' Emergency Operation.

P. Closed Circuit TV Security System (New)

1. Provide a corner mounted, high-resolution color camera with a wide angle for a Closed-Circuit Television (CCTV) security system.
2. The camera is to be mounted diagonally across from the strike plate of the elevator door and able to view the position indicator and passenger traffic.
3. The camera shall be of the wide-angle lens low light type.
4. Provide a fifteen (15) inch LCD color monitor in the Lobby or as otherwise directed by the Owner.
  - a. Monitor shall be capable of displaying all cameras on a split screen (via separate splitter) and switching to a single camera utilizing the entire screen.
5. The receiving monitor shall be a self-contained unit designed for wall or shelf mounting with all necessary brackets, hardware and fixture component accessories as required.
6. Provide a Digital Video Recorder (DVR) with CD/DVD burner capable of saving up to thirty (30) days of video and a six (6) month supply of applicable recordable media (DVD, Video CD).
7. Provide a lockable storage cabinet for the CCTV operating system to be located in a climate-controlled location as directed by the Owner.
8. The CCTV security system shall be energized by an independent source of current, other than the current supply to the main elevator operation to avoid the possibility of system failure due to an interrupted current supply to the elevator equipment.
9. Provide a battery back-up unit located at the DVR to provide a minimum of two (2) hours of back-up power in the event of building power loss.

2.12 CAR ENCLOSURES (Remodel)

A. Elevator Car Enclosure(s) and the Five Percent (5%) Rule:

1. Please refer to matrix and appendix for approved materials and styles.
2. In accordance with A17.1, Section 8.7, as adopted and/or modified by the AHJ, entitled “Alterations”, where a new or remodeled elevator car enclosure is included in the base scope of work, the Contractor shall, within thirty (30) days after execution of the contract, weigh the elevator, or one (1) elevator of each group of elevators included in the base scope of work, to determine the present deadweight of the platform/sling/cab assembly.
3. The Contractor shall, when necessary, weigh the interior materials of a single cab to better estimate the total existing weight of existing materials being removed as part of the alteration.
4. The Contractor shall make every effort to provide accurate weight measurements while taking into consideration all weights that may present themselves at the time the measurement is taken such as compensation, compensating sheave, hoist ropes and traveling cables that may affect the measurement of the assembly itself.
5. The Contractor shall evaluate the actual counterbalance percentage for each sample elevator to identify prevailing conditions.
6. Measurements of actual cab weight shall be compared to the original deadweight of the car as stamped on the crosshead data tag.
7. Where no data tag exists, the Contractor shall make every effort to determine the original weight of the platform/sling/cab through calculations based on the current weight of the counterweight assembly and the verified percent of full load counterbalance.
8. The amount of weight that may be added to the car, so as to remain within the limits of the “Five Percent (5%) Rule”, shall be calculated based on the following:
  - a.  $(\text{Original Deadweight} + \text{Capacity}) \times (0.05) = \text{Maximum Additional Weight Allowed}$
9. The Contractor shall document and notify the Owner and Consultant of the results of the measurements taken and what weight, if any, can be added or needs to be removed from the cab in order to maintain compliance with the Five Percent (5%) Rule.
10. The Contractor shall work diligently with the Owner and/or Owner’s Representative and/or Architect as well as the manufacturer of the car enclosure to minimize additional weights of the new or remodeled car enclosure so as to maintain compliance with the Five Percent (5%) Rule.
11. Contractor shall be responsible for proper adjustment of the counterbalance of the system, including the static balance of the platform/sling/car enclosure, upon completion of the car interior work.
12. Costs associated with this work shall be included in the base modernization price.
13. Provide a new data tag on the crosshead of the elevator indicating the new deadweight, the current percent counterbalance and the date of the alteration.

B. Elevator Cab Remodel

1. Refer to appendix A

C. Inspection Certificate and Frame (New)

1. Provide the mandated inspection card frame for posting the required certificate or an alternate plaque as directed by the Owner designee.
2. The alternate plaque shall indicate the location of the certificate within the building, including floor and/or room designation, where access is available during normal business hours.

## 2.13 EMERGENCY LIGHTING / COMMUNICATIONS / SIGNALING (New)

### A. Battery Back Up Emergency Lighting Fixture and Alarm (New)

1. Provide a self-powered emergency light unit.
  - a. Arrange a minimum of two (2) of the cab light fixtures to operate as the emergency light system.
  - b. Where cab lighting is utilized for emergency lighting, Contractor shall coordinate the battery back-up equipment so that it is compatible with the type of cab lighting specified by the Owner or Architect.
2. Provide a car-mounted battery unit including solid-state charger and testing means enclosed in common metal container.
  - a. The battery shall be rechargeable nickel cadmium with a ten (10) year minimum life expectancy. Mount the power pack on the top of the car.
  - b. Provide a 6" diameter alarm bell mounted directly to the battery/charger unit and connected to sound when any alarm push button or stop switch in the car enclosure is operated.
  - c. The bell shall be configured to operate from power supplied by the building emergency power generator. The bell shall produce a sound output of between 80-90 dBa (measured from a distance of 10') mounted on top of the elevator car.
    - 1) Activation of this bell shall be controlled by the stop switch and alarm button in the car operating station.
    - 2) The alarm button shall illuminate when pressed.
3. Where required by Code for the specific application, the unit shall provide mechanical ventilation for at least one (1) hour.
4. The operation shall be completely automatic upon failure of normal power supply.
5. Unit shall be connected to normal power supply for car lights and arranged to be energized at all times, so it automatically recharges battery after use.

### B. Common Alarm Bell (New)

1. Provide a common alarm bell located in the elevator pit.
  - a. The bell shall be configured to operate when the alarm or stop switch of any elevator is activated, during both normal and battery back-up power conditions.
  - b. Existing common alarm bells may be rehabilitated and reused providing they meet the intent of this section and applicable codes.

### C. Emergency Voice Communication / Telephone (New)

1. A hands-free emergency voice communication system shall be furnished in each car mounted as an integral part of the car operating panel.
  - a. Necessary wires shall be included in the car traveling cable and shall consist of a minimum of one shielded pair of 20AWG conductors.

- b. 120V power shall be provided to power the hands-free device.
- 2. The telephone shall be equipped with an auto-dialer and illuminating indicator which shall illuminate when a call has been placed and begin to flash when the call has been answered.
  - a. Engraving shall be provided next to the indicator which says, "When lit help is on the way".
- 3. In addition to the standard "Alarm" button, a separate activation button shall be provided on the car operating panel to initiate the emergency telephone and place a call.
  - a. The telephone must not shut off if the activating button is pushed more than once.
  - b. The telephone shall transmit a pre-recorded location message only when requested by the operator and be provided with an adjustable call time which can be extended on demand by the operator.
  - c. Once two-way communication has been established, voice prompts shall be provided which instruct the operator on how to activate these functions as well as alerting the operator when a call is being attempted from another elevator in the building.
- 4. The system shall be compatible with ring-down equipment and PBX switchboards.
- 5. The system shall be capable of serving as the audio output for an external voice annunciation system.
  - a. Conversation levels shall measure 60 dbA or higher and measure 10 dbA above ambient noise levels.
  - b. Each device shall be provided with a self-diagnostic capability in order to automatically alert building personnel should an operational problem be detected.
- 6. The phone shall be able to:
  - a. Receive incoming calls from any On-Site Rescue Station (when provided or required).
  - b. Receive incoming calls from other off-site locations via the public telephone system.
  - c. Acknowledge incoming calls and automatically establishing hands-free two-way communications.
    - 1) If no On-Site Rescue Station is provided, each hands-free device shall have built in line consolidation which will allow up to six (6) elevators to be called individually from outside the building over a single telephone line and up to eighty (80) elevators if an On-Site Rescue Station is provided.
- 7. The emergency elevator communication system shall require a maximum of one (1) telephone line.
  - a. The system must provide line sharing capability to eliminate the need for a dedicated telephone line.
  - b. The line sharing function must ensure that the emergency telephones always receive dialing priority even if the line is in use and that the emergency telephones can be called into from an off-site location.

8. The system shall provide its own four (4) hour backup power supply in case of a loss of regular AC power.
9. The system must provide capability for building personnel to call into elevators and determine the charge state of any backup batteries provided for the emergency telephones.
10. Pushing the activation button in any of the elevator car stations will cause any on-site Rescue Station (where provided or required) or security telephone to ring.
  - a. If the on-site call is not picked up within thirty (30) seconds, the call will be automatically forwarded to a twenty-four (24) hour off-site monitoring service.
  - b. The arrangements and costs of the off-site monitoring and telephone line shall be by others.
11. All connections from the junction box to the telephone system shall be done by the Elevator Contractor where existing provisions can be reused.
12. New telephone lines, where required, shall be provided and interfaced by others.
13. All connections from the junction box to the security room's main telephone system shall be done by others.
14. All electrical work shall conform to Division 16 requirements.
15. Existing phone systems removed shall be returned to the Owners for installation by others in other areas.

D. Firefighters' Two-Way Telephone Communications System (New)

1. Provide a complete two-way telephone communications system for point-to-point communications between authorized personnel.
2. Provide firefighter telephone jack behind locked door in the car operating panel in accordance with the requirements of the local authorities. The box shall be fitted with a flush mounted door having hairline joints.
3. Connection devices (jacks) and all associated wiring shall be provided by the elevator Contractor as part of the base bid.
4. The handsets shall be self-powered and not require an external power source for operation.
  - a. The firefighter phone shall be furnished under Division 16.

E. Life Safety System (New)

1. Install Life Safety System speaker in each elevator cab.
2. Provide all necessary wiring and interfacing between the elevator system and the Life Safety System as required.
3. The Life Safety System speaker shall be furnished under Division 16.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Inspection

1. Study the Contract Documents with regard to the work as specified and required so as to ensure its completeness.
2. Examine surface and conditions to which this work is to be attached or applied and notify the Owner in writing if conditions or surfaces are detrimental to the proper and expeditious installation of the work. Starting the work shall imply acceptance of the surfaces and conditions to perform the work as specified.
3. Verify, by measurements at the job site, dimensions affecting the work. Bring field dimensions which are at variance with those on the accepted shop drawings to the attention of the Owner. Obtain the decision regarding corrective measures before the start of fabrication of items affected.
4. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

### 3.2 INSTALLATION / PROJECT PHASING

#### A. Installation

1. Modernize the elevators, using skilled personnel in strict accordance with the final accepted shop drawings and other submittals.
2. Comply with the code, manufacturer's instructions and recommendations.
3. Coordinate work with the work of other building functions for proper time and sequence to avoid delays and to ensure right-of-way of system. Use lines and levels to ensure dimensional coordination of the work.
4. Accurately and rigidly secure supporting elements within the shaftways to the encountered construction within the tolerance established.
5. Provide and install motor, switch, control, safety and maintenance and operating devices in strict accordance with the submitted wiring diagrams and applicable codes and regulations having jurisdiction.
6. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
7. Arrange door tracks and sheaves so that no metal-to-metal contact exists.
8. Reinforce hoistway fascias to allow not more than 1/2" of deflection.
9. Sound isolate cab enclosure from car structure. Allow no direct rigid connections between enclosure and car structure and between platform and car structure.
10. Isolate cab fan from canopy to minimize vibration and noise.
11. Remove oil, dirt and impurities and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.
12. Prehang traveling cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting after installation.
13. After installation, touch up in the field, surfaces of shop primed elements which have become scratched or damaged.
14. Lubricate operating parts of system as recommended by the manufacturer.

#### B. Project Phasing

1. Phase I - Final design development and contractors' preliminary work procedures to be completed within four (4) weeks from date of contract award.
  - a. Prevailing conditions review and layout.

- b. Selection meeting for aesthetic design and finishes with Owners' designee.
  - c. Filing for required permits or other governing authorities work procedure requirements.
- 2. Phase II - Submittal approvals and confirmations shall be completed within eight (8) weeks from date of contract award.
  - a. Selection confirmations.
  - b. Manufacturer's shop drawings applicable, i.e., fixtures, cab, machine room layouts, doors, etc.
  - c. Engineering data acknowledgment applicable, i.e., power, heat, structural loads.
  - d. Delivery dates for major component suppliers, i.e., controls, machinery, fixtures, cabs, etc.
  - e. Posting of permits or other governing agency authorizations to proceed.
  - f. Proposed work implementation schedule based on the aforementioned procedures/confirmations.
- 3. Phase III - Mobilization of Final Design Approvals
  - a. Revision confirmations. (Equipment, etc.)
  - b. Preliminary work procedures.
  - c. Schedule confirmations.
- 4. Contractor shall provide a project schedule as part of the Bid based on the following:
  - a. Include three (3) days of simulated operation, with or without door operation, while not allowing passenger use.
  - b. Consultant punch list inspection report shall be performed after acceptance testing by the AHJ for each individual elevator.
  - c. Contractor shall complete all punch list items issued by both the AJH and the Consultant prior to turn-over for beneficial use by the Owner and removal of the next elevator for modernization.

C. Removal of Elevators

- 1. If extenuating circumstances (i.e. separating controller interconnections, inspection, testing, etc.), require that multiple cars of a single elevator group be removed from service simultaneously, the work shall be performed outside of the normal business hours at a time mutually agreed to by the Owner and Contractor.
- 2. A minimum of five (5) days advance written notice shall be given to the Owner and Elevator Consultant by the Contractor detailing the reasons for the simultaneous removal of the elevators from service along with the estimated out-of-service time.
- 3. The request shall be subject to review by the Elevator Consultant and approved by the Owner prior to the commencement of the work.
- 4. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

D. Transfer of Hall Button Risers

1. Transfer of the hall button riser(s) to the new signal control systems shall be performed on a not-to-interfere basis and shall not interrupt building operations or inconvenience building occupants.
2. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

### 3.3 FIELD QUALITY CONTROL

#### A. Inspection and Testing

1. Upon completion of each work phase or individual elevator specified herein, the Contractor shall, at its own expense, arrange and assist with inspection and testing as may be required by the A.H.J. in order to secure a Certificate of Operation.

#### B. Substantial Completion

1. The work shall be deemed "Substantially Complete" for an individual unit or group of units when, in the opinion of the Consultant, the unit is complete, such that there are no material and substantial variations from the Contract Documents, and the unit is fit for its intended purpose.
2. Governing authority testing shall be completed and approved in conjunction with inspection for operation of the unit; a certificate of operation or other required documentation issued; and remaining items mandated for final acceptance completion are limited to minor punch list work not incorporating any life safety deficiencies.
3. The issuance of a substantial completion notification shall not relieve the Contractor from its obligations hereunder to complete the work.
4. Final completion cannot be achieved until all deliverables, including but not limited to training, spare parts, manuals, and other documentation requirements, have been completed.

#### C. Contractor's Superintendent

1. The Contractor shall assign a competent project superintendent during the work progress and any necessary assistant, all satisfactory to the Owner. The superintendent shall represent the Contractor and all instructions given to him shall be as binding as if given to the Contractor.

### 3.4 PROTECTION / CLEANING

#### A. Protection and Cleaning

1. Adequately protect surfaces against accumulation of paint, mortar, mastic and disfiguration or discoloration and damage during shipment and installation.
2. Upon completion, remove protection from finished surfaces and thoroughly clean and polish surfaces with due regard to the type of material. Work shall be free from discoloration, scratches, dents and other surface defects.
3. The finished installation shall be free of defects.

4. Before final completion and acceptance, repair and/or replace defective work, to the satisfaction of the Owner, at no additional cost.
5. Remove tools, equipment and surplus materials from the site.

B. Barricades and Hoistway Screening

1. The Contractor shall provide barricades where necessary in order to maintain adequate protection of areas in which work specified by the Contract Documents is being performed, including open hoistway entrances. Fabrication and erection as all barricades shall be in compliance with applicable OSHA regulations.
2. As required, the Contractor shall provide temporary wire mesh screening in the hoistway and of any elevator undergoing work specified in the Contract Documents. This screening shall be installed in such a manner as to completely segregate the hoistway from that of adjacent elevators. Screening shall be constructed from .041" diameter wire in a pattern that rejects passage of a 1" diameter ball.

### 3.5 DEMONSTRATION

A. Performance and Operating Requirements

1. Passenger elevators shall be adjusted to meet the following performance requirements:
  - a. Speed: within  $\pm$  three percent (3%) in both directions of travel under any loading condition.
  - b. Leveling: within  $\pm$  1/4" as measured between the car entrance threshold and the landing sill on any given floor under any loading condition.
  - c. Typical Floor-to-Floor Time: (Recorded from the doors start to close on one (1) floor until they are 3/4 open at the next floor) under various loading conditions.

Group Passenger Elevators	10.0 – 11.0 seconds
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d. Door Operating Times

Door Type	Opening	Closing
42" center opening	1.7 sec.	2.4 sec.

- e. Door dwell time for hall calls: 4.0 sec with Advance lantern signals.
- f. Door dwell time for hall calls: 5.0 sec without Advance lantern signals.
- g. Door dwell time for car calls: 3.0 seconds.
- h. Reduced non-interference dwell time: 1.0 seconds.

2. Maintain the following ride quality requirements for the passenger elevators:

- a. For speeds up to 1400 fpm, the speed of the car roller guides shall not exceed 500 rpm.
- b. Where pit permits, extend bottom roller guides by not less than one half the distance from the centerline of the upper roller guides to the platform.
- c. Noise levels inside the car shall not exceed the following:

- 1) Car at rest with doors closed and fan off - 40 dba.
  - 2) Car at rest with doors closed, fan running - 55 dba.
  - 3) Car running at high speed, fan off - 50 dba.
  - 4) Door in operation - 60 dba.
- d. Vertical accelerations shall not exceed 14 milli-g and horizontal accelerations shall not exceed 20 milli-g.
- 1) The accelerometer used for this testing shall be capable of measuring and recording acceleration to nearest 0.01 m/s<sup>2</sup> (1 milli-g) in the range of 0-2 m/s<sup>2</sup> over a frequency range from 0-80 Hz with ISO 8041 filter weights applied. Accelerometer should provide contact with the floor similar to foot pressure, 60 kPa (8.7psi).
- e. The amplitude of acceleration and deceleration shall not exceed 2.6 - 2.8 ft./sec<sup>2</sup> for geared and MRL traction, and 3.5 - 4 ft./sec<sup>2</sup> for gearless traction elevators.
- f. The maximum jerk rate shall be 1.5 to 2.0 times the acceleration and deceleration.
- g. The maximum velocity which the elevator achieves in either direction of travel while operating under load conditions that vary between empty car and full rated load shall be within  $\pm$  three percent (3%) of the rated speed.

#### B. Acceptance Testing

1. Comply with the requirements of Division 01.
2. The Contractor shall provide at least five (5) days prior written notice to the Owner and Consultant regarding the exact date on which work specified in the Contract Documents will reach completion on any single unit of vertical transportation equipment.
3. In addition to conducting whatever testing procedures may be required by local inspecting authorities in order to gain approval of the completed work, and before seeking approval of said work by the Owner, the Contractor shall perform certain other tests in the presence of the Consultant.
4. The Contractor shall provide test instruments, test weights, and qualified field labor as required to safely operate the unit under load conditions that vary from empty to full rated load and, in so doing, to successfully demonstrate compliance with applicable performance standards set forth in the project specifications with regard to:
  - a. Operation of safety devices.
  - b. Sustained high-speed velocity of the elevator in either direction of travel.
  - c. Brake-to-brake running time and floor-to-floor time between adjacent floors.
  - d. Floor leveling accuracy.
  - e. Door opening/closing and dwell times.
  - f. Ride quality inside the elevator car.
  - g. Communication system.
  - h. Load settings at which anti-nuisance, load dispatch, and load non-stop features are activated.
5. Upon completion of work specified in the Contract Documents on the last car in any group of elevators, and in conjunction with the aforementioned testing procedures, the Contractor shall carry out additional testing of group dispatch/supervisory control features in the presence of the Consultant.

6. The Contractor shall provide test instruments and qualified field labor as required to successfully demonstrate:
  - a. The back-up operating mode for group dispatch failure.
  - b. Simulated and actual emergency power operation.
  - c. Firefighter, attendant and independent service operations.
  - d. Restricted access security features and card reader controls.
  - e. Zoning operations and floor parking assignments.
  - f. Up/down peak operation.
7. Upon completion of the modernization of each individual elevator, emergency power testing shall be conducted by the Building Management after normal business hours and/or weekends.
8. After hour tests of systems such as emergency generators, fire service, and security systems shall be conducted at no extra cost to the Owner.

END OF SPECIFICATION

Appendix A						
Bldg. No.	WSU Bldg. ID	WSU Bldg. Address	WSU ID #	Elevator Type	Cab Flooring Material (per specifications)	Interior Wall Finishes (per specifications)
5	Science Hall	5045 Cass Avenue, Detroit, MI 48202	005 01	Traction	Seamless Resilient Rubber	5WL hanging panels ???
34	Student Center Center	5221 Gullen Mall Detroit, MI 48202	034 03	Traction	diamond plate	5WL hanging panels ???
36	Reuther Library	5401 Cass Avenue, Detroit, MI 48202	036 01	Hydraulic	Seamless Resilient Rubber	Plastic laminate panels
42	Alumni House	441 Gilmour Mall Detroit, MI 48202	042 01	Hydraulic	Porcelain tile	Wood Veneer panels
45	Parking Structure 5	5501 Anthony Wayne Drive, Detroit, MI 48202	045 01 045 02	Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
51	Parking Structure 1	450 West Palmer, Detroit, MI 48202	051 03 051 04	Traction Traction	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
71	5057 Woodward	5057 Woodward, Detroit, MI 48202	071 01 071 02 071 03 071 03 071 03	Traction Traction Traction Traction Traction	Seamless Resilient Rubber	Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels
88	Parking Structure 6	61 Putnam Avenue, Detroit, MI 48202	088 01 088 03 088 02	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels 5WL hanging panels
89	Biological Sciences	5047 Gullen Mall, Detroit, MI 48202	089 01 089 02	Traction Traction	Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels 5WL hanging panels
130	Faculty / Administration Building	656 West Kirby Avenue, Detroit, MI 48202	130 03 130 02 130 01	Hydraulic Hydraulic Hydraulic	Existing to remain	Plastic laminate panels Plastic laminate panels Plastic laminate panels
629	Elliman Clinical Research	421 East Canfield Avenue	629 01 629 02 629 03	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels Plastic laminate panels 5WL hanging panels

## APPENDIX A

### WAYNE STATE UNIVERSITY CAR ENCLOSURE AND INTERIOR FINISH STANDARDS

#### CAR ENCLOSURE AND INTERIOR FINISHES

- A. Passenger Elevator: Retain existing car enclosure and provide new interior finishes.
1. Check and tighten all fastenings.
  2. Provide new interior finishes as specified herein.
  3. Modify car enclosure for application of new signal and pushbutton fixtures.
  4. Post modernization weight not to exceed code allowable limits.
  5. Provide the following features:
    - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
    - b. Stationary Return Panels: Retain.
    - c. Entrance Columns: Retain.
    - d. Transom: Retain.
    - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
    - f. Base: Stainless steel with concealed ventilation cutouts.
    - g. Interior Wall Finish:
      - 1) Removable panels, faced and edged, with color core plastic laminate. Plastic laminate (HPDL) shall meet or exceed NEMA Standard LDI-1964 for Type 1, 1/16" high pressure general purpose laminate.
      - 2) Color and finish as selected by Purchaser.
      - 3) 5WL hanging panels with #4 stainless steel reveals between panels.
    - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
    - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
    - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
    - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
    - l. Cab Flooring, provide floor covering per below:
      - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
      - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
      - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
      - 4) Seamless resilient non-slip rubber or vinyl with sealed edges

- 5) Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

B. Service Elevator: Retain existing car Shell enclosure and provide new interior finishes.

1. Check and tighten all fastenings.
2. Provide new interior finishes as specified herein.
3. Modify car enclosure for application of new signal and pushbutton fixtures.
4. Post modernization weight not to exceed code allowable limits.
5. Provide the following features:
  - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
  - b. Stationary Return Panels: Retain.
  - c. Entrance Columns: Retain.
  - d. Transom: Retain.
  - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - f. Base: Textured stainless steel with concealed ventilation cutouts.
  - g. Interior Wall Finish: Removable panels made of 5WL.
  - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
  - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - l. Cab Flooring: Provide a heavy vinyl cab floor covering as selected by the Purchaser.
  - m. Pads and Buttons: 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.

C. Passenger Elevator: New Car Enclosure and Interior Finishes.

1. Remove all existing interior finishes and shell components, weigh, and document.
2. Provide complete new car enclosure and interior finishes as specified herein.
3. Post modernization weight not to exceed code allowable limits.
4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel stainless steel formed panels Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - d. Entrance Columns: Reinforced 14 gauge satin finish stainless steel.
  - e. Transom: Reinforced 14 gauge satin finish stainless steel full width of enclosure.
  - f. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.

