



**PENNSYLVANIA
CONVENTION CENTER
ELEVATOR 22 &
ELEVATOR 23
MODERNIZATIONS**

Project Specifications and Information for Bidders

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Philadelphia, PA 19107

PART 1 – GENERAL

1.01 SUMMARY:

- A. This specification provides information and details for the modernization of two basement traction passenger elevators at the Pennsylvania Convention Center located in Philadelphia, PA. The work includes provision of all labor, materials, tools, rigging and equipment that are necessary to upgrade and modernize the two elevators. Specifically:
1. Modernize two existing traction elevators complete in every respect. Upgrades shall include all items required to meet the current relevant codes and ADA requirements.
 2. Coordinate this work with work that is being completed by others under the direction of the Pennsylvania Convention Center.
 3. Complete the work per the schedule established by the Pennsylvania Convention Center so that this work does not interfere with the site's operations.
 4. Any component or device that is listed in this specification as "Retain existing" or "Reuse existing" shall be carefully inspected by the contractor to confirm its viability and to verify that it complies with all relevant codes. Any repairs, refurbishments or replacements of retained devices and components are to be included in the contractor's base bid.
 5. If this specification does not include details of a required feature or the installation of parts, material or equipment that is needed to provide a complete modernization that complies with all codes and standards, the contractor shall include such items in his base bid.
- B. The following related electrical construction work will be completed by others under the direction of the PACC:
1. Removing the Elevators' 480 Volt fused disconnect switches in the elevator machine rooms and all circuits and raceways from them to the Elevator Control Panels. The Elevator Contractor will remove the motor branch circuits and raceways from the Elevator Control Panels to the elevator motors and devices.
 2. Furnishing and installing new 480 Volt shunt trip molded case circuit breakers in the elevator machine rooms and power circuits and raceway from it to the New Elevator Control Panels. The elevator Contractor will provide all power and control wires, including wires to motor embedded overload thermistors, from the new Elevator Control Panels to elevator equipment.
 3. Furnishing and installing new control wires and raceways from the Fire alarm modules, that will be provided by Siemens, to the shunt trip molded case circuit breakers and to the Elevator Control Panels.

4. Furnishing and installing new control wires and raceways from the Elevator Control Panels to the Automatic Transfer Switches (ATSs) including making connections I the ATSs.
 5. Removal of the branch circuit conductors and portions of the raceway from the Elevator Lighting Fused Disconnect Switch to the Elevator Control Panel. The Elevator Contractor is responsible for the replacement or reuse of the lighting circuits and raceways between the Elevator Control Panel and the Elevator Cabs.
 6. Removal of the existing lighting fixtures and switches in the elevator machine rooms and elevator pits and the furnishing and installation of new LED lighting fixtures with guards and motion sensing light switches.
 7. Removal of existing duplex receptacle and the replacement of these with new GFCO receptacles that are connected to a normal/emergency power source, providing new wires and raceways as needed.
- C. The following related electrical construction work will be completed by others under the direction of the PACC.
1. Installation of smoke and heat detectors and modules that will interface with the new elevator control panels and shunt trip circuit breakers.
- D. Drawings ME-1 and ME-2, which have been provided to the bidders are diagrammatic and provide additional information which is supplemental to the specifications.
- E. The elevator modernization contractor ("Contractor") shall coordinate with the fire alarm contractor and electrical contractor, assuring its provision of a complete project that satisfies all requirements of the Authority Having Jurisdiction and all applicable codes and standards.
- F. Site Visit and Inspection of Existing Equipment
1. By submitting a bid, the Contractor certifies that he has visited the site and inspected the existing elevator systems so that any existing conditions that could impact the work can be identified and accounted for in his bid.
 2. A pre-bid meeting for the project will be scheduled for which participation is mandatory. Access to the site beyond the pre-bid meeting during the bidding process can be coordinated with the Pennsylvania Convention Center.
- G. Related Work:
1. Welding at the project site shall be performed by certified welders who have previously qualified by test as prescribed in the American Welding Society Publications AWS DI.1 to perform the type of work required. Certificates shall be submitted for all workers employed in this capacity.
 2. Electrical work shall be performed by a Licensed Master Electrician and Licensed Journeymen Electricians as required by permits obtained from the Authority Under Jurisdiction.