- g. Base: Stainless steel with concealed ventilation cutouts.
- h. Interior Wall Finish: Removable panels, faced and edged, with color core plastic laminate. Color and finish as selected by Architect/Purchaser.
- i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
- k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
- l. Subfloor; 5/8" thick marine grade plywood.
- m. Cab Flooring: Provide floor covering per below:
  - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
  - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
  - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
  - 4) Seamless resilient non-slip rubber or vinyl with sealed edges
- n. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
- o. Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

D. Service Elevator: New Car Enclosure and Interior Finishes.

- 1. Remove all existing interior finishes and shell components, weigh, and document.
- 2. Provide complete new car enclosure and interior finishes as specified herein.
- 3. Post modernization weight not to exceed code allowable limits.
- 4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel textured stainless steel formed panels with baked enamel interior finish as selected. Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Car Sill:
  - d. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - e. Entrance Columns: Reinforced 14 gauge textured satin finish stainless steel.
  - f. Transom: Reinforced 14 gauge textured satin finish stainless steel full width of enclosure.
  - g. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - h. Base: Textured stainless steel with concealed ventilation cutouts.
  - i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.

- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - l. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - m. Guardrails:
    - 1) Solid stainless steel flat stock bars, 4" x 3/8", mounted across rear and side walls.
    - 2) Locate guardrail line at 8" above car floor.
    - 3) Bolt rails through car walls from back and mount on 1½" deep solid round stainless steel standoff spacers no more than 18" O.C.
    - 4) Return guardrail ends to car walls.
    - 5) Pads and Buttons: 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.
  - n. Cab Flooring:
    - 1) Seamless resilient non-slip rubber or vinyl with sealed as selected by the Owner.
- E. Freight Elevator Enclosure: Car weight to be verified prior to removal of interior cab finishes/cab enclosure. Post modernization weight not to exceed code allowable limits. Provide the following features:
- 1. Enclosure Walls: Reinforced 10-gauge furniture steel formed panels no more than 20" wide with light-proof joints.
    - a. Baked enamel finish as selected.
    - b. Provide recess in car side wall for recessed mounting of car operating panel.
  - 2. Enclosure Canopy:
    - a. Reinforced 12-gauge furniture steel formed panels no more than 20" wide with light-proof joints and Hinged emergency exit.
    - b. Interior finish white reflective baked enamel.
    - c. Lighting: Recessed LED down lights with on/off switch in car operating panel. Recess mount fixture flush with inside surface of car top. Provide steel guard on car top over fixture.
    - d. Bumper Rails: Two rows of 2" x 12" oak or maple bumpers mounted on both sides and rear of the car.
      - 1) Locate bottom rail at floor level and top rail at 36" above the car floor.
      - 2) Bolt rails through car walls with bolt and captive nuts on exterior of wall panel sections on 18" centers.
      - 3) Finish both upper and lower top edges with a 45-degree chamfered edge to eliminate collection of trash.
      - 4) Finish ends of upper and lower bumpers on side walls to 45° chamfer to eliminate carts and people from hitting blunt ends.
      - 5) Flooring: Provide cab flooring which is 1/8" aluminum diamond plate.

**DIVISION 14**

**SECTIONS 14 21 23 & 14 21 43**

**TECHNICAL SPECIFICATIONS FOR**

**TWO (2) ELEVATORS**

**AT**

**WSU - BIO SCIENCE**

**5047 GULLEN MALL**

**DETROIT, MI**

**ADDENDUM #2**

DATE: February 26, 2024

VDA No. 69967/BM

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## DIVISION 14 – CONVEYING SYSTEMS

### 14 00 00 Conveying Equipment

#### 14 21 00 – Traction Elevators

##### 14 21 23 – Electric Traction Passenger Elevators

##### 14 21 43 – Electric Traction Service Elevators

## PART 1 - GENERAL

### 1.1 SUMMARY AND DEFINITIONS

#### A. Related Documents

1. Division 01 - Supplementary General Conditions
2. 14 21 23 - Electric Traction Passenger Elevators
3. 14 21 43 - Electric Traction Service Elevators
4. Request for Proposal

#### B. Intent

1. This section includes:
  - a. Electric traction passenger
  - b. Electric traction service
2. The following outlines the scope of work covered in this Section:
  - a. Comprehensive “Turn-key” modernization of one (1) 3,500 lb. capacity traction service and one (1) 2,500 passenger elevators operating at 350 fpm.
  - b. Completion of Related Work identified herein Item 1.5.A.
  - c. This is a "TURN-KEY" project with the Elevator Contractor designated the "PRIME CONTRACTOR" for all related and non-related work specified and required unless specifically excluded or referenced to be done by others.

As this is a “Turn-Key” project, with the Elevator Contractor being the “Prime” Contractor, it is the Elevator Contractor’s responsibility to perform a detailed survey of the existing jobsite conditions to determine applicability and detailed scope for related work completion.

The Elevator Contractor is required to retain the services of trade sub-contractors that are either experienced in working as subcontractors on elevator modernization projects or that have relevant experience on similar projects. The trade sub-contractors shall be required to complete a detailed survey of related work / building conditions at this location(s) alongside the Elevator Contractor as a requirement to provide cost proposals for the related scope of work. At a minimum,

trade sub-contractors that are required to be included on the Elevator Contractors project team should include:

Electrical Contractor

Mechanical Contractor

Fire / Life Safety Contractor

The Elevator Contractor is required to identify in their proposal the Trade sub-contractors utilized to compile their cost estimates included in their Base Bid.

It is the intent of this specification that the Elevator Contractor include in their Base Bid the cost to complete all elevator and related work that will be required to return each of the units to public use with no Code violations or punch-list items identified by the local Authority Having Jurisdiction (AHJ) as remaining to be completed. As such, the items Identified in Section 1.5.A of the Technical Specifications are intended to be as accurate a listing as can be compiled at the time of preparation of these documents.

However, should other related building work items be necessary to be completed to meet the requirements of the AHJ for issuance of permanent elevator operating certificates / permits, it will be the responsibility of the Elevator Contractor to complete the additional items under the scope of their Base Bid amount, with no additional costs to the Owner.

3. Related equipment shall be designed, constructed, installed and adjusted to produce the highest results with respect to smooth, quiet, convenient and efficient operation, durability, economy of maintenance, and the highest standard of safety.
4. It is not the intent of these specifications to detail the construction and design of all parts of the equipment, but it is expected that the type, materials, design, quality of work and construction of each part shall be adequate for the service required, durable, properly coordinated with all other parts, and in accordance with the best commercial standards applicable and of the highest commercial efficiency possible.
5. Electric and magnetic circuits and related parts shall be of proper size, design and material to avoid heating and arcing, and all other objectionable effects which may reduce the efficiency of operation, economy of maintenance and/or net-useful life of the apparatus.
6. Minimum requirements for design, materials, etc., are for certain parts of the equipment. Equivalent requirements approved by the Consultant shall apply to such parts as are of special design, construction or material and to which the specified requirements are not directly applicable. These minimum requirements as a whole shall be considered as establishing proportionate general minimum standards for all parts of the equipment.
7. The Consultant may permit variations from the requirement of these specifications to permit use of the Contractor's standard equipment, provided such standard equipment is in every way adequate for the intended use and meets the full intent of these specifications. All such variations proposed by the manufacturer shall be called to the attention of the Consultant and shall only be made if approved in writing prior to the award of the contract.
8. General requirements for design, materials and construction are intended primarily to apply to the heavy-duty and important parts of the equipment specifically mentioned and to other parts of similar duty and importance. Less important and light-duty parts may be of the

standard design, materials and construction provided that, in the opinion of the Consultant, such standards are in accordance with the best commercial practice and are fully adequate for the purpose of use. All such variations shall be made only on the Consultant's written approval.

9. All equipment and component parts installed, supplied or provided under this contract shall be manufactured and distributed by a third-party, non-installer company servicing the vertical transportation industry.
  - a. Apparatus shall conform to the design and construction standards referenced herein and shall be rated the best commercial grade suitable for this application.
  - b. Equipment and component systems shall not employ any experimental devices or proprietary designs that could hamper and/or otherwise prohibit subsequent maintenance repairs or adjustments by all qualified contractors.
  - c. Manufacturers of the apparatus shall provide technical support and parts replacements for their equipment and component systems for a minimum of twenty (20) years and issue such guarantee of support to the purchaser with written certification naming the final Owner of their product(s) to ensure the apparatus or systems remain maintainable regardless of who may be selected for future service.
10. All equipment provided shall be factory and field tested with a history of design reliability and net-useful life established.
  - a. Contractor must be able to demonstrate the apparatus to be installed has been used successfully in a substantially similar manner under comparable conditions.
  - b. If the apparatus proposed differs substantially in construction, material composition, design, size, capacity, duty or other such rating from the equipment previously used for the same purpose by the manufacturer, the Consultant may reject the apparatus or require the vendor test and demonstrate the adequacy and suitability for this particular situation. Any necessary tests shall be performed at the sole expense of the Contractor with no prior guarantee of acceptance after the testing procedure.
11. The Contractor shall not use as part of the permanent equipment any experimental devices, proprietary design, components, construction of materials which have not been fully tried out in at least substantially similar or under comparable service, except as may be especially approved by the Consultant. If any important equipment or devices to be used on this installation differ substantially in construction, materials, design, size, capacity or duty from corresponding items previously used for the same purpose by the manufacturer, they shall pass such tests as the Consultant may require to fully show their adequacy and suitability. These tests shall be in addition to tests herein specified and shall be made at the expense of the Contractor.
12. Certain design limitations, tests, etc., are herein specified as a partial check of the adequacy of design, construction and materials used. These requirements do not cover all features necessary to ensure satisfactory and approved operation, etc., of the equipment.
13. It is understood, the entire system shall be designed, fabricated, modified and/or upgraded in full compliance with applicable local laws and code standards. The absence of a particular item or requirement shall not relieve the Contractor of the full and sole responsibility for such equipment, features and/or procedures.
14. With the exception of only those items specifically identified as being performed by others, the Specifications are intended to include all engineering, material, labor, testing, and inspections needed to achieve work specified by the Contract Documents. Inasmuch as it

is understood that any incidental work necessary to complete the project is also covered by the Specifications, bidders are cautioned to familiarize themselves with the existing job site conditions. Additional charges for material or labor shall not be permitted subsequent to execution of the Contract.

15. Bidders must report discrepancies or ambiguities occurring in the Specifications to the Consultant for resolution prior to the bidding deadline, otherwise the Specifications shall be deemed acceptable in their existing form.
16. Fixtures, Operating Devices and Signage Survey
  - a. Upon award of the Contract, Contractor shall perform a survey of the existing elevator operating fixtures and devices, including signage, and present a report to the Building Management. The report shall include photographs of the following existing items:
    - 1) Hall call push buttons
    - 2) Floor identification / Braille signage in entrance jambs
    - 3) Lobby directional lanterns at all floors
    - 4) Applicable wall surfaces
  - b. The Contractor shall submit, as part of the report, pictures or catalog cuts of the new devices intended to be installed under the modernization project at the various locations including any additional signage either new or replacing existing.

#### C. Abbreviations and Symbols

1. The following abbreviations, Associations, Institutions, and Societies may appear in the Project Manual or Contract Documents:

ADA	Americans with Disabilities Act
AHJ	Authority Having Jurisdiction
AIA	American Institute of Architects
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
IBC	International Building Code
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
OSHA	Occupational Safety and Health Act

#### D. Codes and Ordinances / Regulatory Agencies

1. Work specified by the Contract Documents shall be performed in compliance with applicable Federal, State, and municipal codes and ordinances in effect at the time of Contract execution. Regulations of the Authority Having Jurisdiction shall be fulfilled by the Contractor and Subcontractors. The entire installation, when completed, shall conform with all applicable regulations set forth in the latest editions of:

- a. Local and/or State laws applicable for logistical area of project work.
  - b. Building Code applicable to the AHJ.
  - c. Elevator Code applicable to the AHJ.
  - d. Safety Code for Elevators and Escalators, ASME A17.1 and all supplements as modified and adopted by the AHJ.
  - e. Safety Code for Elevators and Escalators, A17.1S supplement to A17.1 as modified and adopted by the AHJ for Machine Room Less installations (MRL).
  - f. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2.
  - g. Safety Code for Existing Elevators and Escalators, ASME A17.3 as modified and adopted by the AHJ.
  - h. Guide for emergency evacuation of passengers from elevators, ASME A17.4.
  - i. National Electrical Code (ANSI/NFPA 70).
  - j. American with Disabilities Act - Accessibility Guidelines for Building and Facilities and/or A117.1 Accessibility as may be applicable to the AHJ.
  - k. ASME A17.5/CSA-B44.1 - Elevator and escalator electrical equipment.
  - l. ECC (Energy Conservation Code) as may be applicable to the AHJ.
2. The Contractor shall advise the Owner's Representative of pending code changes that could be applicable to this project and provide quotations for compliance with related costs.

#### E. Reference Standards

1. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
2. ANSI/AWS D1.1 - Structural Welding Code, Steel.
3. ANSI/NFPA 80 - Fire Doors and Windows.
4. ANSI/UL 10B - Fire Tests of Door Assemblies.
5. ANSI/IEEE - 519-Latest Edition
6. ANSI/IEEE - Guide for Surge Withstand Capability (SWC) Tests
7. ANSI Z97.1 - Laminated/Safety Tempered Glass

#### F. Definitions

1. Defective Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
2. Provide: Where used in this document, provide shall mean to install new device, apparatus, system, equipment or feature as specified in this document.
3. Definitions in ASME A17.1 as amended or modified by the AHJ apply to work of this Section.

### 1.2 PERMITS AND SUBMITTALS

#### A. Permits

1. Prior to commencing work specified by the Contract Documents, the Contractor shall, at its own expense, obtain all permits or variances as may be required by the AHJ and provide

- satisfactory evidence of having obtained said permits and variances to both the Owner's Representative and Consultant.
2. File necessary drawings for approval of all Authorities Having Jurisdiction.
  3. The Elevator Contractor shall undertake the necessary review and search procedure to identify open applications and/or outstanding violations for this property; and close-out such applications and/or expunge such violations relative to the project scope as required for final acceptance by the AHJ.
  4. Outstanding applications and violations must be indicated on the request for permit filing for this procedure to ensure such applications and/or violations are dismissed accordingly.
- B. All relative costs shall be included in the base bid proposal with the understanding that corrective actions are covered under the specified scope of work.
- C. Submittals
1. Prior to beginning the work, the Contractor shall submit and have approved copies of layout drawings, shop drawings and standard cuts. These items shall include:
    - a. A plan and section view of the hoistway, pit and machine room
    - b. Machine assembly, controller, door equipment, signal fixtures Door panels, car and counterweight guides, travel cable, and cab enclosures/ interiors.
    - c. All specified additional accessories.
  2. The Consultant and the Owner's Representative shall pass on the submittals with reasonable promptness and the Contractor shall be responsible to ensure that there will be no delay in their work or that of any other trade involved.
  3. Approved filing and submittal requirements must be completed before equipment and related materials are ordered.
  4. Copies of Department of Buildings' permits and/or governing authority's documents will be posted at the job site with copies issued to the Owner's Agent, Owner's Representative and Consultant.
  5. Samples of wood, metal, plastic, paint or other architectural finish material applicable to this project shall be submitted for approval by the Owner's designee.
  6. It shall be understood that approval of the drawings and cuts by Owner's designee, Architect and/or Consultant shall be for general arrangement only and does not include measurements which are the Contractor's responsibility or approval of variations from the contract documents required by the AHJ.
  7. The Contractor shall prepare a record log and maintain all submittals, shop drawings, catalog cuts and samples.
- D. Measurements and Drawings
1. Drawings or measurements included with the bidding material shall be for the convenience of the bidders only and full responsibility for detailed dimensions lies with the Contractor.
  2. In the execution of the work on the job, the Contractor shall verify all dimensions with the actual conditions.
  3. Where the work of the Elevator Contractor is to join other trades, the shop drawings shall show the actual dimensions and the method of joining the work of the various trades.
- E. Substitutions

1. Requests for substitutions will be considered under the following time limitations and situations:
  - a. Not less than ten (10) calendar days before bids are due.
  - b. Work or equipment specified becomes unavailable through unforeseen events such as strikes, loss of manufacturer's plant through fire, flood, or bankruptcy.
2. Requested substitutions will be reviewed and adjudged. Failure of the Owner to raise objection shall not constitute a waiver of any of the requirements of the Contract Documents.
3. Request for substitutions shall include complete data with drawings and samples as required, including the following:
  - a. Quality Comparison - Proposed substitution versus the specified product.
  - b. Changes required in other work because of the substitution.
  - c. Effect on the construction schedule.
  - d. Cost Data - Resulting from the proposed substitution versus the specified product. The Contractor shall certify that the cost data presented is complete and includes all related costs under this Contract.
  - e. Safety Comparison – Proposed substitution shall provide equivalent or greater safety, with certification data provided where relevant.
4. When proposing a substitution, the Contractor represents that:
  - a. They have investigated the proposed substitution and have determined that it is equal to or better than the product specified.
  - b. They will guarantee the substitution in the same manner as the product specified.
  - c. They will coordinate and make other changes as required in the work as a result of the substitution.
  - d. They waive all claims for additional costs as a result of the substitution, with the exception of those identified above under "cost data".
5. The Owner will be sole judge of the acceptability of the proposed substitution.
6. The Owner and Consultant will have authority to approve or reject substitutions or to change the specified standards of quality. However, neither this authority to act under this provision nor any decision made in good faith, either to exercise or not to exercise this authority, shall give rise to any duty or responsibility of the Owner to the Contractor, any Subcontractor, any Sub-Subcontractor, any of their agents or employees or any other persons performing the work or offering to perform the work.

F. Changes in Scope and Extra Work

1. The Owner may at any time make changes in the specifications, plans and drawings, omit work, and require additional work to be performed by the Contractor.
  - a. Each such addition or deletion to the Contract shall require the Owner and the Contractor to negotiate a mutually acceptable adjustment in the contract price, and, for the Contractor to issue a change order describing the nature of the change and the amount of price adjustment.

- b. The Contractor shall make no additions, changes, alterations or omissions or perform extra work except on written authorization of the Owner.
- c. Each change order shall be executed by the Contractor, Owner, and the Consultant.

G. Keys

- 1. Upon the initial acceptance of work specified by the Contract Documents on each unit, the Contractor shall deliver to the Owner, six (6) keys for each general key-operated device that is provided under these specifications in accordance with ASME A17.1, Part 8 standards as may be adopted and modified by the AHJ.
- 2. All other keying of access or operation of equipment shall be provided in accordance with ASME A17.1 Part 8 as may be adopted and modified by the AHJ.

H. Diagnostic Tools

- 1. Prior to seeking final acceptance of the project, the Contractor shall deliver to the Owner any specialized tools required to perform diagnostic evaluations, adjustments, and/or programming changes on any microprocessor-based control equipment installed by the Contractor. All such tools shall become the property of the Owner.
  - a. Owner's diagnostic tools shall be configured to perform all levels of diagnostics, systems adjustment and software program changes which are available to the Contractor.
  - b. Owner's diagnostic tools that require periodic re-calibration and/or re-initiation shall be performed by the Contractor at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the project.
  - c. The Contractor shall provide a temporary replacement, at no additional cost to the Owner, during those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation or repair.
- 2. Contractor shall deliver to the Owner, printed instructions, access codes, passwords or other proprietary information necessary to interface with the microprocessor-control equipment.

I. Service Support Requirements / Spare Parts

- 1. Software / Firmware Updates
  - a. During the life of the equipment and subject to the term of the maintenance agreement, where revisions to firmware and/or software are issued by the control manufacturer or manufacturer of solid state and microprocessor-based subsystems subsequent to the beneficial use of the equipment, updates shall be provided so that the installation and spare circuit boards are current with respect to software and firmware versions.

J. Wiring Diagrams, Operating Manuals and Maintenance Data

- 1. Deliver to the Owner two (2) identical volumes of printed information organized into neatly bound manuals prior to seeking final acceptance of the project.

2. The manuals shall also be submitted in electronic format on non-volatile media, incorporating raw 'CAD' and/or Acrobat 'PDF' file formats. Electronic manuals shall be properly indexed, bookmarked, and searchable.
3. Manuals, as well as electronic copies, shall contain the following:
  - a. Step-by-step adjusting, programming and troubleshooting procedures that pertain to the solid-state microprocessor-control and motor drive equipment.
  - b. Passwords or identification codes required to gain access to each software program in order to perform diagnostics or program changes.
  - c. A composite listing of the individual settings chosen for variable software parameters stored in the software programs of both the motion and dispatch controllers.
  - d. Method of control and operation.
4. Provide two (2) sets of "AS INSTALLED" straight-line wiring diagrams in both hard and electronic format in accordance with the following requirements:
  - a. Displaying the name and symbol of each relay, switch or other electrical component utilized including identification of each wiring terminal.
  - b. Electrical circuits depicted shall include all those which are hard wired in both the machine room and hoistway.
  - c. Supplemental wiring changes performed in the field shall be incorporated into the diagrams in order to accurately replicate the completed installation.
5. Furnish two (2) sets of bound instructions and recommendations for maintenance, with special reference to lubrication and lubricants along with the full Maintenance Control Program as required Part 8 of ASME A17.1.
6. Manuals or photographs showing controller replacement parts with part numbers listed.

K. Training

1. Prior to seeking final acceptance of the project, the Contractor shall conduct an eight (8) hour training program on-site with building personnel selected by the Owner.
2. The focus of the session shall include:
  - a. Instructions on proper safety procedures and who to contact for the purpose of assisting passengers that may become entrapped inside an elevator car.
  - b. Explain each control feature and its correct sequence of operation.
3. Control features covered shall include but not be limited to:
  - a. Independent Service Operation.
  - b. Emergency Fire Recall Operation - Phase I.
  - c. Emergency In-car Operation - Phase II.
  - d. Emergency Power Operation.
  - e. Emergency Communications Equipment.
  - f. Security Operating Features.

L. Patents

1. Patent licenses which may be required to perform work specified by the Contract Documents shall be obtained by the Contractor at its own expense.
2. The Contractor agrees to defend and save harmless the Owner, Consultant and agents, servants, and employees thereof from any liability resulting from the manufacture or use of any patented invention, process or article of appliance in performing work specified in the Contract Documents.

M. Advertising

1. Advertising privileges shall be retained by the Owner.
2. It shall be the responsibility of the Contractor to keep the job site free of posters, signs, and/or decorations.
3. Contractor's logo shall not appear on faceplates or entrance sills without the approval of the Owner.

1.3 QUALITY ASSURANCE

A. Materials and Quality of Work

1. All materials are to be new and of the best quality of the kind specified.
2. Installation of such materials shall be accomplished in a neat manner and be of the highest quality.
  - a. Should the Contractor receive written notification from the Owner stating the presence of inferior, improper, or unsound materials or quality of installation, the Contractor shall, within twenty-four (24) hours, remove such work or materials and make good all other work or materials damaged.
  - b. Should the Owner permit said work or materials to remain, the Owner shall be allowed the difference in value or shall, at its election, have the right to have said work or materials repaired or replaced as well as the damage caused thereby, at the expense of the Contractor, at any time within one (1) year after the completion of the work; and neither payment made to the Contractor, nor any other acts of the Owner shall be construed as evidence of acceptance and waiver.

B. Electrical Design Requirements (General)

1. The following typical requirements shall apply to all parts of the work and are supplementary to other requirements noted under the respective headings.
  - a. The design and construction of the motors shall conform to the requirements of these specifications and to the ASME Standards for Rotating Electrical Machinery with revisions issued to the first day when the work of this Contract was advertised.
    - 1) Motors shall operate successfully under all loads and speeds and during acceleration and deceleration.
    - 2) Motors shall be designed for quiet operation without excessive heat.
    - 3) Insulation on motor coils and windings and on all insulated switch, relay, brake and other coils shall conform to the requirements of minimum Class

“F” insulation, as defined in ANSI Standards for Rotating Electrical Machinery. All motors shall be impregnated twice.

- 4) Switches, relays, etc., on controller, starter and signal panels and similar items on other parts of the equipment shall be the latest improved type for the condition of use. They shall function properly in full accordance with the requirements of the machines controlled and with the specified operating requirements of the elevator. Any of these parts showing wear or other injurious effects during the guarantee period to the extent that abnormal maintenance is required or indicated shall be replaced with proper and adequate parts by the Contractor.
- 5) Contacts in elevator motor circuits which are intended to be opened by governors or other safety devices shall be copper to carbon or other approved non-fusing type.
- 6) Where required, controllers and other component parts of the installation shall be labeled in accordance with the latest codes and standards as adopted and/or otherwise modified by the AHJ.
- 7) Electrical equipment, motors, controllers, etc., installed under this contract shall have necessary CSA/US or UL/US listing as may be required by the AHJ. Equipment shall be labeled or tagged accordingly.

#### C. Energy Conservation Code

1. The Contractor shall comply with the requirements set forth in the Energy Conservation Code as may be applicable to the AHJ.
2. Except for equipment or systems under the purview of other disciplines, elevator and escalator equipment provided by the Contractor requiring compliance shall include, but not be limited to:
  - a. Gear ratio efficiencies in geared machines
  - b. Energy efficiencies of geared and gearless motors
  - c. Absorption of regenerated power for elevators
  - d. Energy efficiencies of car interior lighting and ventilation
  - e. Automatic operation of car interior lighting and ventilation through the individual car controller

#### D. Materials, Painting and Finishes

1. Two (2) coats of rust inhibiting machinery enamel shall be applied to exposed ferrous metal surfaces in the pit that do not have a galvanized, anodized, baked enamel, or special architectural finishes.
2. Two (2) coats of rust inhibiting enamel paint to the machinery located within the machine room and secondary level (where applicable) as well as to the machine room floors.
3. Architectural metal surfaces of bronze or similar non-ferrous materials which are specified to be refinished, re clad and/or provided new, shall be sufficiently clear coated so as to resist tarnishing during normal usage for a period of not less than twelve (12) months after final acceptance by the Owner.
4. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.

5. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by Code at intervals not exceeding 7'-0". The color of paint used shall contrast with the color of the surface to which it is applied.

E. Accessibility Requirements

1. Locate the alarm button and emergency stop switch at 35", and floor and control buttons not more than 48" above the finished floor. The alarm button shall illuminate when pressed for visual acknowledgement to user.
2. Provide raised markings in the panel to the left of the car call and other control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons and cover plate.
3. The centerline of new hall push button shall be 42" above the finished floor.
4. The hall arrival lanterns, or cab direction lantern provided shall sound once for the "up" direction and twice for the "down" direction. Design and locate fixtures per Federal standards.
5. Provide floor designations at each entrance on both sides of jamb at a height of 60" above the floor.
  - a. Use cast metal plates and polished numbers secured with tamper-proof hardware.
  - b. Designations shall be 2" high, raised .03" on a contrasting color background as selected by the Owner.
6. Provide an audible signal within the elevator to tell passengers that the car is stopping or passing a floor served by the elevator.
7. Where elevators operate at a speed greater than 200 fpm, provide a verbal annunciator to announce the floor at which the elevator is stopping where required by the AHJ.
8. Provide signal control timing for passenger entry/exit transitions per Federal and/or Local standards.
9. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
10. Provide visual call acknowledgment signal for car emergency intercommunication device.

F. Qualifications

1. The work shall be performed by a company specialized in the business of manufacturing, installing and servicing conveying systems of the type and character required by these specifications with a minimum of ten (10) years of experience.
2. Prior written acceptance is required for manufacturers other than those listed, before quoting this project. Requests for acceptance will not be considered unless they are submitted before bid date and are accompanied by the following information:
  - a. List of five (5) similar installations having exact equipment being proposed for this project arranged to show name of project, system description and date of completed installation. The list shall include the names, position and resumes of the construction team and field supervisor of the installations.
  - b. Complete literature, performance and technical data describing the proposed equipment. Include the names, position and resumes of the proposed construction team and field supervisor.

- c. List of ten (10) service accounts by building name, building manager or owner, including phone numbers.
- d. Location of closest service office from which conveying system will be maintained.
- e. Location of closest parts inventory for this installation.
- f. List of the names, positions and resumes of the construction teams and field supervisor for the installation.

#### 1.4 DELIVERY / STORAGE / HANDLING / COORDINATION

##### A. Delivery and Storage of Material and Tools

###### 1. Delivery, Storage and Handling:

- a. Deliver materials to the site ready for use in the accepted manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name. Delivered materials shall be identical to accepted samples.
  - b. Store materials under cover in a dry and clean location, off the ground.
  - c. Remove delivered materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
- 2. The Owner shall bear no responsibility for the materials, equipment or tools of the Contractor and shall not be liable for any loss thereof or damage thereto.
  - 3. The Contractor shall confine storage of materials on the job site to the limits and locations designated by the Owner and shall not unnecessarily encumber the premises or overload any portion with materials to a greater extent than the structural design load of the Facility.

##### B. Work with Other Trades / Coordination

- 1. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are embedded in concrete or masonry for the applicable equipment. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to the Project site in time for installation.
- 2. Coordinate sequence of installation with other work to avoid delaying the Work.
- 3. Coordinate locations and dimensions of other work relating to the equipment scheduled for installation including pit ladders, sumps, and floor drains in pits; entrance subsills; machine beams; and electrical service, electrical outlets, lights, and switches in pits and machine rooms, secondary levels, overhead sheave rooms and hoistways as it relates to the specific equipment.

##### C. Removal of Rubbish and Existing Equipment

- 1. On a scheduled basis, the Contractor shall remove all rubbish generated in performing work specified in the Contract Documents from the job site.
- 2. Any component of the existing elevator plant that is not reused under the scope of work specified in the Contract Documents shall become property of the Contractor and, as such, shall be removed from the premises at the Contractor's sole expense.
- 3. The Contractor agrees to dispose of the aforementioned equipment and rubbish in accordance with any and all applicable Federal, State, and municipal environmental

regulations, and further accepts all liability that may result from handling and/or disposing of said material.

D. Protection of Work and Property

1. The Contractor shall continuously maintain adequate protection of all their work from damage and shall protect the Owner's property from injury or loss arising out of this contract.
2. The Contractor shall make good any such damages, injury or loss, except such as may be directly caused by agents or employees of the Owner.
3. The Contractor shall provide all barricades required to protect open hoistways or shafts per OSHA regulations. Such protection shall include any necessary guards or other barricades for employee protections during and after the modernization procedure.

1.5 RELATED WORK

A. Work by Elevator Contractor Included in the Base Bid

1. The following requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.
  - a. Provide hoist rope guards at the car and counterweight drop side of the hoisting machine sheave to prevent accidental contact with the hoisting ropes. The guard shall extend from the point where the hoisting ropes penetrate the machine room floor slab to a point beyond where the ropes contact the traction and deflector sheaves. The guards shall be constructed so as to conceal pinch-points between ropes and sheave grooves.
  - b. The top surface of any setback or projection in the hoistway that measures 2" or more in width shall be beveled at an angle of not less than seventy-five (75) degrees from horizontal. Each bevel plate shall be constructed from prime painted 14-gauge cold-rolled steel and installed so as to conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
  - c. Provide a standard railing conforming to Code on the outside perimeter of the car top on all sides where the perpendicular distance between the edges of the car top and the adjacent hoistway enclosure exceeds 300 mm (12 in.) horizontal clearance or as otherwise required by the Authority Having Jurisdiction.
  - d. Provide necessary patching, repairing and installation of masonry and/or dry wall for smooth and legal elevator hoistways.
  - e. Provide a smoke detector and/or smoke detector alarm system meeting the requirements of A17.1 and/or the Local Governing Authority as may be further specified.
  - f. Subsequent to the contract execution, the Contractor shall perform the following procedures and engineering tasks relative to balance loading of system and cab work included under base specification requirements and alternative/optional upgrades:
    - 1) Perform balance load testing to determine existing conditions and requirements applicable to new/modified equipment.

- 2) Provide data for Purchaser and/or their agents to evaluate any limitations that may be placed on design/finish options due to prevailing conditions or total suspended loading.
- g. Subsequent to the contract execution, the Contractor shall perform a Violation search and review of all open Applications in conjunction with the filing procedure. Subsequently, any and all outstanding Violations and/or open Applications shall be indicated on the Request for Permit; and such outstanding Violations shall be expunged, and open Applications closed out as part of this filing procedure.
- 1) If requirements and/or work necessary to satisfy outstanding Violation or Applications are not included in the contracted scope of work, the Elevator Contractor shall prepare an itemized listing with relative extra costs to cure the condition(s) and expunge and/or close out the Violation or Application for the Owners' and Consultants' review/approval prior to executing such work procedures.

B. Work by Others

1. The following requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.
  - a. Installation of new main line power feed with related disconnect switch designed and located per local law requirements.
  - b. Provide remote/auxiliary disconnects where new or existing disconnect switches are not in line-of-sight of the controller.
  - c. Installation of auxiliary power feed with related distribution panel(s) and disconnect(s) designed and located per local law requirements (circuit breaker panel) for intercommunication, CCTV systems, cab lighting or other specialty devices existing or to be provided by the Elevator Contractor.
    - 1) Voltage shall be 110 VAC with one (1) 15-Amp circuit breaker or fuse for lighting of each individual elevator car enclosure.
    - 2) Circuit breakers and/or fused disconnects shall be lockable in the "OFF" position in accordance with applicable code.
  - d. The top surface of any setback or projection in the hoistway that measures 2" or more in width shall be beveled at an angle of not less than seventy-five (75) degrees from horizontal, constructed from prime painted 14 gauge cold-rolled steel and installed so as to conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
  - e. Installation of new permanent dual lamp LED lighting fixtures with protective guards and 110-volt duplex GFI receptacles inside the machine room. Illumination shall be no less than thirty (30) foot-candles at floor level. A light control switch shall be provided immediately adjacent to the machine room entrance door. Provide necessary receptacles as required by Elevator Contractor to supply power to auxiliary elevator equipment and/or remotely located monitors.
  - f. Provide machinery spaces of the secondary level directly below the machine room with permanent dual lamp LED lighting fixtures having protective guards and a duplex GFI receptacle. Illumination shall be no less than nineteen (19) foot-candles

at floor level. A light control switch shall be provided immediately adjacent to the secondary level entrance door/ladder in accordance with code.

- g. Provide each elevator pit with a 110-volt GFI duplex receptacle and a permanent dual lamp LED lighting fixture equipped with protective guard. Illumination shall be no less than ten (10) foot-candles at pit floor level. A light control switch shall be provided and so positioned as to be readily accessible from the pit entrance door or ladder.
- h. Installation of hoistway and machine room smoke relief provisions in accordance with local laws.
- i. Provide each machine room, secondary space and pit with a self-closing, self-locking, fire-labeled access door. Locking means shall be spring-type arranged to permit the doors to be opened from the inside without a key.
- j. Provide a smoke detector system meeting the requirements of A17.1 and/or the Local Governing Authority.
- k. Installation of new or modification of existing fire emergency control interface provisions for automatic recall of the elevator(s) through operation of the fire detection system. Provisions shall be made for primary, alternate and third-zone (Fire-Hat) designated fire recall landing with connection contingent on Codes recognized by the local governing authority. The interfacing contacts shall be wired to an electrical junction box located inside each elevator machine room for connection to the elevator control systems by the Elevator Contractor. Each wire shall be clearly labeled with its control function. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.
  - 1) Installation of heat / smoke detecting devices in the elevator machine room, elevator lobbies, top of shaft and / or pit as required for elevator fire recall operation to meet current requirements of A17.1 and/or the local Governing Authority. Connection and programming of these new devices to existing building fire alarm control panel.
  - 2) Modification of existing fire alarm control panel and interface / wiring to panel as required to accommodate new heat / smoke detecting devices or new elevator fire recall zones, including installation of expansion panel and new power supply(s) (if required) to existing FACP.
  - 3) Software modifications as required to the existing fire alarm control panel as required to accommodate new smoke / heat detecting devices, new elevator fire recall zones, or expansion panel (if required).
  - 4) All wiring, piping, coring, cutting, patching, as required for new ducts / conduits to connect new or modified components of the fire alarm control system to operate elevator fire recall to meet current requirements of ASME A.17.1 and/or the local Governing Authority.
- l. Where sprinkler fire protective systems are provided inside any elevator hoistway, machine room or associated machinery space, provisions shall be made for the disconnecting of the main line power supply from the affected elevator prior to activation. This means of disconnect shall be manually reset in accordance with code.
- m. Installation of emergency power control interface provisions to signal the elevator control apparatus of a transfer from normal (utility) power to the building emergency (generator) power supply. Also, provide additional control interface to give advanced notification to the elevator control apparatus that the power source will

transfer from emergency (generator) power to normal (utility) power. Interfacing contacts shall be wired to an electrical junction box located inside each machine room for connection to the elevator control equipment by the Elevator Contractor. Coordinate the type of interface required for the specific elevator control apparatus with the Elevator Contractor.

- 1) On the line side of each main line disconnect switch, provide some means to absorb power that may be regenerated by the elevator hoist motor during emergency power operation.
  - 2) Normal Power/Emergency Power Control Signals consisting of two (2) dry contacts provided by others to function as follows:
    - a) One (1) dry contact normally open to make when Normal Power is available. (Logic state of dry contact is to be confirmed by the Manufacturer of the Elevator Control Equipment).
    - b) One (1) dry contact normally open to make when emergency power is available. (Logic state of dry contact is to be confirmed by the Manufacturer of the Elevator Control Equipment).
- n. Installation of HVAC provisions inside the machine room so as to maintain ambient temperature and humidity levels that are within the range specified by the microprocessor-control equipment manufacturers.
- o. Provide a class “ABC” fire extinguisher in electrical machinery and control spaces. Locate the extinguisher in close proximity to the access door.
- p. Provide necessary telephone wiring with connection to local telephone service for remote elevator monitoring and/or two-way voice emergency communications systems.
- 1) Terminate the telephone wiring in junction boxes or standard phone jack terminals in the machine room.
  - 2) Coordinate the quantity and termination method of individual phone connections with the Elevator Contractor.
  - 3) Identify each phone line for connection by the Elevator Contractor to the appropriate elevator device(s).
  - 4) Telephone wiring, where required by applicable codes, shall be installed in conduit.
- q. Sumps in pits where provided, shall be covered. The cover shall be level with the pit floor so as not to produce a tripping hazard.
- r. Where the pit extends more than three (3) feet below the sill of the pit access door, provide a permanent fixed metal ladder.
- 1) Ladder shall extend no less than 48” above the sill of the access door. Handgrips shall extend from the ladder to a point no less than 48” above the sill of the access door where the ladder does not comply.
  - 2) The rungs shall be a minimum of 12” wide. Where prevailing conditions prevent a 12” wide rung, the rung may be reduced to no less than 9”.
  - 3) The rungs shall be spaced 12” on center.

- 4) A clear distance of no less than 4-½” from the centerline of the rungs and handgrips to the nearest permanent object in back of the ladder shall be provided.
- s. Provide necessary signage and labels as may be required:
  - 1) Elevator identification labels using numerical designations adjacent to or on every elevator entrance at the designated level.
    - a) The designation shall match the numerical or alpha-numerical designation of the individual elevator to which the label applies.
- t. Provide Ethernet connection terminals in elevator machine rooms and location of elevator monitoring system.
- u. Subject work area does not require an “asbestos project”, but some minimal ACM was present and abated.
- v. An asbestos abatement project was performed and completed, ensuring that all ACM was removed.

## 1.6 WARRANTY / MAINTENANCE SERVICES

### A. Contract Close-Out, Guarantee and Warranties

1. The Contractor agrees to certify that work performed in accordance with the Contract Documents shall remain free of defects in materials and quality of work for a period of one (1) year after final acceptance of the completed project, or acceptance thereof by beneficial use on a unit-by-unit basis, whichever occurs first.
2. The sole duty of the Contractor under this warranty is to correct any non-conformance or defect and all damages caused by such defect without any additional cost to the Owner and within fifteen (15) days of notification.
3. The express warranty contained herein is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.
4. In the event the Contractor fails to fulfill its obligations defined herein, the Owner shall have the express right to perform the Contractor’s obligations and to charge the Contractor the cost of such performance or deduct an equal amount from any monies due the Contractor.

### B. Maintenance Coverage

1. The following maintenance coverage apply:
  - a. Interim Maintenance
    - 1) Provide full protective maintenance services and equipment coverage for one (1) month prior to the commencement of work, and during the work implementation procedure, until final acceptance of the finished project.
    - 2) Interim full comprehensive maintenance services shall be provided in accordance with Section 14 01 20, Owner’s Form of Agreement issued with the modernization documents for subsequent services.

- 3) Costs related to interim maintenance shall be included in the base bid quotation indicated on the bid form provided with a deduction for unit(s) out of service for upgrading.
- b. Guarantee Maintenance
- 1) Provide a full comprehensive preventative maintenance service for a period of twelve (12) months after the final completion and acceptance of the entire project.
  - 2) Guarantee maintenance and related services shall be provided in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.
  - 3) Costs related to guarantee maintenance shall be included in the base bid quotation indicated on the bid form in the space provided.
- c. Long-Term Maintenance
- 1) Long-term full comprehensive maintenance and related services shall be returned to the incumbent provider in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.

#### 1.7 AUXILIARY SYSTEMS / TESTING PROCEDURES (New)

##### A. Smoke Detector System (New)

1. The Elevator Contractor shall provide a complete smoke detector system for elevator recall complying with the governing authority's requirements and ASME A17.1 as approved or modified under local law.
  - a. Smoke detectors shall be installed in the elevator lobby at each floor, top of hoistway, in pit areas, and associated elevator machine room in accordance with NFPA and/or other applicable codes and standards of the authority having jurisdiction.
  - b. The activation of a smoke detector in any elevator lobby or associated elevator machine room other than the designated level (1st Floor) shall cause all cars in all groups that serve that lobby to return non-stop to the designated level (1st Floor).
  - c. The activation of a smoke detector at the designated level (1st Floor) shall cause the cars to return to an alternate level as required and/or allowed by applicable code unless the Phase I key-operated switch is in the "firemen service" position.
  - d. Smoke detectors and/or smoke detector system shall not be self-resetting.
  - e. Elevator Recall System shall incorporate a minimum number of zones as follows:
    - 1) Zone 1, First Floor
    - 2) Zone 2, Alternate Floor
    - 3) Zone 3, Machine Room
    - 4) Zone 4, Top of Shaftway
    - 5) Zone 5, Pit
    - 6) Zone 6, Spare

7) Zone 7 to All Typical Landings serviced

- f. The system shall be independent of the existing building systems and shall contain the following:
- 1) Modular LED control panel/annunciator, located at the 1st Floor Lobby in a specially designed tamperproof station, shall be custom designed for each individual system and location.
  - 2) Smoke detectors shall be photoelectric type or approved equal.
  - 3) Primary power supply shall be provided by Elevator Contractor.
  - 4) Minimum twenty-four (24)-hour emergency power failure battery back-up with automatic recharging apparatus and signal status indicators.
- g. Elevator Contractor shall provide all wiring, conduit and make final connections. Conduit may run in elevator hoistway as part of elevator control signal systems provided such circuitry is installed per local code requirements.

1.8 ALTERNATES AND VALUE ENGINEERING:

The following alternatives are elective upgrades which constitute changes to the base scope of work specified. Pricing for each alternate upgrade is requested from the bidder with costs indicated in the appropriate space in the Request for Proposal (RFP). Contractor shall take into consideration, as part of the alternative pricing, alternate work that is required either in lieu of, or in addition to, work specified in the base scope and shall not duplicate costs.

A. Contractor's Value Engineering Options

1. This alternative is provided for individual contractors to propose optional equipment or otherwise offer cost saving suggestions that will provide the same desired results or further enhance the safety, durability, or performance of the elevator systems.
2. Each suggestion must be fully detailed on the contractor's own letterhead with the associated price change specified on the form of proposal provided.

PART 2 - PRODUCTS

2.1 GENERAL DESCRIPTION

2.2 Traction Elevator

A. WSU BIO SCIENCE 5047 Gullen Mall, Detroit, MI 48202 US - Traction Elevator PE1

1.	Quantity	One (1)
2.	Type	Traction Elevator Passenger/Service
3.	Capacity (lbs)	3500
4.	Speed (fpm)	350
5.	Travel in Feet	Existing

	a. Roping\Hoisting	New
	b. Roping\Governor	New
	c. Roping\Compensating	Not Applicable
	d. Roping/Ropes	1:1
6.	Compensation Sheave	Not Applicable
7.	Compensation	
	a. Compensation Ropes	Not Applicable
	b. Compensation Chains	New
8.	Number of Landings	Seven (7)
9.	Number of Openings	Seven (7)
10.	Front Openings	Seven (7)
11.	Rear Openings	None (0)
12.	Side Openings	None (0)
13.	Operation	Simplex Selective Collective Operation
14.	Controller	Control Equipment (New)
15.	Firefighter's Service	National
16.	Machine Room, Secondary, Pit	New
	Lighting and GFI	
17.	Machine Type	Gearless - New
18.	Power Drive	ACVF
19.	Machine Location	Overhead
20.	Governor	New
21.	Car Platform / Frame / Safety	Car Platform (Reuse); Car Frame (Reuse)
22.	Counterweight	Counterweight Assembly (Reuse)
23.	Counterweight Safety	N/A
24.	Guide Rails	Reuse
25.	Guides	Roller Guides (New)
26.	Buffers	Car and Counterweight Buffers (New)
27.	Buffer Ladder / Platform	New
28.	Car Door Type	
	a. Front Door	Two (2) Speed Side Opening
	b. Rear Door	N/A
	c. Side Door	N/A
29.	Car Door Size	
	a. Front Door	48" wide x 84" height
	b. Rear Door	N/A
	c. Side Door	N/A
30.	Hoistway Door Type	Two (2) Speed Side Opening
31.	Hoistway Door Size	48" wide x 84" height
32.	Master Door Operator	Car Door Zone Lock Restrictor (New)
33.	Hoistway Entrance Sills	Retain/Recondition
34.	Sill Finish	Nickel Silver (Car)
35.	Hoistway Entrances	Reuse/Recondition
36.	Tracks / Hangers / Interlocks / Closers	Interlocks / Unlocking Devices (New); Tracks / Hangers / Closers / Related Equipment (New)
37.	Emergency Access Doors	New
38.	Emergency Exits / Top and Side	New
39.	Keyed Access	New
40.	Pit Ladder	New

41.	Power Supply	480V-3-60 (field verify)
42.	Electrical Conduit / Wiring / Traveling Cable (New)	New
43.	CCTV	New
44.	Card Reader	New
45.	Floor Lockout Feature	Keyless - Card Reader Control / Wiring Provisions; Car Only
46.	Number of Push Button Risers	One (1)
47.	Inconspicuous Riser	N/A
48.	Car Operating Fixtures	New
49.	Emergency Communication	New
50.	Door Reopening Device	Door Reopening Device (New)
51.	Emergency Cab Lighting	New
52.	Car Ventilation	New
53.	Elevator Cab Enclosure	Retain/Refurbish
54.	Car Doors / Gate Panels	Car Door Panel(s) (New)
55.	Car Flooring	New
56.	Car Sill	New (Nickel silver)
57.	Platform Size	Retain/Field verify
58.	Door Operation	Power Car / Slide Hoistway
59.	Emergency Access Doors	New
60.	Intercom / Central Exchange	New

### 2.3 Traction Elevator

#### A. WSU BIO SCIENCE 5047 Gullen Mall, Detroit, MI 48202 US - Traction Elevator PE2

1.	Quantity	One (1)
2.	Type	Traction Elevator Passenger
3.	Capacity (lbs)	2500
4.	Speed (fpm)	350
5.	Travel in Feet	Existing
	a. Roping\Hoisting	New
	b. Roping\Governor	New
	c. Roping\Compensating	Not Applicable
	d. Roping\Ropes	1:1
6.	Compensation Sheave	Not Applicable
7.	Compensation	
	a. Compensation Ropes	Not Applicable
	b. Compensation Chains	Not Applicable
8.	Number of Landings	Six (6)
9.	Number of Openings	Six (6)
10.	Front Openings	Six (6)
11.	Rear Openings	None (0)
12.	Side Openings	None (0)
13.	Operation	Simplex Selective Collective Operation
14.	Controller	Control Equipment (New)
15.	Machine Room, Secondary, Pit Lighting and GFI	New

16.	Machine Type	Gearless
17.	Power Drive	ACVF
18.	Machine Location	Overhead
19.	Governor	New
20.	Car Platform / Frame / Safety	Car Frame (Reuse); Car Platform (Reuse)
21.	Counterweight	Counterweight Assembly (Reuse)
22.	Counterweight Safety	N/A
23.	Guide Rails	Reuse
24.	Guides	Roller Guides (New)
25.	Buffers	Car and Counterweight Buffers (New)
26.	Buffer Ladder / Platform	New
27.	Car Door Type	
	a. Front Door	Single Speed Center Opening
	b. Rear Door	N/A
	c. Side Door	N/A
28.	Car Door Size	
	a. Front Door	42" wide x 84" height
	b. Rear Door	N/A
	c. Side Door	N/A
29.	Hoistway Door Type	Single Speed Center Opening
30.	Hoistway Door Size	42" wide x 84" height
31.	Master Door Operator	Car Door Zone Lock Restrictor (New); Master Door Power Operator System - VVVF/AC (New)
32.	Hoistway Entrance Sills	Retain/Recondition
33.	Sill Finish	Nickle silver
34.	Hoistway Entrances	Reuse/recondition
35.	Tracks / Hangers / Interlocks / Closers	Interlocks / Unlocking Devices (New); Tracks / Hangers / Closers / Related Equipment (New)
36.	Emergency Access Doors	New
37.	Emergency Exits / Top and Side	New
38.	Keyed Access	Not Applicable
39.	Pit Ladder	New
40.	Power Supply	480V-3-60 (Field verify)
41.	Electrical Conduit / Wiring / Traveling Cable (New)	New
42.	CCTV	New
43.	Card Reader	New
44.	Floor Lockout Feature	Keyless - Card Reader Control / Wiring Provisions
45.	Number of Push Button Risers	One (1)
46.	Inconspicuous Riser	None (0)
47.	Car Operating Fixtures	New
48.	Emergency Communication	New
49.	Door Reopening Device	Door Reopening Device (New)
50.	Emergency Cab Lighting	New
51.	Car Ventilation	New
52.	Elevator Cab Enclosure	Retain/Remodel
53.		