3. Firestopping: Sealing is required around all penetrations to maintain the integrity of fire-rated construction.

1.02 ABBREVIATIONS:

- A. PACC Pennsylvania Convention Center
- B. (E) Existing
- C. (N) New

1.03 SUBMITTALS

- A. Shop drawings and submittals shall be submitted electronically using PDF format files. The Contractor may, at his option, create or use a web-based platform through which exchanges of shop drawings and submittals can be completed and tracked.
- B. Equipment:
 - a. Equipment within a group of traction elevators shall be the product of the same manufacturer. Specifically, elevator #22 and #23 shall have identical manufacturers and equipment size since they have matching rating and speed.
 - b. The Contractor shall provide and install safety devices that have been subjected to tests witnessed and certified by an independent professional testing laboratory that is not a subsidiary of the firm that manufactures supplies or installs the equipment.
- C. Submittal List:
 1. Shortly after a contract is awarded, the Contractor shall provide a list of all shop drawings, elevator layout, equipment and submittals that he will provide for the PACC and/or the PACC's engineer to review. This list will be reviewed and, as needed, amended by the Contractor to include additional shop drawings and submittals that are requested by or required by the PACC and/or the PACC's engineer.
 2. List of equipment shall include but not limited to the following: Manufacturer's Name, Trade Names, Model or Catalog Number, Nameplate Data (size, capacity, and rating).
 3. Shop Drawings shall include the following:
 - a. Complete scaled and dimensioned layout in plan and section view showing the arrangement of equipment and all details of each elevator unit specified.
 - b. Submit drawings showing the location and arrangement of each machine room and each elevator's hoistway equipment. Layouts of the existing machine rooms are included on project drawings ME-1 and ME-2. Note that these layouts are close to but not necessarily to scale.

- i. Plan drawing to show traction machine, controllers, governors, and all other components located in machine room.
 - ii. Elevation Drawing to show car, counterweight, sheaves, supporting beams, guide rails, brackets, buffers, and size of car platform, car frame members, and other components located in hoistway.
 - c. Weight of principal parts.
 - d. Top and bottom clearances and over travel of car and counterweight.
 - e. Location of main line switch/shunt trip circuit breaker, switchboard panel, light switch, and feeder extension points in the machine room.
4. The following equipment shall be shown on the elevator layouts:
 - a. Traction machine, traction sheave and deflector sheaves.
 - b. Traction machine Motor, HP and RPM ratings, Voltage, Starting and Full Load Ampere, and Number of Phases.
 - c. Traction machine Drive Controller.
 - d. Starters and Overload Current Protection Devices.
 - e. Car Safety Device; Type "A" safeties and Governor.
 - f. Emergency Hoist Rope Grippers rating and location.
 - g. Electric Door Operator: HP, RPM, Voltage, and Ampere rating of motor.
 - h. Hoistway Door Interlocks.
 - i. Car and Counterweight Buffers: maximum and minimum rated loads, maximum rated striking speed and stroke.
 - j. Car Ventilation Unit: HP rating and CFM rating.
 - k. Hoist and Counterweight Ropes: breaking strength, allowable working load, and actual working load.
5. Dimensioned drawings showing details of:
 - a. Traction Machine
 - b. All signal and operating fixtures.
 - c. Car and counterweight roller guides.
 - d. Hoistway door tracks, hangers, and sills.
 - e. Door operator and infrared curtain units.
 - f. Emergency Hoist Rope Grippers rating and location.
6. Cut sheets, operational manuals and drawings showing details of all provided mechanical and electrical equipment. This equipment includes but is not limited by

traction machine, rope gripper, controllers and supervisory panels. Include a system logic description of controller and supervisory panels.

7. Provide complete wiring diagrams needed for field troubleshooting, adjustment, repair and replacement of components. Diagrams shall be base diagrams, containing all changes and additions made to the equipment during the design and construction period.
8. Furnish certificates as required under: Paragraph "QUALITY ASSURANCE".
9. Submit operation and maintenance manuals on all equipment being furnished prior to ordering or manufacturing.
10. The Contractor shall maintain a Submittal Log that is to be provided to the PACC and the PACC's engineer on a bi-weekly basis.

D. Samples:

1. Provide/submit samples of all exposed materials and all custom fixture fabrications.
2. Provide drawings of complete hall panel button, hall lanterns, and interior car control panel for review.
3. Omit all logos from exposed finishes or components.

E. Maintenance Data and Tools:

1. Provide the information that is required for proper maintenance and adjustments of the equipment prior to the final acceptance test. This information shall be part of an overall "Operations and Maintenance Manual". Two copies of the manual shall be provided along with a PDF format file of the manual.
2. Provide a complete set of site-specific schematic wiring diagrams of as-built elevator circuits. The location of each item on the diagram shall be noted. The functionality of the system shall be annotated on the diagrams. A hard-copy full size set of diagrams shall be placed in each elevator's machine room. An additional hard-copy shall be provided to the PACC along with PDF format files. The Operations and Maintenance Manual shall include half-sized diagrams.
3. Lubricating instructions and recommended lubricant grade shall be provided.
4. The Contractor shall include in his scope of supply any special tools or passwords that are required for maintenance, troubleshooting, adjustments or for the performance of periodic safety checks. All costs for such items, including rental fees if applicable, shall be included in the Contractor's bid.
5. The elevator controllers shall not include any devices, sim cards, tools or other removable devices that, if removed, would inhibit the serviceability of the controllers or elevators.
6. Provide six (6) sets of keys for each elevator for all keyed functions.