54.	Car Doors / Gate Panels	Car Door Panel(s) (New)
55.	Car Flooring	New
56.	Car Sill	New (Nickel Silver)
57.	Platform Size	Retain (field verify)
58.	Door Operation	Power Car / Slide Hoistway
59.	Emergency Access Doors	New
60.	Intercom / Central Exchange	New

## 2.4 MANUFACTURERS

### A. Pre-Approved Equipment Manufacturers

1. The following manufacturer's equipment and materials have been pre-approved by Wayne State University for use on all their traction and hydraulic elevator modernization project.
2. Other equipment not specifically mentioned shall be considered for approval on an individual basis.
  - a. Controller - GAL (GALaxy), Elevator Controls Corporation, Smartrise
  - b. Tracks, Hangers, Interlocks and Door Operators - G.A.L., ECI.
  - c. Fixtures - Innovation, PTL, MAD.
  - d. Door Protective Device - Janus, T.L. Jones, Tri-Tronics.
  - e. Cabs and Entrances/Entrance Door Panels - Tyler, Velis, Gunderlin, Columbia Elevator Products, United Cabs.
  - f. Cab interiors refurbish/remodel – Architectural Metals, A better Elevator Co., Weir inc.
  - g. Machines - Hollister-Whitney, Titan, Imperial, Torin.
  - h. Motors - Imperial Electric, General Electric, Baldor, Reuland Electric.
  - i. SCR Power Drives - MagneTek, KEB, Nidec.
  - j. VVVF Power Drives - Mitsubishi, MagneTek, Yaskawa, TorqMax.
  - k. Guide Rails - AFD Industries, Savera, Monteferro.
  - l. Electrical Traveling Cables - Draka, James Monroe.
  - m. Hydraulic Systems/Components - Canton, Elevator Equipment Corporation, MEI, Schumacher.
  - n. Freight Doors and Systems - Courion, EMS Group, Peelle.
  - o. Guide Shoes/Rollers – ELSCO, G.A.L.
  - p. Wire Ropes - Paulsen, Bethlehem, Wayland, Draka.
  - q. Intercommunications/Telephones -K-Tec, Rath Microtec, Wurtec, Janus, Kings three.
  - r. Compensation Chains - Draka
  - s. Compensation Chain Guides - Draka
  - t. All specialized tools, equipment, software, and passwords, required to maintain, repair, adjust the operation, and perform code mandated inspections are provided to the Owner as part of the base installation.
    - 1) Updates to these items shall be available via the parts supply facility referenced above.
  - u. Technical support of the product(s) shall be available to the Owner's elevator service provider.

3. Original Equipment Manufacturers are not accepted.

## 2.5 CONTROL FEATURES / OPERATION

### A. Motion Control (New)

1. Smooth stepless acceleration and deceleration of the elevator car shall be provided in either direction of travel during both single and multiple floor runs.
2. Use digital logic to calculate optimum acceleration and deceleration patterns during each run.
3. Acceleration, deceleration, jerk, maximum velocity, leveling accuracy and elapsed flight time, for a typical elevator one (1) floor run, shall not exceed values as further specified.

### B. Simplex Selective Collective Operation (New)

1. Provide simplex selective collective operation from a riser of hall push button stations.
2. The registration of one (1) or more car calls shall dispatch the car to the selected floors.
  - a. The car shall also respond to registered hall calls in the same direction of travel.
  - b. Car and hall calls shall be canceled when answered.
3. Stops in response to calls that are registered in either the car or hall push button stations shall occur in the natural order of progression in which the floors are encountered, depending on the direction of car travel, and irrespective of the order in which calls are registered.
4. When the car has responded to the highest or lowest call, and calls are registered for the opposite direction, the car shall reverse direction automatically and respond to those registered calls.
5. When the car arrives at its last stop and reverses direction of travel, all previously registered car calls shall be automatically cancelled.
6. When the car arrives at a landing where both up and down hall calls are registered, it will answer the call in the direction of travel.
  - a. After a pre-determined delay, if no car call is registered, the car shall respond to calls registered for the opposite direction. Car doors shall close immediately, re-open and respond to the call for the opposite direction.
  - b. Hall lantern operation shall always correspond to direction of service.
7. When an empty car reverses direction at a landing with no hall calls, the doors shall not open, and the hall lantern shall not operate.
8. If the car has no car calls registered and arrives at a floor where both up and down hall calls have been registered, the car shall respond to the hall call corresponding to the last direction of car travel. If, after making its stop, a car call is not registered and no other hall calls exist ahead of the car corresponding to its original direction of travel, the doors shall close and immediately reopen in response to the hall call for the opposite direction.
9. The car shall maintain its original direction at each stop until the doors are fully closed to permit a passenger to register a car call before the car reverses its direction of travel.

### C. Independent Service Operation (New)

1. The car operating station shall be equipped with a key-operated switch labeled “IND SER”.
2. Locate the switch in the locked service compartment.
3. When placed in the “on” position the following shall occur:
  - a. Group elevator - the elevator shall bypass corridor calls and travel directly to any floor chosen by registration of a car call. Hall calls shall remain registered for service by another elevator in the group.
  - b. Simplex elevator - existing hall call registrations shall extinguish and hall buttons shall remain inoperative as an indication to passengers that there is no elevator service.
4. During Independent Service Operation, the elevator doors shall remain open at any landing until the door close or a car call push button is pressed and maintained until the doors are fully closed.
5. If more than one (1) car call is registered, all registered car calls shall extinguish when the elevator stops in response to the first call.
6. Fire Emergency Recall shall automatically override Independent Service Operation and engage Phase I - Fire Emergency Recall Operation following a period of approximately forty-five (45) seconds.

D. Inspection Service Operation (New)

1. Provide a key operated switch in the locked service panel that, when turned to the ‘ON’ position, shall cause the elevator to be removed from service and placed in Inspection Service Operation.
2. Limited operation of the car shall be provided through pressing the Attendant Service up and down push buttons (if provided) or the highest or lowest car call push buttons (if up and down buttons are not provided) in the main car operating panel only.
3. The car shall move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with both the hall and car door panels in the closed and locked position.
4. The Inspection Service switch shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. The top of the elevator car shall be equipped with a control for limited operation of the car during repairs, maintenance and inspection conducted in the hoistway. The transfer of control to the top of car operating device shall cause that device to be the sole means of control for the elevator.
  - a. Visual and audible indication shall be provided on the top of the car when Firefighters’ Emergency Operation is initiated.
6. Power door operating equipment shall be rendered inoperative while the car is being operated in the Inspection Service mode with the exception of power closing of the door. The control system shall maintain closing power on the door while the elevator is moving under Inspection Service Operation.
7. The in-car Inspection Service switch shall be rendered ineffective when the top of car inspection control is activated.
8. Machine Room Inspection Operation and Inspection Operation with open door circuits shall be provided in accordance with A17.1 Safety Code, as modified and adopted, where required or allowed by the AHJ.

E. Hoistway Access Operation (New)

1. Provisions shall be made to allow access to the hoistway through the use of hoistway access switches.
2. Operating the access switch shall permit the car to move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with the hall and car doors in the open position to obtain access to the top of the car or climb-in pit.
3. The car shall automatically stop motion when the car top is level with the hoistway door sill for access to top of car.
4. The access key switch(es) shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. Access operation shall be disabled when top of car inspection operation is in effect.

F. Overload Detection (New)

1. For service elevators, a positive means shall be provided to detect if the load in the elevator car exceeds the rated capacity of the elevator.
2. When an overload condition is detected:
  - a. The elevator doors shall remain open.
  - b. A voice notification and visual signal shall indicate that the elevator is overloaded.
3. Overload detection shall be overridden by Firefighters' Emergency Operation Phase I and Phase II.

G. Load Weighing Operation (New)

1. A positive means shall be provided to continuously monitor the amount of load being transported by the elevator car.
2. The system shall be used to:
  - a. Preload static motor drives.
  - b. Activate control features that include:
    - 1) anti-nuisance operation.
    - 2) load dispatch operation.
    - 3) load dependent non-stop operation where applicable.
3. The anti-nuisance feature shall operate at loads not exceeding 200 lbs., whereas load dispatch and load non-stop shall be set to function at sixty-five percent (65%) of the rated loading capacity for the initial set up and adjustment procedure.

H. Anti-Nuisance Operation (New)

1. In the event car loading is not commensurate with the number of car calls registered, all car calls shall be canceled.
  - a. The system shall monitor the door protection device to determine if passenger transfer has occurred.

- b. If after the third (3<sup>rd</sup>) stop a passenger transfer has not occurred, the system shall cancel all remaining registered car calls and respond to assigned hall call demand.
- c. The number of calls registered with no passenger transfer that will trigger anti-nuisance shall be adjustable and initially set to three (3) calls.

I. Out-of-Service Control Operation (New)

- 1. Provide an unidentified key-operated switch, engraved with “ON” and “OFF” only, that shall remove the elevator from service when placed in the “ON” position and the car is not in motion. Locate the switch in the service cabinet of the car operating panel.
  - a. When the key-switch is turned to the “ON” position while the elevator is in motion, the car shall proceed to the next call and be removed from service after leveling operations are completed and the doors have opened.
  - b. When engaged, the Out-of-Service Control feature shall cause the car door to remain open and the car call buttons rendered inoperative.
  - c. The elevator shall not respond to hall call assignments from dispatching systems when the Out-of-Service Control feature is active.
- 2. Firefighters’ Emergency Operation shall override this feature.

J. Firefighters’ Emergency Operation (New)

- 1. Phase I Emergency Recall Operation shall be provided for each car in accordance with ASME A17.1 code as modified under the applicable local or State law.
- 2. Each main or auxiliary car operating station shall be provided with an indicator light and warning buzzer, each of which shall become activated whenever Phase I Operation is engaged.
  - a. The warning buzzer shall cease to function once the car has completed the recall sequence and is positioned at the designated recall landing.
  - b. The indicator light shall remain illuminated as long as Phase I Operation is activated.
- 3. A three-position, key-operated switch shall be provided on the designated recall landing to manually activate Phase I Operation.
  - a. When activated, Phase I Operation shall be arranged so that in order to reset normal service, all cars must first be returned to the designated recall landing, after which the Phase I key-switch must be turned to the “OFF” position.
- 4. A standardized Fire Recall Key (FEKO1) shall be used where required by the codes and standards applicable to the AHJ.
  - a. Multiple elevators within a group or building that are not affected by the scope of work specified herein, shall be upgraded to the “Standardized Fire Recall Key”.
  - b. The “Standardized Fire Recall Key” shall apply to both Phase I and Phase II Operation.
- 5. Phase II Emergency Recall In-Car Operation shall be provided for each car in accordance with ASME A17.1 code as modified under local or State law.

6. Locate controls required for Phase II In-Car Operation in a locked access cabinet in the main car operating panel.
  - a. The cover of the locked access panel shall be engraved as required by local or State law.
  - b. The locked access panel shall contain:
    - 1) Phase II key switch.
    - 2) Fire indicator light.
    - 3) Call cancel push button.
    - 4) Door open push button.
    - 5) Door close push button.
    - 6) Run/Stop switch.
    - 7) Other devices as may be required by local law.
  - c. Engrave the Firefighters' Service operating Instructions on the inside of the locked cabinet door.

K. Floor Lockout Feature / Keyed Security Control / Car Only (New)

1. Provide a car call floor lockout feature for the elevators which will prevent registration of car calls to floors that are "locked out".
  - a. Provide a two (2) position "on-off" key switch located in the car station adjacent to each floor call button except the primary egress floor.
  - b. Turning the key switch to the "off" (locked out) position shall prevent the registration of a call when the corresponding car call button is pressed.
  - c. The key switches shall be individually keyed with a master as directed by the Owner.
2. Activation of a floor lockout key switch shall have no effect on the operation of the hall call station, i.e., the car can be called to a floor from the hall button on the floor that is locked out in the car station.
3. The "floor lockout" key switches shall be in a material and finish to match the car operating panel cover plate.
4. Firefighters' Emergency Operation shall override the car call lockout feature.
5. Provide a label on the door of the individual car controller cabinet identifying that the control system utilizes Floor Lockout Feature.
  - a. Firefighters' Emergency Operation override of Floor Lockout Feature shall be tested in accordance with applicable requirements.

L. Floor Lockout Feature / Keyless - Card Reader Control / Wiring Provisions (New)

1. Wiring: Provide eight (8) pair of 20 gauge two (2) flexible conductor low voltage cables with an overall braided shield in the traveling cable of all elevators for card reader interface.
  - a. The cables shall extend from the security interface terminal cabinet in the elevator machine room to behind the elevator return panel above the space allotted for the card reader.
  - b. Terminate the cable to dual screw barrier terminal strips on each end.

2. Card Reader Space: Allocate card reader space in each main car station as directed by the Consultant. Provide a flush Lexan lens and mounting provisions for the card reader unit which is provided by others.
3. Interface: For floor programmable card access control in all elevators, provide a pair of terminals for all floors such that application of a momentary dry (no voltage present) contact closure across those terminals by the security system shall enable the selection of the corresponding floor from the floor selector button in the elevator cab.
  - a. Locate the terminals inside an interface terminal cabinet in the elevator machine room.
  - b. Provide all relays required to interface the elevator control system to the momentary dry contact closures provided for under another section of these specifications.
  - c. If applicable, the card reader shall be operable and compatible with the issued card keys used building wide.
  - d. Coordinate system requirements with the manufacturer of the issued card key system.
4. Card Reader "Secure/Bypass" Switch: Provide separate card reader control bypass key switches for each elevator.
  - a. The bypass key switches shall be located in the interface box.
  - b. The bypass key switches shall be a maintained contact type key switch with the key removable in the secure or bypass position.
    - 1) When the key switch is in the secure position, the card reader control mode shall be initiated.
    - 2) When in the bypass position, the card reader control mode shall be bypassed and the elevator shall return to normal operation, permitting free access to any floor.
5. The card reader operation shall bypass floor cut-out switches.
6. Firefighters' Service Operation shall override Floor Lockout Feature.
7. Provide a label on the door of the individual car controller cabinet identifying that the control system utilizes Floor Lockout Feature.
  - a. Firefighters' Emergency Operation override of Floor Lockout Feature shall be tested in accordance with applicable requirements.

M. Door Operation (New)

1. Car and hoistway doors shall be arranged to operate in unison without excessive noise or slamming in either direction of travel.
  - a. Door opening speeds of two (2) feet per second shall be provided in conjunction with closing speeds of one (1) foot per second in accordance with the governing code.
  - b. Door operation shall commence as the car stops level at the floor and the machine brake is applied. Pre-door opening shall not be permitted.

2. Where the hoistway door and the car door are mechanically coupled, the kinetic energy of the closing door system shall be based upon the sum of the hoistway and the car door weights, as well as all parts rigidly connected thereto, including the rotational inertia effects of the door operator and the connecting transmission to the door panels.
3. The force necessary to prevent closing of the car and hoistway door from rest shall not exceed thirty (30) lbf. This force shall be measured on the leading edge of the door with the door at any point between one-third and two-thirds of its travel.
4. Door open and door close time shall be measured between the moment car door operation in either direction begins and the instant at which that cycle is completed.
5. When responding to either a car or corridor call, the amount of time that the elevator door remains stationary in the open position shall be adjustable up to sixty (60) seconds.
  - a. Door open dwell time for a corridor call shall be separate of that for a car call, and in both cases, dwell time shall be canceled whenever the car door protection device is momentarily interrupted by passenger transfers, followed by a reduced door open dwell time of approximately one (1) second (adjustable) after the door protection device is cleared of obstructions.
6. The operation of the door protective device by interruption of one or more infrared light beams (dual or multi-beam non-contact) during the close cycle shall cause the immediate reversing of the doors to the full open position.
7. The door closing cycle shall be arranged so that, in the event the door protective devices become continually obstructed after the normal door open dwell time has expired and following a time interval of approximately thirty (30) seconds (adjustable), a warning tone shall sound and the door closing cycle shall commence at reduced speed and torque per applicable Code requirements.
8. Each car operating station shall be provided with a “door open” and “door close” push button.
  - a. Pressure on the “door open” button shall cause doors in the full open position to remain so, and doors engaged in the close cycle to reverse direction and assume the full open position so long as pressure remains applied to the button.
  - b. The “door open” buttons shall also control the open cycle during Phase II - Emergency In-car Operation.
  - c. The “door close” push button shall function on Independent Service, Attendant Service and Phase II - Emergency In-car Operation as well as during normal automatic operations.
9. Each service elevator car operating station shall be provided with a “door hold” push button.
  - a. Pressure on the “door hold” button shall cause doors in the full open position to remain in the open position and doors operating in the close cycle to reverse direction and travel to the full open position for an extended (adjustable) period of time to allow for loading and unloading.
  - b. The “door hold” feature shall be overridden when the elevator is on Fire Emergency Phase I and Phase II.
  - c. The “door hold” feature shall be canceled when the “door close” button is pressed.

10. Repeated attempts by the power door operator to open or close the door at any landing shall be monitored by the control system.
  - a. In the event the door fails to cycle properly after a preset (adjustable) number of attempts, the car shall either travel to the next stop or remove itself from service, depending upon whether the malfunction is in the open or close cycle.
11. Each hoistway door shall be provided with an automatic self-closing mechanism arranged so that the door shall close and lock if the car should leave the landing while the hoistway door is unlocked.
12. Car doors shall be arranged to prevent their being manually opened from inside the car unless the elevator is positioned within a floor landing zone.

## 2.6 MACHINE ROOM / SECONDARY EQUIPMENT

### A. Control Equipment (New)

1. Provide a microprocessor-based elevator control system.
2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.
3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
4. System operating software shall be stored in non-volatile memory.
  - a. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, circuit boards, static motor drive units, wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.
  - b. The motor drive may be located in its own cabinet where the physical size of the drive prohibits installation within the elevator signal controller cabinet.
  - c. Mechanical ventilation of the cabinet shall be provided and shall be adequate to dispose of the full load heat losses without exceeding 40° C (104° F) ambient temperature.
    - 1) Control equipment cabinets shall be provided with forced air ventilation to prevent overheating of the electrical components housed therein.
  - d. All electrical wiring inside the control equipment cabinet shall be performed in a neat manner with field wiring terminated at stud blocks provided inside the control cabinet.
  - e. Each wiring terminal shall be clearly identified according to the nomenclature used on the “as built” wiring diagrams. No more than two (2) field wires may be connected to any single terminal stud.
  - f. Spare wires shall be tagged according to their point of termination, bundled, and placed at the bottom of the control equipment cabinet.
  - g. Each electrical component within the cabinet shall be permanently identified with symbols identical to those used on the “as-built” wiring diagrams.
  - h. A data plate that indicates the edition of the Code in effect at the time of installation and/or alteration shall be provided in accordance with applicable code and

requirements of ASME A17.1 Code. The data plate shall be in plain view and securely attached on the mainline disconnect or on the controller.

- i. Control equipment shall comply with the requirements of all applicable Sections of the ASME A17.1 Code as approved and adopted by the AHJ.
- j. The manufacturer's standard on-board "LCD" display shall be incorporated on the main processor board and/or otherwise incorporated in the controller cabinet. The "LCD" shall be capable of providing alpha-numeric characters to view the operational status of the elevator and/or group functions depending on the application. The display shall provide the user with necessary information for troubleshooting and reprogramming of the basic system parameters.
  - 1) Where the "LCD" is not an integral part of the controller and troubleshooting/reprogramming requires the use of a separate tool, the tool shall be maintained in the machine room and accessible to service personnel. This tool, along with all technical documentation for the correct use of the tool, shall remain the property of the Owner.
  - 2) Password protection of critical programming features is required to prevent accidental changes to life-safety and other non-typical control settings.
  - 3) Where a separate dispatch or group control panel is provided, a separate "LCD" display shall be provided to view group functions.
  - 4) Power for the unit shall be obtained through elevator main line feeders with voltages modified as required as part of the power-end of the controller.
  - 5) Devices necessary to obtain required power shall be provided by the controller manufacturer and no external power supplies shall be required.

B. Machine Beams (Retain Original and New where Required)

1. Provide support beams, angles, plates, bearing plates, blocking steel members to support machine, governors, dead end hitches, deflector and overhead sheaves.
2. Provide anchor bolts, templates and support beams for the machine.
3. Note the location of the structural machine beam supports and advise if the top of support is not adequate for the machine beams.
4. Fit each rope, cable and tape opening with 3" high 16-gauge minimum galvanized guard.
5. Where 2:1 roping is specified, orientate machine beams front to back as shown on the design drawings.
  - a. Provide a "fixed" 2:1 car sheave between the crosshead channels as shown on the design drawings.
  - b. Locate hoist machine in a manner to eliminate any interference with the machine room wall, and to provide proper clearances around the machines.

C. Gearless Elevator Hoisting Machine (New)

1. Provide a permanent magnet synchronous motor (PMSM) alternating current (AC) gearless traction machine, specially designed and manufactured for elevator service. The machine shall have high starting torque and low starting current, rated for 50<sup>0</sup> C (90<sup>0</sup> F) continuous operation, and a minimum of 240 starts per hour.
  - a. The traction driving sheave and brake drum shall be cast integral and bolted securely to the main armature shaft.

- b. Securely mount the machine frame, including motor fields, bearing stands and brake on a heavy steel bedplate.
- c. The armature shaft shall be supported in ball or roller type bearings.
- d. Minimum class “F” (or approved equal) insulation shall be used to ensure long-term reliability.
- e. The driving sheave shall be cast from the best grade of metal with a Brinell hardness of 215 to 230 and shall be machined with grooves, providing maximum traction with a minimum of rope and sheave wear.
  - 1) Roping requirements and type of steel rope used as suspension means shall be engineered by the contractor and manufacturer of the equipment for maximum life of ropes and sheave.
- f. Ensure that adequate ventilation of internal stator windings and rotating element is provided to prevent overheating with thermal overload protection. (Constant velocity fan for constant cooling.)
- g. Equip housing with eyebolt(s) for lifting.
- h. Provide the machine with an electro-mechanical brake.
  - 1) Brakes shall be drum or disk-type.
  - 2) The brake shall be spring applied and electrically released.
  - 3) Design the brake electro-magnet for quick release and application of the brake.
  - 4) The brake lining material shall be non-asbestos.
- i. Design the brake for quick release to provide smooth and gradual application of the brake shoes or pads.
  - 1) An emergency brake shall be an integral part of the machine design.
- j. Provide 14-gauge hoist cable guards at the car-drop and counterweight-drop side of the machine sheave.
  - 1) Guards shall cover cables from the point of slab penetration to the point where the hoist cables contact the sheave.
  - 2) Guards shall prevent access to cables at pinch points.
  - 3) Guards shall have no sharp edges.
  - 4) Guards shall be properly mounted to prevent vibration.
- k. Where feasible, provide a raised machine arrangement so that the deflector sheave is located above the machine room slab. Provide adequate steel blocking members to support the machine assembly.
  - 1) Provide service platforms, grating, handrails, ladders and required accessories to service and maintain the hoisting machines.
- l. Where a secondary level exists, span the distance between the car and counterweight with an accurately grooved deflector sheave mounted in the secondary level.
- m. Provide a sheave guard to prevent hoisting rope from jumping off grooves and to prevent possible entrapment on both sides of the floor penetrations.

- n. Design and construct the hoisting machine based on passenger elevator cab enclosure weight as specified and as shown on the architectural drawings.
- 2. Provide overhead and/or hoisting machine wire rope deflector sheave(s) with related apparatus and structural mounting supports.
  - a. Locate and size new sheave to maximize use of available clearances maintaining the present car and counterweight hitch drops.
  - b. New support bearings shall be of a roller type designed for a minimum of twice the total load calculation.
  - c. The sheaves shall be equipped with suitable lubrication devices.
  - d. The deflector sheave shall be provided with means to guard the hoist ropes, so they do not jump out of their respective grooves during a slack rope condition.
  - e. Required new mounting beams and structural supports shall be interfaced with existing building structures as may be modified under the terms of this contract for the new design rated loading where applicable.

D. Machine Brake (New)

- 1. Provide an electro-mechanical brake.
  - a. Drum or disk-type brakes shall be spring applied and electrically released.
  - b. Design the brake electro-magnet for quick release and application of brake shoes.
  - c. Swivel type brake shoes shall be applied to the braking surface (pulley or disk).
  - d. The brake lining material shall be non-asbestos and shall be attached to two (2) cast iron shoes.
  - e. The brake pulley or disk shall act as the coupling between the drive motor shaft and the worm shaft.
- 2. The brake shall be designed and adjusted to safely hold 125% of rated full load capacity in accordance with applicable code.

E. VVVF AC Drive - Regenerative Module (New)

- 1. The system shall provide full regenerative capabilities to control overhauling motor speed and reduce hoist motor deceleration time by allowing overhaul power to be discharged back into the power lines.
  - a. The regenerative section may be an integral part of the drive, or a stand-alone unit mounted in a separate cabinet with proper ventilation as required by the manufacturer.

F. Overspeed Governor (New)

- 1. Provide a speed governor, located in the machine room, to operate the car safety.
  - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
    - 1) Springs used to develop the tension are not acceptable.

- b. Provide rope grip jaws, designed to clamp the governor rope to actuate the car safety upon a predetermined overspeed downward.
  - 1) The centrifugal type governor shall trip and set rope jaws within sixty (60) degrees of governor sheave rotation after reaching rated tripping speed.
- c. Design the governor rope tripping device so that no appreciable damage to or deformation of the governor rope shall result from the stopping action of the device in operating the car safety.
- d. Provide an electrical governor overspeed protective device which shall remove power from the driving machine motor and brake before or at the application of the safety.
  - 1) The setting for the overspeed switch shall be as prescribed in the ASME A17.1 Safety Code.
  - 2) Locate and enclose the switch to ensure that excess lubrication will not enter the switch enclosure.
  - 3) Overspeed switch shall operate in both direction of travel on systems employing a static power drive unit.
- e. Seal and tag the governor with the running speed, tripping speed and date last tested.
- f. Design the governor to prevent false tripping due to conditions caused by rope dynamics.

G. Equipment Isolation (New)

- 1. Provide sound reducing vibration isolation elements at all support points of elevator controller, solid-state motor drives, isolation transformers, reactance units, hoisting motors and machines.
- 2. The elements for controllers, solid-state motor drives and isolation transformers shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries, Type ND, with 0.35" static deflection under design load ratings.
- 3. Elements between the hoisting machine unitized base and machine support beams shall be similar to triple layer ribbed neoprene pads, separated by appropriate steel shims as manufactured by Mason Industries, Type W pads, at 50 durometer, loaded for 40 psi or approved equal.
- 4. All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.
- 5. Isolation of existing hoisting machine and motor is contingent on the OEM design of the apparatus.
  - a. Existing isolation pads shall be replaced with new.

H. Overhead / and Governor Stop Switches (New)

- 1. Provide a positive action stop switch at the following locations as required by applicable code:
  - a. Overhead machine/sheave space.
  - b. Secondary level.

- c. Overhead governor access panel or space as may be mandated by the AHJ.
  - 2. The switch shall be arranged to prevent the application of power to the hoist motor and machine brake when placed in the “OFF” position.
    - a. Clearly identify the switch with permanent marking on the switch cover that indicates “RUN” and “STOP” positions.
- I. Emergency Brake (New)
- 1. Ascending Car Overspeed Protection Device
    - a. Provide a device designed to prevent an ascending elevator from striking the hoistway overhead structure.
    - b. The device shall decelerate the car with any load up to the rated capacity by applying an emergency brake.
      - 1) The device shall detect an ascending car overspeed condition of not greater than ten percent (10%) higher than the speed that the car governor is set to trip.
      - 2) The device, when activated, shall prevent operation of the car until the device is manually reset.
      - 3) The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.
  - 2. Unintended Car Movement Protection Device (New)
    - a. Provide an AHJ approved device to prevent unintended car movement away from the landing when the car and hoistway doors are not closed and locked.
      - 1) The device shall prevent such movement in the event of failure of:
        - a) The electric driving machine motor.
        - b) The brake.
        - c) The machine shaft or shaft coupling.
        - d) Machine gearing.
        - e) Control system.
        - f) Any component upon which the speed of the car depends.
        - g) Suspension ropes and the drive sheave of the traction machine are excluded.
      - 2) The device shall prevent operation of the car until the device is manually reset.
      - 3) The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.
  - 3. Where the installation of the Emergency Brake involves the raising of existing hoisting machines or modifications to the machine room slab, the contractor shall provide necessary engineering data, structural review and drawings as part of the submittal process.

J. Machine Room Guarding (New)

1. Elevator machine room equipment must be guarded as required by the Occupational Health and Safety Act.
2. The guarding must:
  - a. Meet the requirements of Occupational Health and Safety Act for Industrial Establishments Machine Guarding and Maintenance and Repairs.
  - b. Include a Professional Engineer, with the expertise and knowledge of the Occupational Health and Safety Act.
    - 1) The Professional Engineer is to review each elevator machine room equipment guarding installed.
  - c. Provide Health and Safety Review of the completed work for each elevator, signed and stamped by the Professional Engineer.
    - 1) The Health and Safety review must note the approval of the installed elevator machine room equipment guarding and certify compliance with the Occupational Health and Safety Act for Industrial Establishments
  - d. If a Ministry of Labor inspector does not approve the machine guarding as originally installed and certified by the Professional Engineer, the Contractor shall make all necessary changes to comply with the Occupational and Safety Act at no additional charge.
  - e. Meet the requirements of ASME A17.1/CSA B44 - 07 - Safety Code for Elevators and Escalators.
3. Costs associated with this work shall be included in the base lump-sum modernization price.

## 2.7 HOISTWAY EQUIPMENT (New/Reuse where required)

### A. Guide Rails / Inserts / Brackets (Reuse)

1. Car and counterweight guide rails, fishplates, rail brackets, backing support and related attachments shall be inspected to determine if unfavorable conditions exist that diminish the structural integrity of any component.
  - a. In the event substandard conditions are disclosed by means of this inspection, the Contractor shall immediately inform the Consultant as to the exact nature of said problems and then undertake whatever repairs and/or replacements the Consultant may deem appropriate to remedy the situation.
2. Each stack of guide rails shall be individually examined to determine if excessive compression has occurred from building settlement.
  - a. In the event such conditions are found to exist, each affected stack shall be cut off enough to relieve pressure.
  - b. Jacking bolts shall be provided underneath each stack of both car and counterweight guide rails.

3. Each stack of guide rails shall be realigned so that total deviation from plumb in any direction does not exceed 1/8" over the entire length of the hoistway and that DBG measurements never vary more than .030".
4. As required, car guide rails joints shall be individually filled, filed and sanded in order to eliminate minor variations in adjoining machined surfaces.

**B. Counterweight Assembly (Reuse)**

1. The existing counterweight assembly shall be refurbished to as new condition and reused.
2. Individual counterweight frame members shall be inspected for any indication of damage and to determine if the overall assembly is twisted, racked, or otherwise distorted.
  - a. All fastenings between counterweight frame members shall be individually examined, tightened and if necessary renewed.
  - b. In case any of these conditions are found to exist, the Contractor shall immediately inform the Consultant about the exact nature of the problem and undertake whatever corrective action the Consultant may deem appropriate to remedy the situation.
3. The amount of filler weight placed within the counterweight frame shall be adjusted so the weight of the entire counterweight assembly is equal to that of the renovated elevator car, plus forty to forty-two percent (40-42%) of its rated loading capacity unless otherwise required by a manufacturer where new hoisting machinery is employed.
  - a. Filler weights shall be held securely in place at all times with tie rods passing through holes in both the weights and the counterweight frame with tie rods secured on each end with double lock nut and a cotter pin arrangement.

**C. Roller Guides (New)**

1. Provide roller guide shoes with adjustable mounting base, rigidly bolted to the top and bottom of each side of the car and counterweight frame.
  - a. Roller guides shall consist of a set of sound reducing polyurethane wheels in precision bearings held in contact with the three (3) finished rail surfaces by adjustable stabilizing springs.
  - b. The bearings shall be sealed or provided with grease fittings for lubrication.
  - c. Equip roller guides with adjustable stops to control postwise float.
  - d. Fit the top car roller guides with galvanized, painted or powder coated steel guards.
2. Approved applications and manufacturers:
  - a. Geared traction elevators: ELSCO Model B for car roller guides and ELSCO Model D for counterweight guides or approved equal.
  - b. Gearless traction elevators with speeds below 1000 fpm: ELSCO Model A for car roller guides and ELSCO Model C for counterweight guides or approved equal.
  - c. Gearless traction elevators with speeds 1000 fpm and 1200 fpm: ELSCO Model Express High Speed Roller guides for car guides, ELSCO Model A for counterweight guides, or approved equal.

- d. Gearless traction elevators with speeds greater than 1200 fpm: Use 12" diameter wheels on the car roller guides and ELSCO Model A for counterweight guides or approved equal.
- 3. Roller guides shall not be installed on counterweight frames where traveling buffers with separate guide shoes are employed, and lubrication of the rails is necessary for proper guide operation.
- 4. Roller guides shall not be installed on counterweight frames where counterweight safeties are employed, and prevailing conditions prohibit installation due to limitations in clearances or in cases where rollers will interfere with the operation of the safety plank.

D. Hoist Ropes (New)

- 1. Pre-formed traction steel wire rope, specifically constructed for elevator applications, shall be provided for suspension of the elevator car and counterweight assembly.
  - a. Fastenings shall be accomplished by use of individual tapered rope sockets (wedge clamp) with adjustable shackles.
  - b. General design requirements for rope shackles and the method of securing wire rope shall conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
  - c. Properly select rope for the application and compatibility with the machine drive sheave hardness and groove profile. Design shall provide for a minimum service life of ten (10) years and shall be substantiated by calculations during the submittal phase.
- 2. New ropes shall be identical in number and construction to those which are currently in use.
- 3. Broken rope shackle springs shall be replaced on an as needed basis.
- 4. New rope shackles shall be provided.
- 5. Existing hitch plates shall be inspected for wear. Hitch plates with elongated holes or other conditions that may damage shackles shall be replaced with new.
- 6. Provide anti-spinout as required by applicable code at all shackles where applicable.

E. Governor Rope (New)

- 1. Pre-formed wire rope specifically constructed for elevator applications, shall be provided for governor ropes.
  - a. Rope shall be traction steel or iron in accordance with OEM design requirements.
  - b. Rope diameter and method of fastening shall be in accordance with ASME A17.1 Safety Code as adopted and/or otherwise modified by the AHJ.

F. Compensation Chain (New)

- 1. Provide vinyl encapsulated compensating chain.
  - a. The quantity and size of the chains shall be calculated in accordance with the manufacturer's guidelines based upon the number, diameter and construction of hoist cables being used.

- b. Final attachment of each compensating chain underneath the car and counterweight frame shall be accomplished by means of 'U-bolts'.
  - c. Intermediate support for each chain shall be provided 24" to 39" from the point of final attachment underneath the elevator car by use of an S-hook and separate U-bolt.
    - 1) Arrange compensation attachment points to maintain recommended loop dimension established by the compensation manufacturers.
  - d. Provide a guidance system designed to prevent cable sway.
  - e. The use of a single compensating chain if not centered on the car and counterweight is unacceptable.
2. Provide manually reset electric switch to monitor each compensating chain connection at the elevator platform which shall stop the elevator immediately upon failure of one or more of the "S" hooks.

G. Electrical Conduit / Wiring / Traveling Cable (New)

- 1. Electrical wiring shall be provided.
  - a. All wiring shall be stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
  - b. Electrical wiring provided for hoistway interlock shall be of a flame-retardant type, capable of withstanding temperatures of at least 392 degrees Fahrenheit. Conductors shall be Type SF or equivalent.
  - c. Each run of electrical conduit or duct shall contain no less than ten percent (10%) spare wires and, in any case, no fewer than two (2) spare wires.
  - d. Crimp-on type wire terminals shall be used where possible.
- 2. Traveling cable shall be provided.
  - a. Each traveling cable shall be provided with a flame- and water-resistant polyvinyl chloride jacket.
  - b. Electrical wiring shall consist of stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
  - c. Each traveling cable shall contain no less than ten percent (10%) spare wires.
  - d. Traveling cable exceeding 100' in length shall be provided with a steel wire rope support strand from which the cable shall be suspended.
  - e. Traveling cable must be contained within an approved electrical conduit to within 6' of the final suspension point in the hoistway.
  - f. Each traveling cable shall be arranged to provide no fewer than six (6) individually shielded pairs of 20-gauge wire and arranged to contain no less than one (1) coaxial cable for CCTV remote monitoring.
  - g. Traveling cable conductors that terminate at a hoistway center box shall be connected to stud blocks provided for that purpose.

- 1) Each wiring terminal shall be clearly identified by its nomenclature as shown on the “as built” wiring diagrams and solderless, crimp-on type wire terminals shall be used where possible.
- h. The attachment of a traveling cable to the underside of the elevator car shall be performed so that a minimum loop diameter of thirty times (30x) the cable diameter is provided.
- i. Pre-hang the cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting during operation.
3. Rigidly supported EMT conduit, flexible metal conduit and galvanized steel trough shall be utilized throughout the hoistway.
  - a. Both EMT and flexible conduit shall be connected on either end by use of compression fittings and secured in place with metal clamps sized in accordance with the diameter of conduit utilized.
    - 1) Wire or plastic wire ty-raps shall not constitute an acceptable means of fastening.
  - b. The use of flexible metal conduit shall be limited to runs not greater than three feet (3') in length.
  - c. All abandoned or unused electrical conduit shall be removed from the hoistway.
  - d. Existing conduit and wiring duct may be reused if suitable for the application.
    - 1) Reuse of existing conduit/duct shall be at the discretion of the Consultant.

#### H. Normal and Final Terminal Stopping Devices (New)

1. Provide normal terminal stopping devices to stop the car automatically from any speed obtained under normal operation within the top and bottom overtravel, independent of the operating devices, final terminal stopping device and the buffers.
2. Provide final terminal stopping devices to stop the car automatically from the speed specified within the top clearance and bottom overtravel.
3. The terminal stopping devices shall have rollers with rubber or other approved composition tread to provide silent operation when actuated by the cam fixed to the top of the car.
  - a. Terminal stopping devices that are not mechanically operated (i.e.: magnetic proximity) shall be provided by the manufacturer of the control equipment, intended for use as a terminal limit, and designed for reliable operation in the hoistway environment.
4. Final terminal limits shall be pinned so as to prevent movement after final adjustment where required by the AHJ.

#### I. Normal and Final Terminal Stopping Devices (New)

1. Provide necessary new normal terminal stopping devices to stop the car automatically from any speed obtained under normal operation within the top and bottom overtravel independent of the operating devices, final terminal stopping device and the buffers.

2. Provide necessary new final terminal stopping devices to stop the car and counterweight automatically from the speed specified within the top clearance and bottom overtravel.
3. The terminal stopping devices shall have rollers with rubber or other approved composition tread to provide silent operation when actuated by the cam fixed to the top of the elevator.
  - a. New terminal stopping devices that are not mechanically operated (i.e.: magnetic proximity) shall be provided by the manufacturer of the control equipment, intended for use as a terminal limit, and designed for reliable operation in the hoistway environment.
4. When conditions warrant or code requires relocation of apparatus for actual clearances, perform modifications applicable.
5. Final terminal limits shall be pinned so as to prevent movement after final adjustment where required by the AHJ.

J. Emergency Terminal Speed Limiting Device (New)

1. Provide necessary emergency terminal speed limiting devices where reduced stroke buffers are used.
  - a. Operation of the device shall be independent of the operation of the normal terminal stopping device.
  - b. Arrange the device to automatically reduce the car and counterweight speed by removing power from the driving machine motor and brake so that the rated striking speed of the buffer is not exceeded at the time of impact.
  - c. The sensing device shall be independent of the normal speed control system.
  - d. Short circuits caused by grounds or other conditions shall not prevent the operation of the device.

K. Emergency Terminal Stopping Device (New)

1. Provide necessary emergency terminal stopping devices where static motor control is used at speeds over 200 feet per minute.
  - a. Operation of the device shall be independent of the operation of the normal terminal stopping device.
  - b. Arrange the device to remove power from the driving machine motor and brake should the normal terminal stopping device fail to cause the car to slow down at the terminal as intended.

2.8 PIT EQUIPMENT (New)

A. Car and Counterweight Buffers (New)

1. Provide buffer with necessary blocking and horizontal steel braces under the car and counterweight.
2. Provide spring type buffers for elevators with operating speeds of up to and including 200 fpm.
3. Use oil buffers for elevators with operating speeds over 200 fpm.

4. Oil buffer shall bring the car and counterweight to rest from governor tripping speed at an average rate of retardation not exceeding gravity (32 ft/s<sup>2</sup>).
5. Oil buffer shall be of the spring return type and shall have means of checking oil supply level.
6. Use reduced stroke buffer with associated terminal slowdown devices where runby is restrictive.
  - a. Buffer and emergency terminal slowdown device shall operate in accordance with applicable codes.
7. The buffer shall be tested and approved by a qualified testing laboratory.
8. Provide a permanent buffer marking plate which indicates the manufacturer's name, identification number, rated impact speed and stroke.
9. Provide a permanent data plate in the vicinity of the counterweight buffer indicating the maximum designed counterweight runby.
10. Support buffers from the pit floor level with all required blocking and bracing steel members.
11. Coordinate the installation of the buffer inspection platform and ladder with the Architect and Construction Manager.

B. Inspection Platforms, Ladders, Guard Rails, Screens and Guards (New)

1. Where required provide the following secondary metal work in the pit, hoistway and in elevator machine room in accordance with bid documents.
  - a. Wire mesh separator screen between two (2) adjacent elevator pits located at different elevations.
  - b. Counterweight shall be guarded by means of a fixed screen from the pit floor to a position of at least 2450 mm (96") above pit floor.
  - c. Pit access ladders.
  - d. Buffer inspection platforms and ladders.
  - e. Guard rails and sixty (60) degree ships ladders in machine room.
  - f. Guard around machine, ropes and rope holes.
2. Submit detailed shop drawings of all miscellaneous metal items for Consultant's approval.
3. Provide painted sheet steel covers for all dead-end hitches.
4. The pit ladder shall have continuous steel flat bar side rails 12 mm (1/2") x 75 mm (3"), with eased edges, spaced a minimum of 400 mm (16") apart. Rungs shall be steel bars 18 mm (3/4") in diameter, spaced 300 mm (12") apart with top to have a non-slip surface. Rungs shall be located along centerline of side rails, located not less than 180 mm (7") from the nearest permanent object or structure. Plug weld and grind smooth on outer rails faces. Support each ladder at top and bottom and at intermediate points spaced not more than 1500 mm (60"). Extend side rails 1200 mm (48") above top rung.
5. Prime paint and apply two (2) coats of rust inhibiting machinery enamel to metal work specified above as approved by the Consultant.

C. Governor Rope Tension Assembly (New)

1. Provide a governor rope tension assembly.

- a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
  - 1) Springs used to develop the tension are not acceptable.
- b. The sheave shall be of proper diameter and set directly plumb with the governor rope drop to prevent the rope from pulling off of the sheave at an angle.
- c. Lubrication fittings shall be provided on the assembly.
- d. The assembly shall have necessary rope guards to prevent accidental contact of the rope/sheave by service personnel and to prevent the governor rope from jumping off of the sheave.

D. Pit Stop Switch (New)

- 1. Where pit depth does not exceed 67", each elevator pit shall be provided with a push/pull or toggle switch that is conspicuously designated "EMERGENCY STOP" and located so as to be readily accessible from the hoistway entrance on the lowest landing served at a height of approximately 18" above the floor.
  - a. This switch shall be arranged to prevent the application of power to the hoist motor and machine brake when placed in the "OFF" position.
- 2. Where climb-in pit depth exceeds 67", each pit shall be provided with two (2) push/pull or toggle switches conspicuously designated "EMERGENCY STOP".
  - a. Both of these stop switches shall be located immediately adjacent to the pit access ladder.
    - 1) Place one stop switch approximately 47" above the pit floor.
    - 2) Place the second stop switch 18" above the hoistway entrance sill on the lowest landing served.
    - 3) These switches shall be arranged so as to prevent the application of power to the hoist motor or machine brake when either one is placed in the "OFF" position.
- 3. Where a walk-in pit exists, each elevator shall be provided with a push/pull or toggle switch that is conspicuously numbered and designated "EMERGENCY STOP".
  - a. The location of this stop switch shall be approximately 47" above the pit floor at the nearest point of pit entry from the access door.
  - b. This switch shall be arranged so as to prevent the application of power to the hoist motor and machine brake when placed in the "OFF" position.
- 4. Provide an electric contact safety switch for the pit access door if any equipment attached to the car extends within the space of the hoistway pit when the car is level at the bottom terminal landing.
  - a. Opening the pit access door shall cause the electric contact switch to stop the elevator by interrupting electric power to the driving machine and brake.

- b. Provide a sign on the pit door **“WARNING – OPENING OF PIT DOOR WILL STOP ELEVATOR”** using lettering a minimum of two (2) inches high.
5. Existing stop and/or pit door switch conforming to the requirements set forth herein may be refurbished to as new condition and reused subject to approval of the Consultant.

## 2.9 HOISTWAY ENTRANCES (Retain/Recondition)

### A. Hoistway Entrances (Reuse)

- 1. Hoistway entrance sills, sill supports, entrance frames, headers and header supports shall be reused and refurbished.
  - a. Hoistway entrances that have become distorted or bent shall be straightened, plumbed, reset to the proper width dimension and reinforced, as necessary.
  - b. Provide 14-gauge steel fascia plates that extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
    - 1) Reinforce fascia to allow not more than ½” of deflection.
    - 2) Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.
  - c. Provide 14-gauge steel toe guards that extend 12” below any sill not protected by fascia.
    - 1) The toe guards shall extend the full width of the door and shall return to the hoistway wall at a fifteen (15) degree angle and be firmly fastened.
  - d. Remove oil, dirt and impurities on new and existing apparatus and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.

### B. Slide Type Hoistway Door / New in Existing Frame (New)

- 1. Provide a new elevator hoistway entrance door reusing existing entrance frame.
- 2. Each new door shall be as follows:
  - a. Hollow metal construction.
  - b. 1-1/2-hour fire-rated test approved with required label.
  - c. Manufactured of cold rolled furniture steel.
  - d. Flush design both sides.
  - e. Rigidly reinforced.
  - f. Sound deadened.
- 3. Where conditions warrant, and where otherwise required by code, equip all hoistway landing doors with one (1) piece full height non-vision wings of material and finish to match hall side of door panels.

4. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in existing sill grooves with a minimum clearance.
  - a. The guide mounting shall permit their replacement without removing the door from the hangers.
  - b. A steel fire stop shall be enclosed in each guide.
5. Provide the meeting edge of center opening doors with necessary new continuous rubber astragal bumper strips.
  - a. Astragal shall be relatively inconspicuous when the doors are closed.
  - b. Provide rubber bumpers at the top and bottom of each section of door to stop them at their limit of travel in the opening direction.
6. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
7. Provide a special key so that an authorized person can open any landing door when the car is elsewhere.
  - a. The keyhole shall be not less than 3/8" in diameter and shall be fitted with a stainless steel or bronze ferrule to match related equipment.
8. Finish all door panels to match elevator entrances or stainless-steel brush No. 4 finish Approval by Owner/Consultant.
9. Where conditions require, provide necessary new masonry around existing entrance frames to maintain fire rating. Painting or other wall surface decorating will be by Others.

C. Tracks / Hangers / Closers / Related Equipment (New)

1. Formed or extruded steel landing door hanger tracks shall be provided.
2. Each landing door panel shall be suspended from a pair of door hanger assemblies that are compatible with the hanger tracks.
  - a. Hanger assemblies shall be directly mounted to the door panel using 3/8" diameter or better hardware.
  - b. Solid steel blocks shall be used where job-site conditions dictate the use of spacers between hanger assemblies and the landing door panel.
  - c. Hanger assemblies shall be adjusted or shimmed so that door panels are suspended in a plumb manner with no more than 3/8" vertical clearance to the cab entrance threshold.
  - d. Upthrust rollers shall be adjusted for minimal operating clearance against the bottom edge of the hanger track.
  - e. Means shall be provided to prevent hangers from jumping the track.
  - f. Blocks shall be provided to prevent rollers from overrunning the end of the track.
3. Each set of center opening landing doors shall be provided with a cable driven relating mechanism which is compatible for use with the door hanger assemblies.
  - a. The relating mechanism shall be properly tensioned and adjusted so as to equalize the relationship between the door panels and the hoistway entrance.

4. Each set of multi-speed center opening, or side slide landing doors shall be provided with a sill-mounted spring closing mechanism with necessary door panel relating hardware.
5. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
6. Each set of single speed side slide landing doors shall be provided with a sill-mounted spring closing mechanism.
  - a. Spirator-type spring closers shall be acceptable should prevailing sill depth or runby clearance conditions require their use.
7. Where applicable, each hoistway door interlock assembly shall be provided with an emergency release mechanism utilizing manufacturers' standard type access key at all landings served.
  - a. Drill each hoistway door to accommodate manufacturers standard lock release key and install escutcheon.
    - 1) Escutcheon shall be brushed stainless steel to match door panels where required.
    - 2) Aluminum shall be provided at all other typical floors.
8. Where multi-speed side slide door panels exist, provide a secondary interlocking device that will prevent separation of the panels should the sill closer or relating cable(s) fail.

D. Interlocks / Unlocking Devices (New)

1. Each set of landing doors shall be provided with a complete electromechanical interlock assembly.
  - a. Each interlock assembly shall consist of:
    - 1) A switch housing with contacts.
    - 2) Lock keeper.
    - 3) Clutch engagement/release subassembly.
    - 4) Associated linkages.
  - b. Arrange the lock so that individual leading door panels (side slide or center opening) are locked when in the closed position.
2. Non-typical mounting arrangements for interlocks and/or related mechanisms must receive prior approval from the Consultant.
3. Each hoistway door interlock assembly shall be provided with an emergency release mechanism utilizing a drop-leaf type access key at all landings served.
  - a. Each hoistway door shall accommodate manufacturers standard lock release key with escutcheon.
    - 1) The keyhole shall be fitted with a metal ferrule that matches the door finish.
    - 2) "Plugging" of nonoperational keyholes shall be performed.
    - 3) Drilling key holes in the field will not be accepted.

E. Hoistway Door Bottom Guides / Safety Retainers (New)

1. The bottom of each side sliding type hoistway door panel shall be equipped with a minimum of two (2) guiding members.
  - a. Metal mounting angles shall be secured to the integral panel frame structure; and when conditions warrant, additional external metal support plates or angles shall be installed to ensure the integrity of the panel frame is not compromised.
  - b. Guides shall be manufactured of low friction non-metal material with sufficient strength to withstand forces placed on door panels per ASME A17.1 Standards.
  - c. Each guide assembly shall incorporate a steel wear indicator and be so designed to permit sliding member replacements without removal of door panel(s) from top hanger devices.
  - d. Panels shall be hung with a maximum vertical clearance of 3/8 inch between top of sill and bottom of panel and the guide shall engage the sill groove by not less than 1/4 inch.
2. The bottom of each side sliding type hoistway door panel shall be equipped with a guiding member safety retainer to prevent displacement in the event of primary guide means failure.
  - a. A metal reinforcement (12 gauge stainless or galvanized steel) shall be installed between the two (2) primary guiding members (a.k.a. "Z" bracket).
  - b. The reinforcement shall be designed with a minimum length of eight (8) inches or the maximum possible length that will fit between the primary members and a minimum overall height of two and one-half (2.5) inches secured on the internal face of the door panel. (Hoistway side)
  - c. The retainer shall be set with the supplemental safety angle 3/8 inch into the corresponding sill groove; and be capable of preventing displacement of the panel no more than 3/4 inch with an applied force of 1125 lbf at right angles over an area twelve (12) inches x twelve (12) inches at the approximate center of the door panel.

2.10 CAR EQUIPMENT / FRAME

A. Car Frame (Reuse)

1. The existing car frame assembly shall be refurbished to as new condition and reused.
2. Individual car frame members, platform isolation framework, door operator support structure, related bracing, and hardware shall be inspected for any indication of damage or distortion.
  - a. Where damage is detected, the Contractor shall immediately inform the Consultant and then undertake corrective action deemed appropriate by the Consultant to remedy the condition.
3. Provide new elastomer isolation pads for all existing platforms where pads are presently installed.

4. The car frame, door operator support and related bracing shall be modified or reconfigured as necessary in order to accommodate new cab enclosure and/or master door operating equipment specified herein.
5. The elevator car shall undergo static balancing upon substantial completion of all work described in the project specifications and subsequent to any car interior refinishing or cab replacement work performed in conjunction with the project.

B. Car Platform (Reuse)

1. The existing platform shall be modified to accommodate the new apparatus specified herein.
  - a. Where necessary, the underside of platform shall be refurbished and treated with fire-rated material.
  - b. Top of platform shall be refurbished with a marine grade plywood set to receive new finished floor covering as selected by Owner.
  - c. Where necessary, provide a new safety access hole ring and cover assembly to match selected cab finishes.
  - d. At Contractor's option or when conditions warrant, provide a totally new platform in lieu of repairs, modifications and upgraded specified above.

C. Car Safety (Reuse)

1. The existing governor actuated car safety device shall be retained, overhauled and upgraded for current code compliance.
2. Readjust safety for proper operation in accordance with current ASME A17.1 design standards.
3. Check the existing safety operated switch (plank-switch) for proper adjustment and operation.
  - a. Provide a new plank-switch where none currently exists.
4. A new safety shall be provided where the existing is not suitable for reuse due to overall condition or in conjunction with an increase in the elevator speed or full load capacity.

D. Automatic Leveling / Releveling / Positioning Device (New)

1. Equip the elevator with a floor leveling device which shall automatically bring the car to a stop within 1/4" of any floor for which a stop has been initiated regardless of load or direction of travel.
2. This device shall also provide for releveling which shall be arranged to automatically return the elevator to the floor in the event the elevator should move below or above floor level in excess of 1/4".
3. This device shall be operative at all floors served and whether the hoistway or car door is open or closed provided there is no interruption of power to the elevator.
4. A positioning device shall be part of the controller microprocessor systems.
  - a. Position determination in the hoistway may be through fixed tape in the hoistway or by sensors fitted on each driving machine to encode and store car movement.

- b. Design the mechanical features and electrical circuits to permit accurate control and rapid acceleration and retardation without discomfort.
  - 5. Where there are consecutive floors/stops that are short stops, the system shall be capable of distinguishing between the two (2) landing zones without error.
  - 6. All equipment and logic required for leveling system to properly function with short stops shall be included.
- E. Top-of-Car Inspection Operating Station (New)
- 1. An inspection operating station shall be provided on top of the elevator car.
  - 2. This station shall be installed so that the controls are plainly visible and readily accessible from the hoistway entrance without stepping on the car.
  - 3. When the station is operational, all operating devices in the car shall be inoperative.
  - 4. Provide the following control devices and features:
    - a. A push/pull or toggle switch designated “EMERGENCY STOP” shall be arranged so as to prevent the application of power to the hoist motor or machine brake when in the “off” position.
    - b. A toggle switch designated “INSPECTION” and “NORMAL” to activate the top of car Inspection Service Operation.
    - c. Push button designated “Up”, “Down” and “Enable” to operate the elevator on Inspection Service (the “Enable” button shall be arranged to operate in conjunction with either the “Up” or “Down” button).
    - d. An indicator light and warning buzzer that are subject to activation under Phase I - Fire Emergency Recall Operation.
- F. Load Weighing Device (New)
- 1. Provide means to measure the load in the car within an accuracy of  $\pm 4\%$  of the elevator capacity.
  - 2. Provide one of the following types of devices:
    - a. A device consisting of four (4) strain gauge load cells located at each corner of the car platform and supporting a free-floating car platform and cab with summing circuits to calculate the actual load under varying conditions of eccentric loading.
    - b. A strain gauge device located on the crosshead, arranged to measure the deflection of the crosshead and thus determine the load in the car.
    - c. A device consisting of four (4) strain gauge load cells, supporting the weight of the elevator machine with summing circuits to calculate the actual load under varying conditions of load.
    - d. A device to measure the tension in the elevator hoist ropes and thus determine the load in the car.
  - 3. Arrange that the output signal from the load weighing device be connected as an input to the signal and motor control systems to pre-torque of the hoisting machine motors where applicable.
  - 4. Provide audible and visual signals in connection with the load weighing device when used as an “overload” device.

G. Car Enclosure Work Light / Receptacle (New)

1. The top and bottom of each car shall be provided with a permanent lighting fixture and 110-volt GFI receptacle.
2. Light control switches shall be located for easy accessibility from the hoistway entrance.
3. Where sufficient overhead clearance exists, the car top lighting fixture shall be extended no less than 24" above the crosshead member of the car frame.
4. Light bulbs shall be guarded so as to prevent breakage or accidental contact.

H. Emergency Exits / Top (Retain)

1. Ensure they operate as per code and have proper electrical contacts and mechanical locks on the exterior of the cab enclosure.
2. No other key to the building shall unlock the emergency exit lock except access switch keys which may be keyed alike.
  - a. Keys shall be assigned in accordance with ASME A17.1 Group 1 Security requirements.

I. Master Door Power Operator System – VVVF/AC (New)

1. Provide a heavy-duty master door operator on top of the elevator car enclosure for power opening and closing of the cab and hoistway entrance door panels.
2. The operator may be of the pivot/lever or belted linear drive type.
3. Operator shall utilize an alternating current motor, controlled by a variable voltage, variable frequency (VVVF) drive and a closed-loop control with programmable operating parameters.
  - a. System may incorporate an encoder feedback to monitor positions with a separate speed sensing device or an encoderless closed-loop VVVF-AC control to monitor motor parameters and vary power applied to compensate for load changes.
4. The type of system shall be designated as a high-speed operator, designed for door panel opening at an average speed of two (2.0) feet per second and closing at approximately one (1.0) foot per second.
  - a. Reduce the closing speed as required to limit kinetic energy of closing doors to within values permitted by ASME A17.1 as may be adopted and/or modified by the AHJ.
5. The door shall operate smoothly without a slam or abrupt motion in both the opening and closing cycle directions.
  - a. Provide controls to automatically compensate for load changes such as:
    - 1) Wind conditions (stack effect).
    - 2) Use of different weight door panels on multiple landings.
    - 3) Other unique prevailing conditions that could cause variations in operational speeds.

- b. Provide nudging to limit speed and torque in conjunction with door close signaling/closing and timing devices as permitted by ASME A17.1 as may be adopted and/or modified by the AHJ. Nudging shall be initiated by the signal control system and not from the door protective device.
  - 6. In case of interruption or failure of electric power from any cause, the door operating mechanism shall be so designed that it shall permit emergency manual operation of both the car and corridor doors only when the elevator is located in the floor landing unlocking zone.
    - a. The hoistway door shall continue to be self-locking and self-closing during emergency operation.
    - b. The door operator and/or car door panel shall be equipped with safety switches and electrical controls to prevent operation of the elevator with the door in the open position as per ASME A17.1 Code Standards.
    - c. Provide zone-lock devices as required by ASME A17.1 as may be adopted and/or otherwise modified by the AHJ.
  - 7. Construct all door operating levers of heavy steel or reinforced extruded aluminum members.
  - 8. Belts shall be designed for long life and operate noise free.
  - 9. All components shall be designed for stress and forces imposed on the related parts, linkages and fixed components during normal and emergency operation functions.
    - a. All pivot points, pulleys and motors shall have either ball or roller-type bearings, oilite bronze bushings or other non-metallic bushings of ample size.
  - 10. Provide operating data / data tag permanently attached to the operator as required by applicable code and standards.
- J. Car Door Zone Lock Restrictor (New)
- 1. Retrofit the existing car door operator to incorporate a car door zone lock restrictor.
  - 2. In case of interruption or failure of electric power from any cause, the door operating mechanism shall permit emergency manual operation of both the car door and the hoistway door within the floor landing zone.
    - a. The hoistway door shall continue to be self-locking and self-closing.
    - b. The door operator shall operate in conjunction with or be equipped with all gate switches and safety contacts required by ASME A17.1 Code.
- K. Car Door Hangers / Tracks / Gate Switch (New)
- 1. Provide sheave type two-point suspension hangers and track for each car door.
    - a. Sheaves shall be hardened steel, not less than 3-1/4 inches in diameter with sealed grease packed precision ball bearings.
    - b. The upthrust shall be taken by a roller mounted on the hanger and arranged to ride on the underside of the track.

2. The track shall be of formed cold rolled steel or cold drawn steel and shall be rounded on the track surface to receive the hanger sheaves.
  - a. The track shall be removable and shall not be integral with the header.
3. Provide a gate switch that mounts directly to the car door track.
  - a. The gate switch shall prevent movement of the elevator until such time as it signals the control equipment that the car door has physically closed.

L. Car Door Panel(s) (New)

1. Provide standard 1" thick, 14-gauge hollow metal flush construction panel(s), reinforced for power operation and insulated for sound deadening.
2. Paint the hoistway side of each panel black and face the cab side with 16-gauge sheet steel matching the existing returns or in selected material and finish as otherwise directed by Owner/Architect.
3. The panels shall have no binder angles and welds shall be continuous, ground smooth and invisible.
4. Drill and reinforce panels for installation of door operator hardware, door protective device, door gibs, etc.
  - a. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in the sill grooves with minimum clearance.
  - b. The guide mounting shall permit their replacement without removing the door from the hangers.
5. Provide the meeting edge of center opening doors with necessary continuous rubber astragal bumper strips.
  - a. These strips shall be relatively inconspicuous when the doors are closed.

M. Door Reopening Device (New)

1. Provide an infrared curtain door protection system.
2. The door shall be prevented from closing and reopen when closing if a person interrupts any one of the light rays.
3. The door shall start to close when the protection system is free of any obstruction.
4. The infrared curtain protective system shall provide:
  - a. Protective field not less than 71" above the sill.
  - b. Where a horizontal infrared light beam system is used:
    - 1) A minimum of forty-seven (47) light beams.
    - 2) Accurately positioned infrared lights to conform to the requirements of the applicable handicapped code.
  - c. Modular design to permit on board test operation and replacement of all circuit boards without removing the complete unit.
  - d. Controls to shut down the elevator when the unit fails to operate properly.

5. Existing infrared door protection systems, designed in accordance with the criteria specified herein, may be retained and refurbished for new subject to the Consultant's review and approval.

## 2.11 FINISH / MATERIALS / SIGNAGE

### A. Material, Finishes and Painting

#### 1. General

- a. Cold-rolled Sheet Steel Sections: ASTM A366, commercial steel, Type B
- b. Rolled Steel Floor Plate: ASTM A786
- c. Steel Supports and Reinforcement: ASTM A36
- d. Aluminum-alloy Rolled Tread Plate: ASTM B632
- e. Aluminum Plate: ASTM B209
- f. Stainless Steel: ASTM A167 Type 302, 304 or 316
- g. Stainless Steel Bars and Shapes: ASTM A276
- h. Stainless Steel Tubes: ASTM A269
- i. Aluminum Extrusions: ASTM B221
- j. Nickel Silver Extrusions: ASTM B155
- k. Bronze Sheet: ASTM B36(36M) alloy UNS No. C2800 (Muntz Metal)
- l. Structural Tubing: ASTM A500
- m. Bolts, Nuts and Washers: ASTM A325 and A490
- n. Laminated / Safety Tempered Glass: ANSI Z97.1

#### 2. Finishes

##### a. Stainless Steel

- 1) Satin Finish: No. 4 satin, long grain.
- 2) Mirror Finish: No. 8 non-directional mirror polished.

##### b. Sheet Steel:

- 1) Shop Prime: Factory-applied baked on coat of mineral filler and primer.
- 2) Finish Paint: Two (2) coats of low sheen baked enamel; color as selected by the Architect.
- 3) Steel Equipment: Two (2) coats of manufacturer's standard rust-inhibiting paint to exposed ferrous metal surfaces in both the hoistway and pit that do not have galvanized, anodized, baked enamel, or special architectural finishes.

#### 3. Painting

- a. Apply two (2) coats of paint to the machine room floor.
- b. Apply two (2) coats of clear lacquer to bronze or similar non-ferrous materials to prevent tarnishing during a period of not less than twelve (12) months after initial acceptance by the Owner or Agent.

- c. Identify all equipment including buffers, car apron, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
- d. Paint or provide decal-type floor designation not less than four (4) inches high on hoistway doors (hoistway side), fascias and/or walls as required by A17.1 as may be adopted and/or modified by the AHJ. The color of paint used shall contrast with the color of the surface to which it is applied.

B. Car Interior Finishes

- 1. Car interior finishes shall be as selected by Owner and/or Architect.
- 2. Contractor shall provide samples of finishes as required for approval prior to fabrication.
- 3. Refer to specifications for other design requirements where provided.
- 4. Special attention shall be given to flooring materials and suitability for intended duty.

C. Designation and Data Plates, Labeling and Signage.

- 1. Provide an elevator identification plate on or adjacent to each entrance frame where required by the AHJ.
  - a. The designation numeral shall be a minimum of 3" in height.
  - b. The sign shall be located on or adjacent to the Firefighters' Emergency Phase I key switch located at the designated landing.
  - c. Lettering must be a minimum of 6 mm (0.25 in) high in red or a color contrasting with a red background.
- 2. Provide floor designation cast plates at each elevator entrance, on both sides of the jamb at a height of sixty (60) inches to the baseline of floor indication.
  - a. Floor number designations and Braille shall be 2" high, 0.03" raised and stud mounted.
- 3. If required identify the designated medical emergency services elevator with 3" high international symbol at each elevator entrance on both sides of the jamb.
- 4. Provide raised designations and Braille markings to the left of the car call and control buttons of the car operating panel(s).
  - a. Designations shall be a minimum of 5/8" high, 0.03" raised and stud mounted. Provide white characters on a black background
- 5. Provide elevators with data and marking plates, labels, signages and refuge space markings complying with A17.1 Elevator Safety Code as may be adopted and/or otherwise modified by the AHJ.
- 6. Architect shall select the designation and data plates from manufacturer's premium line of plates.

2.12 FIXTURES / SIGNAL EQUIPMENT (New)

A. General - Design and Finish

1. The design and location of the hall and car operating and signaling fixtures shall comply with the ADAAG and local requirements of the AHJ.
2. The operating fixtures shall be selected from the manufacturer's premium line of fixtures.
3. Custom designed operating and signaling fixtures shall be as shown on the drawings or as approved by the Owner .
4. The layout of the fixtures including all associated signage and engraving shall be as approved by the Owner .
5. Where no special design is shown on the drawings, the buttons shall be as follows:
  - a. Stainless steel type as selected by the Owner from the manufacturer's premium line of push buttons.
  - b. The button shall have a collar/ round indicator outside the button with LED call registered light.
6. Where no special design is shown on the drawings, the faceplates shall be as follows:
  - a. Passenger Elevators
    - 1) Ground Floor: stainless steel faceplate with No. 4 finish.
    - 2) Typical Floors: 1/8" thick stainless-steel faceplate with No. 4 finish.
  - b. Service Elevators
    - 1) All Floors - 1/8" thick stainless steel with No. 4 finish and tamperproof screws.
7. Mount passenger elevator fixtures with tamperproof fasteners and service elevator fixtures with tamperproof screws. The screw/fastener and key switch cylinder finishes shall match faceplate finish.
8. Where key-operated switch and or key operated cylinder locks are furnished in conjunction with any component of the installation, four (4) keys for each individual switch or lock shall be furnished, stamped or permanently tagged to indicate function.
9. All caution signs, pictographs, code mandated instructions and directives shall be engraved and filled with epoxy in code required colors.

B. Main Car Operating Panel (New)

1. Provide a main car operating push button panel on the inside front return panel of the car
2. Car operating panel shall be flush mounted with swing type, one (1) piece faceplate with heavy-duty concealed hinges.
  - a. Mount all key switches that are required to operate and maintain the elevators exposed on the car station except those specified within a locked service cabinet.
3. The push buttons shall become individually illuminated as they are pressed and shall extinguish as the calls are answered.
4. The operating panel shall include:

- a. A call button for each floor served, located not more than 48" above the cab floor.
  - b. "Door open" / "Door close" buttons.
  - c. "Alarm" button, interfaced with emergency alarm. The alarm button shall illuminate when pressed.
  - d. "Emergency Stop" switch per local law located at 35" above the cab floor.
  - e. Self-dialing, hands-free emergency communication system actuation button with call acknowledging feature and ASME A17.1. design provisions.
  - f. Three (3) position firefighter key operated switch, call cancel button and illuminated visual/audible signal system with mandated signage engraved per ASME A 17.1 Standards as modified by the AHJ.
5. Locked Firemen's Service cabinet, keyed in accordance with local Code, containing required devices and signals in accordance with ASME A17.1 Standards.
- a. Automatic opening of the locked cabinet door may be provided with signals initiated by the fire detection and alarm system where approved by the Authority Having Jurisdiction.
6. Provide a locked service cabinet flush mounted and containing the key switches required to operate and maintain the elevator, including, but not limited to:
- a. Independent service switch.
  - b. Light switch.
  - c. Fan switch.
  - d. G. F. I. duplex receptacle.
  - e. Emergency light test button and indicator.
  - f. Inspection Service Operation key switch.
  - g. Port for hand-held service tool where applicable.
  - h. Dimmer for cab interior lighting.
7. Car operating panel shall incorporate:
- a. An integral (no separate faceplate) digital L.E.D. floor position indicator.
  - b. Black-filled engraved unit I.D. number or other nomenclature, as approved by Owner.
  - c. A "No Smoking" advisory.
  - d. The rated passenger load capacity in pounds.
  - e. Equip the main car operating panel with security car call keyed switches OR proximity card reader to disconnect the corresponding floor push button.
  - f. Security system shall be overridden by Phase II Firefighter's Emergency Operations in accordance with code.
8. Where posting of an advisory is permitted by the Governing Authority in lieu of the inspection certificate, engrave the following advisory on the hinged cover of the service cabinet, or where otherwise directed by the Owner.
- a. Elevator Certificate is On File in Building Management Office.
9. Post Inspection Certificate behind an opening in the car operating panel that is fitted with a flush-mounted clear Plexiglas without a frame.

C. Car Position Indicator (New)

1. The position of the car in the hoistway shall be indicated by the illumination of the position indicator numeral corresponding to the floor at which the car has stopped or is passing.
  - a. Provide 2" high, ten (10) segment LED type position indicator with direction arrows, integral with the car operating panel.
  - a. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
  - b. Provide audible floor passing signal per ADA standards where not provided by the elevator signal control.
  - c. Flush mount fixture with cover to match selected car front or car operating panel finish as directed by the Owner.

D. Car Direction Lantern (New)

1. Provide a car riding lantern with visual and audible signal in the edge of the strike and/or return post.
2. The lens shall project a minimum of 1/4" and shall be of solid Plexiglas.
3. Use tamperproof screws with surface mount faceplate for flush faceplate with hairline joint.
4. Car lantern shall indicate the direction of travel when doors are 3/4 open.
5. The unit shall sound once for the "up" direction and twice for the "down" direction.
  - a. Provide an electronic chime with adjustable sound volume.

E. Voice Annunciator (New)

1. Provide a voice annunciator in each elevator.
2. The device features shall comply with the requirements of ADAAG and local accessibility requirements.
3. Coordinate size, shape and design with Designer and other trades.
4. The system shall include, but not limited to:
  - a. Solid state digital speech annunciator.
  - b. A recording feature for customized messages.
  - c. Playback option.
  - d. Built-in voice amplifier.
  - e. Master volume control.
  - f. Audible indication for selected floor, floor status or position, direction of travel, floor stop, seismic operation, firefighter service and nudging.
5. Locate all associated equipment in a single, clearly labeled enclosure located either in the machine room and/or on car top.

F. Signal Annunciator System (New)

1. Provide a single / double indication, surface-mounted, manually reset signal annunciator.
  - a. Annunciator cover shall have all necessary mounting plates and brackets.

- b. Provide multi-conductor signal traveling cable and properly connect same to the annunciator and shaft wiring.
- c. Provide new single / double hall push buttons at each landing served.
- d. Provide new low-voltage hoistway wiring installed in a method required by the AHJ.
- e. Provide new transformer to supply low voltage power.

G. Signal Annunciator (New)

- 1. Provide an automatic self-canceling dual direction signal indicator for visual acknowledgment of corridor call demands when elevator is operating in Attendant Service mode.
- 2. System shall work in conjunction with standard audible signaling and operational provisions as specified herein.
- 3. Signal annunciator shall be incorporated in the car operating panel fixture.
- 4. Call registration and subsequent cancellation operations shall be automatic and incorporated in the base signal car controller.
- 5. Where hall push buttons are reused for signal annunciator operation, buttons shall be refurbished and/or otherwise repaired and new buttons shall be provided where necessary to guarantee reliable operation.

H. Corridor Push Button Stations / Reuse Back Boxes

- 1. Push button signal fixtures shall be provided on each landing.
- 2. Each signal fixture shall consist of:
  - a. Up and down illuminating push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
  - b. A recessed mounting box, electrical conduit and wiring.
- 3. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
- 4. Include firefighter key switch in the main lobby level station or other designated recall landing.
- 5. Where existing fixtures are located greater than 48" above the floor:
  - a. The existing back boxes shall be retained and used to attach the oversized fixture faceplate to locate the new buttons with a centerline of 42" above the finished floor.
    - 1) The Contractor has the option of providing a single oversized back box in lieu of retaining existing for faceplate attachment.
  - b. Standardize the new centerline distance on all floors.
- 6. All cutting, patching, grouting and/or plastering of masonry walls resulting from the removal or installation of corridor fixtures shall be performed by the Contractor so as to maintain the fire rating of the hoistway.
  - a. Finished painting or decorating of wall surfaces shall be by Others.

7. All faceplates shall be engraved with fire logo and “In Case of Fire Use Stairs” to help fill the void created by the use of oversized covers.
8. Provide a digital floor position indicator with 1” high numerals at all landings served / at the main lobby landing.

I. Floor Position Indicator (New)

1. Remove existing floor position indicator at each landing and provide new digital LED type unit.
2. New plate shall completely cover the present cutout and provide 2” numerals located on center.
3. Provide integral direction arrows that will indicate the direction in which the elevator is traveling.

J. Floor Position Indicator (New)

1. Provide a digital LED type floor position indicator at each landing
2. Indicator shall include 2” high numerals with integral direction arrows that will indicate the direction in which the elevator is traveling.
3. Indicator shall be located directly above or adjacent to the hoistway entrance frames.

K. Hall Direction Lanterns (New)

1. Provide a visual and audible signal at each entrance to indicate the direction of travel and, where applicable, which car shall stop in response to the hall call.
  - a. Design the lantern with up and down indication at intermediate landings and a single indication at terminal landings.
  - b. Lanterns shall sound once for the up direction and twice for the down direction.
    - 1) Provide an electronic chime with adjustable sound volume.
  - c. Provide adjustable signal time (three [3] to ten [10] seconds, with one [1] second increments) to notify passengers which car shall answer the hall call and preset per ADAAG notification standards.
2. Main Lobby fixture shall incorporate a 2” high LED floor position indicator in the hall lantern fixture with direction arrows located on both sides of the indicator.
3. Locate the lantern above or adjacent to the corridor entrance.

L. Hoistway Access Switch (New)

1. Install a cylindrical type keyed switch at top terminal in order to permit the car to be moved at slow speed with the doors open to allow authorized persons to obtain access to the top of the car.
2. Where there is no separate pit access door, a similar switch shall be installed at the lowest landing in order to permit the car to be moved away from the landing with the doors open in order to gain access to the pit.
3. Locate the switch in the terminal floor entrance jambs without faceplate at a height of 78” above the finished floor and within six (6) inches from the strike side of the jamb.

4. Locate the switch in a separate fixture with a flush cover plate at a height of 78" above the finished floor and within six (6) inches from the strike side of the jamb. Cover plate shall be of a design and style as approved by the Owner, the Owner's representative or Consultant.
5. This switch is to be of the continuous pressure spring-return type and shall be operated by a cylinder type lock having not less than a five (5) pin or five (5) disc combination with the key removable only in the "OFF" position.
  - a. The lock shall not be operable by any key which operates locks or devices used for other purposes in the building and shall be available to and used only by inspectors, maintenance men and repairmen in accordance with A17.1 applicable Security Group.
6. Existing provisions that meet the aforementioned criteria may be updated with keyed switches to match new apparatus provided for uniformity of systems within the building.

M. Lobby Control Panel (New)

1. Provide a Lobby Control Panel for elevators adjacent to the Fire Command Center as directed by the Consultant.
2. Provide stainless steel faceplate with tamperproof screws.
3. The panel shall include:
  - a. 2" high LCD car position and travel direction indicators.
  - b. Master intercom station / telephone.
  - c. Three (3) position (on/car to lobby/off) switches.
  - d. Emergency power controls and indicators as per code requirements.
  - e. "Car at the designated floor with its doors open" indicator.
  - f. System trouble indications.
  - g. Car call floor lockout switches.
  - h. Floor lockout switches as herein further specified.

N. Closed Circuit TV Security System (New)

1. Provide a corner mounted, high-resolution color camera with a wide angle for a Closed-Circuit Television (CCTV) security system.
2. The camera is to be mounted diagonally across from the strike plate of the elevator door and able to view the position indicator and passenger traffic.
3. The camera shall be of the wide-angle lens low light type.
4. Provide a fifteen (15) inch LCD color monitor in the Lobby or as otherwise directed by the Owner.
  - a. Monitor shall be capable of displaying all cameras on a split screen (via separate splitter) and switching to a single camera utilizing the entire screen.
5. The receiving monitor shall be a self-contained unit designed for wall or shelf mounting with all necessary brackets, hardware and fixture component accessories as required.
6. Provide a Digital Video Recorder (DVR) with CD/DVD burner capable of saving up to thirty (30) days of video and a six (6) month supply of applicable recordable media (DVD, Video CD).

7. Provide a lockable storage cabinet for the CCTV operating system to be located in a climate-controlled location as directed by the Owner.
8. The CCTV security system shall be energized by an independent source of current, other than the current supply to the main elevator operation to avoid the possibility of system failure due to an interrupted current supply to the elevator equipment.
9. Provide a battery back-up unit located at the DVR to provide a minimum of two (2) hours of back-up power in the event of building power loss.

O. Closed Circuit TV Security System (New)

1. Provide a complete Closed Circuit TV Security System, including all hardware and wiring as necessary, in accordance with specifications provided by the Owner / Architect attached and made part of this specification.

## 2.13 CAR ENCLOSURES

A. Elevator Car Enclosure(s) and the Five Percent (5%) Rule:

1. In accordance with A17.1, Section 8.7, as adopted and/or modified by the AHJ, entitled "Alterations", where a new or remodeled elevator car enclosure is included in the base scope of work, the Contractor shall, within thirty (30) days after execution of the contract, weigh the elevator, or one (1) elevator of each group of elevators included in the base scope of work, to determine the present deadweight of the platform/sling/cab assembly.
2. The Contractor shall, when necessary, weigh the interior materials of a single cab to better estimate the total existing weight of existing materials being removed as part of the alteration.
3. The Contractor shall make every effort to provide accurate weight measurements while taking into consideration all weights that may present themselves at the time the measurement is taken such as compensation, compensating sheave, hoist ropes and traveling cables that may affect the measurement of the assembly itself.
4. The Contractor shall evaluate the actual counterbalance percentage for each sample elevator to identify prevailing conditions.
5. Measurements of actual cab weight shall be compared to the original deadweight of the car as stamped on the crosshead data tag.
6. Where no data tag exists, the Contractor shall make every effort to determine the original weight of the platform/sling/cab through calculations based on the current weight of the counterweight assembly and the verified percent of full load counterbalance.
7. The amount of weight that may be added to the car, so as to remain within the limits of the "Five Percent (5%) Rule", shall be calculated based on the following:
  - a.  $(\text{Original Deadweight} + \text{Capacity}) \times (0.05) = \text{Maximum Additional Weight Allowed}$
8. The Contractor shall document and notify the Owner and Consultant of the results of the measurements taken and what weight, if any, can be added or needs to be removed from the cab in order to maintain compliance with the Five Percent (5%) Rule.
9. The Contractor shall work diligently with the Owner and/or Owner's Representative and/or Architect as well as the manufacturer of the car enclosure to minimize additional weights of the new or remodeled car enclosure so as to maintain compliance with the 5% Rule.

10. Contractor shall be responsible for proper adjustment of the counterbalance of the system, including the static balance of the platform/sling/car enclosure, upon completion of the car interior work.
11. Costs associated with this work shall be included in the base modernization price.
12. Provide a new data tag on the crosshead of the elevator indicating the new deadweight, the current percent counterbalance and the date of the alteration.

B. Elevator Cab Remodel

1. Refer to appendix A

C. Elevator Cab / Refurbish / Remodel

1. Replace finished top floor covering using a commercial grade floor tile over a new marine grade sub floor.
2. Replace car door entrance saddle using a nickel silver sill with necessary cradle supports.
3. Install new high speed exhaust fan with security protection off-set grill.
  - a. Automatic operating controls to turn fan on/off when doors are in the open/closed position. (Override keyed control switch to be incorporated in new car operating panel for full time operation and disconnect).
4. Install new low voltage, low heat, recessed down-lights in the cab dome to maximize inside floor-to-ceiling clearance.
  - a. Minimum of four (4) to six (6) lighting fixtures with clear Halo lens trim and Lexan shields.
5. Refinish interior ceiling with a white laminate and associated moldings.
6. Provisions for hidden security CCTV camera specified herein.
7. Installation of rear wall handrail thirty-two (32) inches above the finished floor with three (3) points of attachment designed for interior access servicing and support plates on the exterior of the enclosure.
8. Installation of protection pads for all walls and returns (floor to ceiling) using pad buttons permanently attached at top and ring or snap hardware at bottom to maintain hanging tension.

D. Elevator Cab (Refurbish/Remodel)

1. Car Shell and Panels
  - a. The car sides and rear wall shall be constructed of No. 14-gauge furniture steel.
  - b. Apply sound deadening material to the outside face of the shell.
    - 1) Sound deadening material shall be of the rubberized type and shall be of either brush or spray-on consistency.
    - 2) Material shall be applied to a minimum of 1/8" thickness.
  - c. Side emergency exit, where applicable, shall be provided per local laws.

- 1) Side emergency exit shall be inconspicuous flush design fitted with concealed hinges and a satisfactory flush lock.
    - 2) The lock shall provide three (3) point locking of exit; at top, bottom and side.
    - 3) Provide an additional five (5) pin keyed lock and/or electrical safety switch a may be required by local law.
  - d. The car top shall be of no less than No. 12-gauge sheet steel suitably braced to meet the requirements of the A17.1 Code.
  - e. Top of car emergency exit shall include hinging and locking arrangements with electrical safety switch to prevent operation with door open.
    - 1) Attach the top of car exit to the dome of the cab via sash-chain or other suitable means, where the exit cover is not hinged or otherwise permanently attached to the dome.
  - f. The transom shall be constructed of 14-gauge metal finished as selected by Owner.
  - g. The wall panels shall be constructed of 3/4" thick marine grade plywood.
  - h. Each panel section shall be faced with a selected laminate/veneer or other material and framed in 1/16" thick stainless steel or bronze.
  - i. Frame members shall be separated by 1/2" thick polished metal trim and fitted with 3-1/2" by 3-1/2" polished metal plates at corners.
  - j. Apply furniture steel or suitable laminate to shaft side of panels to prevent warping or other deformations.
2. Base:
- a. Provide a finished metal base with a 1/4" wide continuous vent slot above the base to allow the proper amount of air to infiltrate the cab based on the CFM of the exhaust fan and car interior size.
  - b. Prepare base to accept finished floor as selected by the Owner.
3. Entrance Sill:
- a. Provide car door entrance saddle using a nickel-silver sill. Set sill to accommodate flooring selected and installed by others.
4. Lighting:
- a. Provide low voltage high efficiency LED recessed down lighting with finished reflector, trim and cover shields.
  - b. Shall incorporate the emergency lighting.
  - c. Shall light one third (1/3) of the fixtures in case of power loss.
5. Flooring:
- a. Provide finished floor covering using a rubber resilient composition tile as selected by Owner.
6. Handrail:

- a. Provide standard 1/2" x 2" No. 4 brush flat-stock handrail on rear wall with top of rail located 32 inches above the finished floor.
  - b. Use three (3) points of attachment designed for interior access servicing with exterior support plates.
7. Protection Pads:
- a. Provide floor-to-ceiling vinyl pads for all wall surfaces with associated hanging hardware.

E. Elevator Cab / General Design Requirements

- 1. The design, materials and finishes of the cab enclosures shall be as shown on the Architectural Drawings.
- 2. Materials:
  - a. Particleboard: Premium grade, AWI, Section 200, fire retardant treated, equal to Duraflake FR
  - b. Plastic Laminate: Comply with NEMA LD3, 0.05" thick, color, texture and finish as selected by the architect
- 3. Steel Shell: 14-gauge furniture steel reinforced and designed to accept finished wall panels. Finish shell panels with one coat of rust inhibitive primer and two (2) coats of enamel paint in accordance with Section 09900. Apply 1/8" thick, rubberized sound deadening material to the hoistway side of the shell.
  - a. All panels shall have minimum radii. Apply sealant beads to panel joints before bolting together with lock washers.
- 4. Aluminum Shell: Minimum .090" walls and .125" canopy. Reinforce wall panels and ceiling as may be necessary.
  - a. Apply sealant beads to panel joints before bolting together with lock washers.
- 5. Wood Shell: 3/4" thick particleboard with backing laminate at both sides designed to accept finished wall panels. Apply 26-gauge sheet steel or fire proofing compound to the hoistway side of the shell.
- 6. Canopy: Canopy construction methods shall match the shell walls. Use 12-gauge furniture sheet steel and adequately support canopy to comply with the loading requirements of the Code.
  - a. Provide necessary cutouts for the installation of fan and top emergency exit. Arrange exit panel to swing up using a heavy-duty piano hinge.
  - b. The exit panel shall have dual locks, necessary stops and a handle.
  - c. When in the locked position, the panel shall be flush with the interior face of the canopy with hairline joints.
- 7. Base: Where finished base provided under another section of these specifications, recess and prepare the shell to accept the base.

- a. Provide concealed vent slots above side and rear wall base for proper ventilation. Arrange and size vent slots for quiet operation without any whistling. Use 16-gauge baffles to protect the hoistway side of the vent slots.
  - b. The elevator cab shop drawings shall include elevator vent calculations and number, location and size of top and bottom vent holes.
- 8. Flooring: Where finished flooring is provided under another section of these specifications, recess and prepare sub-flooring to accept the finished flooring.
  - a. Service Elevators: Provide aluminum diamond plate flooring in sections of not more than 24" x 48". Install each section using flat head stainless steel screws.
- 9. Front Return Panels, Entrance Posts and Transom: Use 14-gauge furniture sheet steel with proper reinforcing to prevent oil canning.
  - a. Fixed type return panel shall have required cutouts for car operating and signaling fixtures.
  - b. Swing front return panels shall have required cutouts for the car call buttons, keyed switches, indicators, emergency light fixture, cabinets and the specified special control and signaling devices.
    - 1) Provide concealed full height stainless steel piano hinges of sufficient strength to support the panel, without sagging, in the open position.
    - 2) The concealed locks shall secure the panel at two (2) points with linkage that shall be free of vibration and noise when in the locked position.
    - 3) When locked in the closed position, the front return panel shall be in true alignment with the transom and base.
    - 4) Lock release holes shall be not more than 1/4" diameter and be located at the return side jamb of the panel.
    - 5) Engrave the elevator identification number and capacity, no smoking sign, firefighter instructions, and other code mandated instructions and caution signs directly in the front return panel. Applied panels are unacceptable.
  - c. Transom shall be 14 gauge and be reinforced and constructed the same as the front return panels.
  - d. Construct entrance posts for the passenger elevators from 12-gauge sheet steel and reinforce to maintain vertical alignment with the adjacent panels.
  - e. Provide channel post entrance jambs for the service elevators. Clad channels with 14-gauge sheet steel and through bolt channels to the floor and to the reinforced header section.
- 10. Cab Doors: Standard 1" thick, 14-gauge hollow metal flush construction, reinforced for power operation and insulated for sound deadening. Paint hatch side of doors black and face cab side with 16-gauge sheet steel in selected material and finish.
  - a. The door panels shall have no binder angles. All welds shall be continuous, ground smooth and invisible.
  - b. Drill and reinforce doors for installation of door operator hardware, door protective device, door gibs, etc.

11. Ceiling: Construction techniques for wall panels shall apply to ceiling panel construction. Locate top emergency exit inconspicuously. Construct and mount the exit panel to prevent light leakage around the perimeter of panel.
12. Ventilation: The ventilation system of the exhaust type shall be provided in each elevator.
  - a. The system shall include a blower driven by a direct connected motor and mounted on top of car with isolation to effectively prevent transmission of vibration to the car structure. The blower shall have not less than two (2) operating speeds. The ventilation system shall be sized to provide one (1) air change per minute at low speed and one and one-half (1.5) air changes per minute at high speed. The unit design and installation shall be such that the maximum noise level, when operating at high speed, shall not exceed 55 dBA approximately three (3) feet above the car floor. A three (3)-position switch to control the blower shall be provided in the service panel.
13. Lighting: Arrange lighting fixtures and ceiling assembly to provide even illumination without hot spots and shadows. Overlap LED lamps where cove lighting is specified.
  - a. Design and configure lighting system to facilitate maintenance of the fixtures.
  - b. The service elevators shall have not less than 40-foot candle illumination at 48" above the finished floor with the doors closed.
  - c. Cab lighting source shall be designed to provide a minimum of forty (40) lumens per watt.
  - d. When an unoccupied elevator has remained stationary for fifteen (15) minutes, the cab lighting shall become de-energized. The control system shall automatically re-energize the lighting system upon opening of the cab door.
14. Handrails: All attachment hardware shall match the selected handrail and shall permit handrail removal from within the cab.
  - a. Provide a minimum of 10-gauge plate at the hatch side of the shell, aligned with the handrail attachment points, to assure secure handrail mounting.
  - b. Design handrail attachment system to support the weight of a person (two hundred fifty [250] pounds) sitting on it without any deflection and damage to the handrail, cab panel and the shell.
15. Protective Pads and Pad Hooks: Provide pad hooks at locations as directed by the Architect. Protective pads shall cover the front return panels, and the side and rear walls. Provide cutouts in pads for access to the cab operating and signaling devices. Pads shall be fire-resistant canvas with two (2) layers of cotton batting padding.
  - a. Identify each pad by elevator number and wall location.
16. Accessories: Construct elevator cab to accommodate the door operator, hangers, interlocks and all accessory equipment provided under other sections of these specifications, including firefighter phones, card readers and CCTV.
17. All cab materials shall conform to the code prescribed flame spread rating and smoke development requirements.

F. Cab Fabrication and Installation

1. Maintain accurate relation of planes and angles with hairline fit of contacting panels and/or surfaces.
2. Any shadow gaps (reveals) between panels shall be consistent and uniform.
3. Unless otherwise specified or shown on the drawings, for work exposed to view use concealed fasteners.
4. Maximum exposed edge radius at corner bends shall be 1/16". There shall be no visible grain difference at the bends.
5. Form the work to the required shapes and sizes with smooth and even curves, lines and angles. Provide necessary brackets, spacers and blocking material for assembly of the cab.
6. Interior cab surfaces shall be flat and free of bow or oil canning. The maximum overall deviation between the low and high points of 24" x 24" panel section shall not exceed 1/32".
7. Make weights of connections and accessories adequate to safely sustain and withstand stresses to which they will be subjected.
8. All steel work except stainless steel and bronze materials shall be painted with an approved coat of primer and one (1) coat of baked enamel paint.
9. Cab Finish Warranty Enhancement
  - a. Contractor shall be responsible for engineering and installing interior cab finishes in a manner that will withstand all code mandated inspections and test procedures. Failure of finishes during testing shall be repaired by the contractor without expense to the owner. Any objections or qualifications to material selection or design shall be identified during the engineering of the cab interior drawings for review by the owner.

G. Passenger Elevators

1. Wall Panels:
  - a. 3/4" thick fire-retardant plywood or particleboard with all surfaces faced with stainless steel/wood veneer as directed by the Architect. The panels shall be constructed as the removable type.
  - b. 3/4" thick fire-retardant plywood or particleboard with all surfaces faced with sheet steel; front and sides stainless steel, and rear side prime painted steel.
  - c. Modify the existing car shell for removable panel application.
  - d. 9/16" thick laminated glass panels in stainless steel/bronze mullions. Mullion corners shall be mitered, welded and ground smooth for unit frame appearance. Use 1/8" thick durometer neoprene gasket for installing the glass panels.
2. Canopy: Paint canopy with a coat of primer and one coat of low sheen enamel paint.
3. Front Return Panels and Transom: Stainless steel fixed type front return panel.
  - a. Provide stainless steel entrance posts having mitered, welded and ground smooth corners.
4. Cab Doors: Stainless steel with No.4 finish.
5. Ceiling:
  - a. Suspended 3/4" thick fire-retardant plywood or particleboard with all surfaces finished in Stainless steel with No.4 finish

- b. Suspended 3/4" thick fire-retardant plywood or particleboard with all surfaces faced with sheet steel; front and sides stainless steel, and rear side prime painted steel.
  - c. The perimeter of each ceiling panel shall have solid wood trim.
  - d. Suspended 1/4" thick laminated glass ceiling with stainless/bronze frame system. The laminated panels, composed of two 1/8" thick clear glass with a 030" vinyl inter-layer, shall comply with ANSI Z97.1 - 1984, CPSC 16 CFR.
  - e. Suspended 1" square egg crate with 1/4" thick white diffuser in stainless steel / metal with low sheen baked enamel frame.
6. Handrails: (New)
- a. Flat 1/4" x 4" stainless steel handrail at the sides/rear wall(s).
7. Lighting: (New)
- a. The cab lighting system shall be as shown on the drawings.
  - b. Fully recessed LED down light fixtures with aluminum alzak reflector. Unless otherwise shown on the drawings, provide a light fixture in each ceiling panel.
  - c. Fully recessed LED light fixtures with rapid start, high power factor ballasts, warm white light bulbs and stainless-steel frame. Securely fasten the lens to frame to prevent rattling.
  - d. Three (3) rows of 1' x 4' recessed LED light fixtures equally spaced across the width/depth of cab. Each fixture shall have two (2) warm white bulbs and high-power factor ballast. Provide stainless steel/bronze frame with 1/4" thick acrylic lens.
  - e. A 3'-0" diameter, recessed LED lighting fixture with 1/4" thick convex dome diffuser. Provide 3" wide stainless-steel frame.
8. Base: Provide a 4" high base in the material and finish selected by the architect at the sides and rear of the cab enclosure.

#### H. Service Elevators

- 1. Lower Wall Panels: 4'-0" high, 1/8" thick diamond tread aluminum wainscoting on all walls. Mount panels with countersunk stainless-steel screws. The wainscoting shall be demountable from within the car.
- 2. Upper Wall Panels: 16-gauge stainless steel applied to shell.
- 3. Provide oval vent slots 4" above the floor.
- 4. Canopy: Paint canopy with a coat of primer and one (1) coat of enamel paint.
- 5. Front Return Panels and Transom: Stainless steel with No. 4 finish.
- 6. Cab Doors: Stainless steel with No. 4 finish.
- 7. Lighting: Provide six (6) down lights with LED lamps. The light fixture shall have aluminum alzak reflector.
- 8. Flooring: Provide 12" x 12" x 1/8" / 1/4" thick aluminum checkered plate floor covering in color and pattern selected by the Architect.
- 9. Handrails: Double row of 1/2" x 4" stainless steel bars at 12" and 32" above floor on side and rear walls. Mount rails to cabs at 12" on centers and arrange them to be removable from within car. Suitably reinforce cab panel to provide for secure handrail mounting.

#### I. Reinforcement of Rear Cab Wall

1. For service-duty passenger and freight elevators, provide an angle bracket or similar means at the bottom of the rear wall where the wall meets the platform.
2. The reinforcement shall span the entire width of the rear wall and be adequately secured to prevent displacement should the wall be struck by materials being loaded into the elevator.
3. The method of attachment shall not interfere with interior wall finishes or car flooring.

J. Elevator Cab Enclosure Fan

1. Provide an exhaust type two (2) speed fan unit with cover grill, mounting accessories and necessary cab enclosure modifications.
  - a. Fan unit shall include self-lubricating motor with housing rubber mounted for sound vibration isolation.
2. Provide a key switch in the elevator cab enclosure for control of fan unit.
3. Provide necessary wiring and approved conduit to properly connect fan unit with power source and control key switch.

K. Inspection Certificate and Frame (New)

1. Provide the mandated inspection card frame for posting the required certificate or an alternate plaque as directed by the Owner designee.
2. The alternate plaque shall indicate the location of the certificate within the building, including floor and/or room designation, where access is available during normal business hours.

2.14 EMERGENCY LIGHTING / COMMUNICATIONS / SIGNALING (New)

A. Battery Back Up Emergency LED Lighting incorporated into the cab ceiling and Alarm

1. Provide a self-powered emergency light unit.
  - a. Arrange a minimum of two (2) of the cab light fixtures to operate as the emergency light system.
  - b. Where cab lighting is utilized for emergency lighting, Contractor shall coordinate the battery back-up equipment so that it is compatible with the type of cab lighting specified by the Owner or Architect.
2. Provide a car-mounted battery unit including solid-state charger and testing means enclosed in common metal container.
  - a. The battery shall be rechargeable nickel cadmium with a ten (10) year minimum life expectancy. Mount the power pack on the top of the car.
  - b. Provide a 6" diameter alarm bell mounted directly to the battery/charger unit and connected to sound when any alarm push button or stop switch in the car enclosure is operated.
  - c. The bell shall be configured to operate from power supplied by the building emergency power generator. The bell shall produce a sound output of between 80-90 dBA (measured from a distance of 10') mounted on top of the elevator car.

- 1) Activation of this bell shall be controlled by the stop switch and alarm button in the car operating station.
  - 2) The alarm button shall illuminate when pressed.
3. Where required by Code for the specific application, the unit shall provide mechanical ventilation for at least one (1) hour.
  4. The operation shall be completely automatic upon failure of normal power supply.
  5. Unit shall be connected to normal power supply for car lights and arranged to be energized at all times, so it automatically recharges battery after use.

B. Common Alarm Bell (New)

1. Provide a common alarm bell located in the elevator pit.
  - a. The bell shall be configured to operate when the alarm or stop switch of any elevator is activated, during both normal and battery back-up power conditions.
  - b. Existing common alarm bells may be rehabilitated and reused providing they meet the intent of this section and applicable codes.

C. Emergency Voice Communication / Telephone (New)

1. A hands-free emergency voice communication system shall be furnished in each car mounted as an integral part of the car operating panel.
  - a. Necessary wires shall be included in the car traveling cable and shall consist of a minimum of one (1) shielded pair of 20AWG conductors.
  - b. 120V power shall be provided to power the hands-free device.
2. The telephone shall be equipped with an auto-dialer and illuminating indicator which shall illuminate when a call has been placed and begin to flash when the call has been answered.
  - a. Engraving shall be provided next to the indicator which says, "When lit help is on the way".
3. In addition to the standard "Alarm" button, a separate activation button shall be provided on the car operating panel to initiate the emergency telephone and place a call.
  - a. The telephone must not shut off if the activating button is pushed more than once.
  - b. The telephone shall transmit a pre-recorded location message only when requested by the operator and be provided with an adjustable call time which can be extended on demand by the operator.
  - c. Once two-way communication has been established, voice prompts shall be provided which instruct the operator on how to activate these functions as well as alerting the operator when a call is being attempted from another elevator in the building.
4. The system shall be compatible with ring-down equipment and PBX switchboards.
5. The system shall be capable of serving as the audio output for an external voice annunciation system.

- a. Conversation levels shall measure 60 dbA or higher and measure 10 dbA above ambient noise levels.
  - b. Each device shall be provided with a self-diagnostic capability in order to automatically alert building personnel should an operational problem be detected.
- 6. The phone shall be able to:
  - a. Receive incoming calls from any On-Site Rescue Station (when provided or required).
  - b. Receive incoming calls from other off-site locations via the public telephone system.
  - c. Acknowledge incoming calls and automatically establishing hands-free two-way communications.
    - 1) If no On-Site Rescue Station is provided, each hands-free device shall have built in line consolidation which will allow up to six (6) elevators to be called individually from outside the building over a single telephone line and up to eighty (80) elevators if an On-Site Rescue Station is provided.
- 7. The emergency elevator communication system shall require a maximum of one (1) telephone line.
  - a. The system must provide line sharing capability to eliminate the need for a dedicated telephone line.
  - b. The line sharing function must ensure that the emergency telephones always receive dialing priority even if the line is in use and that the emergency telephones can be called into from an off-site location.
- 8. The system shall provide its own four-hour backup power supply in case of a loss of regular AC power.
- 9. The system must provide capability for building personnel to call into elevators and determine the charge state of any backup batteries provided for the emergency telephones.
- 10. Pushing the activation button in any of the elevator car stations will cause any on-site Rescue Station (where provided or required) or security telephone to ring.
  - a. If the on-site call is not picked up within thirty (30) seconds, the call will be automatically forwarded to a twenty-four (24) hour off-site monitoring service.
  - b. The arrangements and costs of the off-site monitoring and telephone line shall be by others.
- 11. All connections from the junction box to the telephone system shall be done by the Elevator Contractor where existing provisions can be reused.
- 12. New telephone lines, where required, shall be provided and interfaced by others.
- 13. All connections from the junction box to the security room's main telephone system shall be done by others.
- 14. All electrical work shall conform to Division 16 requirements.
- 15. Existing phone systems removed shall be returned to the Owners for installation by others in other areas.

D. Firefighters' Two-Way Telephone Communications System

1. Provide a complete two-way telephone communications system for point-to-point communications between authorized personnel.
2. Provide firefighter telephone jack behind the locked door located in the car operating panel in accordance with the requirements of the local authorities. The box shall be fitted with a flush mounted door having hairline joints.
3. Connection devices (jacks) and all associated wiring shall be provided by the elevator Contractor as part of the base bid.
4. The handsets shall be self-powered and not require an external power source for operation.
  - a. The firefighter phone shall be furnished under Division 16.

E. Life Safety System

1. Install Life Safety System speaker in each elevator cab.
2. Provide all necessary wiring and interfacing between the elevator system and the Life Safety System as required.
3. The Life Safety System speaker shall be furnished under Division 16.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Inspection

1. Study the Contract Documents with regard to the work as specified and required so as to ensure its completeness.
2. Examine surface and conditions to which this work is to be attached or applied and notify the Owner in writing if conditions or surfaces are detrimental to the proper and expeditious installation of the work. Starting the work shall imply acceptance of the surfaces and conditions to perform the work as specified.
3. Verify, by measurements at the job site, dimensions affecting the work. Bring field dimensions which are at variance with those on the accepted shop drawings to the attention of the Owner. Obtain the decision regarding corrective measures before the start of fabrication of items affected.
4. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

### 3.2 INSTALLATION / PROJECT PHASING

A. Installation

1. Modernize the elevators, using skilled personnel in strict accordance with the final accepted shop drawings and other submittals.
2. Comply with the code, manufacturer's instructions and recommendations.
3. Coordinate work with the work of other building functions for proper time and sequence to avoid delays and to ensure right-of-way of system. Use lines and levels to ensure dimensional coordination of the work.

4. Accurately and rigidly secure supporting elements within the shaftways to the encountered construction within the tolerance established.
5. Provide and install motor, switch, control, safety and maintenance and operating devices in strict accordance with the submitted wiring diagrams and applicable codes and regulations having jurisdiction.
6. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
7. Arrange door tracks and sheaves so that no metal-to-metal contact exists.
8. Reinforce hoistway fascias to allow not more than 1/2" of deflection.
9. Sound isolate cab enclosure from car structure. Allow no direct rigid connections between enclosure and car structure and between platform and car structure.
10. Isolate cab fan from canopy to minimize vibration and noise.
11. Remove oil, dirt and impurities and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.
12. Prehang traveling cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting after installation.
13. After installation, touch up in the field, surfaces of shop primed elements which have become scratched or damaged.
14. Lubricate operating parts of system as recommended by the manufacturer.

B. Project Phasing

1. Phase I - Final design development and contractors' preliminary work procedures to be completed within four (4) weeks from date of contract award.
  - a. Prevailing conditions review and layout.
  - b. Selection meeting for aesthetic design and finishes with Owners' designee.
  - c. Filing for required permits or other governing authorities work procedure requirements.
2. Phase II - Submittal approvals and confirmations shall be completed within eight (8) weeks from date of contract award.
  - a. Selection confirmations.
  - b. Manufacturer's shop drawings applicable, i.e., fixtures, cab, machine room layouts, doors, etc.
  - c. Engineering data acknowledgment applicable, i.e., power, heat, structural loads.
  - d. Delivery dates for major component suppliers, i.e., controls, machinery, fixtures, cabs, etc.
  - e. Posting of permits or other governing agency authorizations to proceed.
  - f. Proposed work implementation schedule based on the aforementioned procedures/confirmations.
3. Phase III - Mobilization of Final Design Approvals
  - a. Revision confirmations. (Equipment, etc.)
  - b. Preliminary work procedures.
  - c. Schedule confirmations.
4. Contractor shall provide a project schedule as part of the Bid based on the following:

- a. Include three (3) days of simulated operation, with or without door operation, while not allowing passenger use.
- b. Consultant punch list inspection report shall be performed after acceptance testing by the AHJ for each individual elevator.
- c. Contractor shall complete all punch list items issued by both the AJH and the Consultant prior to turn-over for beneficial use by the Owner and removal of the next elevator for modernization.

C. Removal of Elevators

1. If extenuating circumstances (i.e. separating controller interconnections, inspection, testing, etc.), require that multiple cars of a single elevator group be removed from service simultaneously, the work shall be performed outside of the normal business hours at a time mutually agreed to by the Owner and Contractor.
2. A minimum of five (5) days advance written notice shall be given to the Owner and Elevator Consultant by the Contractor detailing the reasons for the simultaneous removal of the elevators from service along with the estimated out-of-service time.
3. The request shall be subject to review by the Elevator Consultant and approved by the Owner prior to the commencement of the work.
4. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

D. Transfer of Hall Button Risers

1. Transfer of the hall button riser(s) to the new signal control systems shall be performed on a not-to-interfere basis and shall not interrupt building operations or inconvenience building occupants.
2. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

### 3.3 FIELD QUALITY CONTROL

A. Inspection and Testing

1. Upon completion of each work phase or individual elevator specified herein, the Contractor shall, at its own expense, arrange and assist with inspection and testing as may be required by the A.H.J. in order to secure a Certificate of Operation.

B. Substantial Completion

1. The work shall be deemed “Substantially Complete” for an individual unit or group of units when, in the opinion of the Consultant, the unit is complete, such that there are no material and substantial variations from the Contract Documents, and the unit is fit for its intended purpose.
2. Governing authority testing shall be completed and approved in conjunction with inspection for operation of the unit; a certificate of operation or other required documentation issued; and remaining items mandated for final acceptance completion are limited to minor punch list work not incorporating any life safety deficiencies.

3. The issuance of a substantial completion notification shall not relieve the Contractor from its obligations hereunder to complete the work.
4. Final completion cannot be achieved until all deliverables, including but not limited to training, spare parts, manuals, and other documentation requirements, have been completed.

C. Contractor's Superintendent

1. The Contractor shall assign a competent project superintendent during the work progress and any necessary assistant, all satisfactory to the Owner. The superintendent shall represent the Contractor and all instructions given to him shall be as binding as if given to the Contractor.

### 3.4 PROTECTION / CLEANING

A. Protection and Cleaning

1. Adequately protect surfaces against accumulation of paint, mortar, mastic and disfiguration or discoloration and damage during shipment and installation.
2. Upon completion, remove protection from finished surfaces and thoroughly clean and polish surfaces with due regard to the type of material. Work shall be free from discoloration, scratches, dents and other surface defects.
3. The finished installation shall be free of defects.
4. Before final completion and acceptance, repair and/or replace defective work, to the satisfaction of the Owner, at no additional cost.
5. Remove tools, equipment and surplus materials from the site.

B. Barricades and Hoistway Screening

1. The Contractor shall provide barricades where necessary in order to maintain adequate protection of areas in which work specified by the Contract Documents is being performed, including open hoistway entrances. Fabrication and erection as all barricades shall be in compliance with applicable OSHA regulations.
2. As required, the Contractor shall provide temporary wire mesh screening in the hoistway and of any elevator undergoing work specified in the Contract Documents. This screening shall be installed in such a manner as to completely segregate the hoistway from that of adjacent elevators. Screening shall be constructed from .041" diameter wire in a pattern that rejects passage of a 1" diameter ball.

### 3.5 DEMONSTRATION

A. Performance and Operating Requirements

1. Passenger elevators shall be adjusted to meet the following performance requirements:
  - a. Speed: within  $\pm$  three percent (3%) in both directions of travel under any loading condition.

- b. Leveling: within  $\pm 1/4$ " as measured between the car entrance threshold and the landing sill on any given floor under any loading condition.
- c. Typical Floor-to-Floor Time: (Recorded from the doors start to close on one (1) floor until they are 3/4 open at the next floor) under various loading conditions.

Passenger/Service Elevators 12.9 seconds.

d. Door Operating Times

Door Type	Opening	Closing
42" center opening	1.7 sec.	2.4 sec.
42" side opening	2.7 sec.	3.8 sec.
48" side opening	2.4 sec.	4.6 sec.

- e. Door dwell time for hall calls: 4.0 sec with Advance lantern signals.
- f. Door dwell time for hall calls: 5.0 sec without Advance lantern signals.
- g. Door dwell time for car calls: 3.0 seconds.
- h. Reduced non-interference dwell time: 1.0 seconds.

2. Maintain the following ride quality requirements for the passenger elevators:

- a. For speeds up to 1400 fpm, the speed of the car roller guides shall not exceed 500 rpm.
- b. Where pit permits, extend bottom roller guides by not less than one half the distance from the centerline of the upper roller guides to the platform.
- c. Noise levels inside the car shall not exceed the following:
  - 1) Car at rest with doors closed and fan off - 40 dba.
  - 2) Car at rest with doors closed, fan running - 55 dba.
  - 3) Car running at high speed, fan off - 50 dba.
  - 4) Door in operation - 60 dba.
- d. Vertical accelerations shall not exceed 14 milli-g and horizontal accelerations shall not exceed 20 milli-g.
  - 1) The accelerometer used for this testing shall be capable of measuring and recording acceleration to nearest 0.01 m/s<sup>2</sup> (1 milli-g) in the range of 0-2 m/s<sup>2</sup> over a frequency range from 0-80 Hz with ISO 8041 filter weights applied. Accelerometer should provide contact with the floor similar to foot pressure, 60 kPA (8.7psi).
- e. The amplitude of acceleration and deceleration shall not exceed 2.6 - 2.8 ft./sec<sup>2</sup> for geared and MRL traction, and 3.5 - 4 ft./sec<sup>2</sup> for gearless traction elevators.
- f. The maximum jerk rate shall be 1.5 to 2.0 times the acceleration and deceleration.
- g. The maximum velocity which the elevator achieves in either direction of travel while operating under load conditions that vary between empty car and full rated load shall be within  $\pm 3\%$  of the rated speed.

B. Acceptance Testing

1. Comply with the requirements of Division 01.
2. The Contractor shall provide at least five (5) days prior written notice to the Owner and Consultant regarding the exact date on which work specified in the Contract Documents will reach completion on any single unit of vertical transportation equipment.
3. In addition to conducting whatever testing procedures may be required by local inspecting authorities in order to gain approval of the completed work, and before seeking approval of said work by the Owner, the Contractor shall perform certain other tests in the presence of the Consultant.
4. The Contractor shall provide test instruments, test weights, and qualified field labor as required to safely operate the unit under load conditions that vary from empty to full rated load and, in so doing, to successfully demonstrate compliance with applicable performance standards set forth in the project specifications with regard to:
  - a. Operation of safety devices.
  - b. Sustained high-speed velocity of the elevator in either direction of travel.
  - c. Brake-to-brake running time and floor-to-floor time between adjacent floors.
  - d. Floor leveling accuracy.
  - e. Door opening/closing and dwell times.
  - f. Ride quality inside the elevator car.
  - g. Communication system.
  - h. Load settings at which anti-nuisance, load dispatch, and load non-stop features are activated.
5. Upon completion of work specified in the Contract Documents on the last car in any group of elevators, and in conjunction with the aforementioned testing procedures, the Contractor shall carry out additional testing of group dispatch/supervisory control features in the presence of the Consultant.
6. The Contractor shall provide test instruments and qualified field labor as required to successfully demonstrate:
  - a. The back-up operating mode for group dispatch failure.
  - b. Simulated and actual emergency power operation.
  - c. Firefighter and independent service operations.
  - d. Restricted access security features and card reader controls.
  - e. Zoning operations and floor parking assignments.
  - f. Up/down peak operation.
7. Upon completion of the modernization of each individual elevator, emergency power testing shall be conducted by the Building Management after normal business hours and/or weekends.
8. After hour tests of systems such as emergency generators, fire service, and security systems shall be conducted at no extra cost to the Owner.

END OF SPECIFICATION

Appendix A						
Bldg. No.	WSU Bldg. ID	WSU Bldg. Address	WSU ID #	Elevator Type	Cab Flooring Material (per specifications)	Interior Wall Finishes (per specifications)
5	Science Hall	5045 Cass Avenue, Detroit, MI 48202	005 01	Traction	Seamless Resilient Rubber	5WL hanging panels ???
34	Student Center Center	5221 Gullen Mall Detroit, MI 48202	034 03	Traction	diamond plate	5WL hanging panels ???
36	Reuther Library	5401 Cass Avenue, Detroit, MI 48202	036 01	Hydraulic	Seamless Resilient Rubber	Plastic laminate panels
42	Alumni House	441 Gilmour Mall Detroit, MI 48202	042 01	Hydraulic	Porcelain tile	Wood Veneer panels
45	Parking Structure 5	5501 Anthony Wayne Drive, Detroit, MI 48202	045 01 045 02	Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
51	Parking Structure 1	450 West Palmer, Detroit, MI 48202	051 03 051 04	Traction Traction	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels
71	5057 Woodward	5057 Woodward, Detroit, MI 48202	071 01 071 02 071 03 071 03 071 03	Traction Traction Traction Traction Traction	Seamless Resilient Rubber	Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels Plastic laminate panels
88	Parking Structure 6	61 Putnam Avenue, Detroit, MI 48202	088 01 088 03 088 02	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber	5WL hanging panels 5WL hanging panels 5WL hanging panels
89	Biological Sciences	5047 Gullen Mall, Detroit, MI 48202	089 01 089 02	Traction Traction	Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels 5WL hanging panels
130	Faculty / Administration Building	656 West Kirby Avenue, Detroit, MI 48202	130 03 130 02 130 01	Hydraulic Hydraulic Hydraulic	Existing to remain	Plastic laminate panels Plastic laminate panels Plastic laminate panels
629	Elliman Clinical Research	421 East Canfield Avenue	629 01 629 02 629 03	Hydraulic Hydraulic Hydraulic	Seamless Resilient Rubber Seamless Resilient Rubber diamond plate (Service)	Plastic laminate panels Plastic laminate panels 5WL hanging panels

## APPENDIX A

### WAYNE STATE UNIVERSITY CAR ENCLOSURE AND INTERIOR FINISH STANDARDS

#### CAR ENCLOSURE AND INTERIOR FINISHES

- A. Passenger Elevator: Retain existing car enclosure and provide new interior finishes.
  - 1. Check and tighten all fastenings.
  - 2. Provide new interior finishes as specified herein.
  - 3. Modify car enclosure for application of new signal and pushbutton fixtures.
  - 4. Post modernization weight not to exceed code allowable limits.
  - 5. Provide the following features:
    - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
    - b. Stationary Return Panels: Retain.
    - c. Entrance Columns: Retain.
    - d. Transom: Retain.
    - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
    - f. Base: Stainless steel with concealed ventilation cutouts.
    - g. Interior Wall Finish:
      - 1) Removable panels, faced and edged, with color core plastic laminate. Plastic laminate (HPDL) shall meet or exceed NEMA Standard LDI-1964 for Type 1, 1/16" high pressure general purpose laminate.
      - 2) Color and finish as selected by Purchaser.
      - 3) 5WL hanging panels with #4 stainless steel reveals between panels.
    - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
    - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
    - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
    - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
    - l. Cab Flooring, provide floor covering per below:
      - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
      - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
      - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
      - 4) Seamless resilient non-slip rubber or vinyl with sealed edges

- 5) Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

B. Service Elevator: Retain existing car Shell enclosure and provide new interior finishes.

1. Check and tighten all fastenings.
2. Provide new interior finishes as specified herein.
3. Modify car enclosure for application of new signal and pushbutton fixtures.
4. Post modernization weight not to exceed code allowable limits.
5. Provide the following features:
  - a. Enclosure: Retain. Apply sound-deadening mastic to exterior.
  - b. Stationary Return Panels: Retain.
  - c. Entrance Columns: Retain.
  - d. Transom: Retain.
  - e. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - f. Base: Textured stainless steel with concealed ventilation cutouts.
  - g. Interior Wall Finish: Removable panels made of 5WL.
  - h. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
  - i. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - j. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - k. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - l. Cab Flooring: Provide a heavy vinyl cab floor covering as selected by the Purchaser.
  - m. Pads and Buttons: 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.

C. Passenger Elevator: New Car Enclosure and Interior Finishes.

1. Remove all existing interior finishes and shell components, weigh, and document.
2. Provide complete new car enclosure and interior finishes as specified herein.
3. Post modernization weight not to exceed code allowable limits.
4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel stainless steel formed panels Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - d. Entrance Columns: Reinforced 14 gauge satin finish stainless steel.
  - e. Transom: Reinforced 14 gauge satin finish stainless steel full width of enclosure.
  - f. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.

- g. Base: Stainless steel with concealed ventilation cutouts.
- h. Interior Wall Finish: Removable panels, faced and edged, with color core plastic laminate. Color and finish as selected by Architect/Purchaser.
- i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.
- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
- k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
- l. Subfloor; 5/8" thick marine grade plywood.
- m. Cab Flooring: Provide floor covering per below:
  - 1) Porcelain tile, 12"x24"x3/8" running bond pattern, thin set mortar, 1/16" joints with non-sanded grout, final selection by Owner, provide allowance of \$10/sf for tile cost with 10% waste.
  - 2) Luxury Vinyl Tile, 6"x36", random linear pattern, zero VOC adhesive as recommended by the manufacturer, final selection by Owner, provide allowance of \$5/sf for tile cost with 10% waste.
  - 3) Diamond Plate, 1/8" thick aluminum, mill finish 6061, seamless where possible, minimal seams if cab width exceeds sheet width. Sand all edges smooth, secure with 1/8" self-tapping aluminum or stainless-steel fasteners 1/2" from edge of panel @ 10" oc along edges, and in field. Trowel zero VOC adhesive over 100% of cab floor prior to installation of diamond plate and roll 100 lb. roller over plate to ensure adhesion.
  - 4) Seamless resilient non-slip rubber or vinyl with sealed edges
- n. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
- o. Pads and Buttons: Where no service elevator available in the building, provide hooks and 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.

D. Service Elevator: New Car Enclosure and Interior Finishes.

- 1. Remove all existing interior finishes and shell components, weigh, and document.
- 2. Provide complete new car enclosure and interior finishes as specified herein.
- 3. Post modernization weight not to exceed code allowable limits.
- 4. Provide the following features:
  - a. Enclosure Walls: Reinforced 14-gauge furniture steel textured stainless steel formed panels with baked enamel interior finish as selected. Width of individual panels shall not exceed 18". Apply sound-deadening mastic to exterior.
  - b. Enclosure Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - c. Car Sill:
  - d. Stationary Return Panels: Reinforced 14 gauge satin finish stainless steel with cutouts for car operating panels and other equipment.
  - e. Entrance Columns: Reinforced 14 gauge textured satin finish stainless steel.
  - f. Transom: Reinforced 14 gauge textured satin finish stainless steel full width of enclosure.
  - g. Car Door Panels: Fully enclosed 16-gauge steel, sandwich construction without binder angles. Constructed with interlocking, stiffening ribs. Leading edges of center-opening doors equipped with rubber astragals full height of panel. 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. Satin finish stainless steel.
  - h. Base: Textured stainless steel with concealed ventilation cutouts.
  - i. Ventilation: Two-speed exhaust blower. Mount to car canopy on isolated rubber grommets. Exhaust blower shall meet noise requirements specified herein.

- j. Lighting: LED fixtures with wiring and hookup. Coordinate with emergency lighting requirements.
  - k. Suspended Ceiling: Six-section satin finish stainless-steel panels with lighting cutouts in each panel.
  - l. Handrails: Solid stainless steel flat stock bars, 4" x 3/8", across rear and side walls. Return handrail ends to car walls.
  - m. Guardrails:
    - 1) Solid stainless steel flat stock bars, 4" x 3/8", mounted across rear and side walls.
    - 2) Locate guardrail line at 8" above car floor.
    - 3) Bolt rails through car walls from back and mount on 1½" deep solid round stainless steel standoff spacers no more than 18" O.C.
    - 4) Return guardrail ends to car walls.
    - 5) Pads and Buttons: 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.
  - n. Cab Flooring:
    - 1) Seamless resilient non-slip rubber or vinyl with sealed as selected by the Owner.
- E. Freight Elevator Enclosure: Car weight to be verified prior to removal of interior cab finishes/cab enclosure. Post modernization weight not to exceed code allowable limits. Provide the following features:
- 1. Enclosure Walls: Reinforced 10-gauge furniture steel formed panels no more than 20" wide with light-proof joints.
    - a. Baked enamel finish as selected.
    - b. Provide recess in car side wall for recessed mounting of car operating panel.
  - 2. Enclosure Canopy:
    - a. Reinforced 12-gauge furniture steel formed panels no more than 20" wide with light-proof joints and Hinged emergency exit.
    - b. Interior finish white reflective baked enamel.
    - c. Lighting: Recessed LED down lights with on/off switch in car operating panel. Recess mount fixture flush with inside surface of car top. Provide steel guard on car top over fixture.
    - d. Bumper Rails: Two rows of 2" x 12" oak or maple bumpers mounted on both sides and rear of the car.
      - 1) Locate bottom rail at floor level and top rail at 36" above the car floor.
      - 2) Bolt rails through car walls with bolt and captive nuts on exterior of wall panel sections on 18" centers.
      - 3) Finish both upper and lower top edges with a 45-degree chamfered edge to eliminate collection of trash.
      - 4) Finish ends of upper and lower bumpers on side walls to 45° chamfer to eliminate carts and people from hitting blunt ends.
      - 5) Flooring: Provide cab flooring which is 1/8" aluminum diamond plate.