1.04 REFERENCES:

- A. All work shall be completed in accordance with the latest and/or applicable editions of all relevant building codes and elevator codes including but not limited to the following:
1. ASME A17.1 – Safety Code for Elevators and Escalators (edition that applies to the City of Philadelphia).
 2. ASME A17.2 - Inspectors Manual for Electric Elevators and Escalators (edition that applies to the City of Philadelphia).
 3. NFPA 70 – National Electrical Code.
 4. Americans with Disabilities Act (ADA).
 5. ANSI 117.1 – American National Standard for Accessible and Usable Buildings and Facilities.
 6. NFPA 13 – Standard for Installation of Sprinkler Systems.
 7. NFPA 72 – National Fire Alarm and Signaling Code.
 8. NFPA 101 - Life Safety Code
 9. NFPA 252 - Fire Test of Door Assemblies
 10. International Building Code (IBC).
 11. American Society for Testing and Materials (ASTM)- A1008/A1008M-09 - Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High Strength Low-Alloy with Improved Formability
 12. Gauges: Sheet and Plate: U.S. Standard (USS); Wire: American Wire Gauge (AWG)
 13. American Welding Society (AWS): D1.1 - Structured Welding Code Steel
 14. Local (City of Philadelphia) and State (Commonwealth of Pennsylvania) codes.
 15. Authority Having Jurisdiction.
- B. The Contractor shall make application for, secure and pay for all necessary permits and certificates of inspection for all furnished equipment as required by various departments of local and state authorities. The Contractor shall furnish the PACC certificates and approval as required by local governing authorities having jurisdiction.
- C. In addition, the Contractor shall be responsible for speed and load carrying tests for both elevators as well as heat tests for the elevator machine rooms.
- D. Any damages by the Contractor to the elevator cars, hoistways or the structures and facilities that adjoin the project areas shall be repaired by Contractor at no expense to the PACC.

1.05 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor shall provide calculations verifying the following:

1. Adequacy of existing 480 VAC feeder to support the power requirements of the new traction elevator drive motor.
 2. Heat emissions in BTU for both machine rooms.
 3. AC motor HP size for Traction Machine.
 4. Traction Machine Option (1) only- The elevator contractor will be required to obtain all approvals needed for rope gripper installation and obtain the service of a licensed professional engineer working for an engineering firm that maintains errors and omissions insurance to design and approve the installation of the rope gripper.
- B. The Contractor shall store all materials and equipment in a dry protected and secure area. Protect and handle all materials and equipment in accordance with manufacturers' recommendations and directions to prevent damage, soiling or deterioration.

1.06 WARRANTY:

- A. The Contractor shall provide a warranty to replace, repair or restore parts or components that fail or do not operate properly due to poor factory or field workmanship, engineering or design for a period of 12 months from the date of signed final acceptance.

1.07 FULL MAINTENANCE:

- A. The Elevator Contractor shall provide a full maintenance proposal for the two modernized elevators that will begin when the modernizations are completed, and the elevators have been accepted by the PACC. The maintenance contract shall end 12 months after acceptance by the PACC.
- B. The full maintenance bid shall be based on an RFP provided by the PACC. The full maintenance bid is to be submitted with the modernization bid but the cost shall be a separate item and shall not be rolled into the modernizations bid.
- C. Provide a monthly discount for the months the new equipment warranty included in the modernizations is in effect. All associated tools, labor and materials required for city and state testing are to be included in the base maintenance proposal.

1.08 QUALITY ASSURANCE

- A. Equipment, materials and products from the following listed manufacturers will be reviewed to confirm acceptability and compliance with the contract documents and governing codes:
1. ThyssenKrupp Elevator Company.
 2. Kone Elevator Company.
 3. Schindler Elevator Company.

4. Excel Elevator Company
 5. Hollister-Whitney Company
- B. The Contractor shall demonstrate that he has successfully installed and maintained traction elevators like those described in this specification and which have been in operation for ten (10) or more years.
 - C. The Contractor shall demonstrate that he is currently and regularly engaged in the installation of elevator equipment as one of his principal products.
 - D. The contractor shall have trained supervisory personnel, equipment and facilities to install elevator equipment specified herein.
 - E. The Contractor shall demonstrate that he has a qualified local workforce (within 50 miles of the city of Philadelphia, PA) that is available to work at the PACC.
 - F. The contractor shall have certified elevator mechanics supersizing and or performing the required work.
 - G. The Contractor shall demonstrate that he locally maintains an adequate stock of parts for replacement or emergency purposes.
 - H. The elevator control systems shall not have any software embedded in its program that shuts down the elevators when the elevators and control system are not malfunctioning.
- 1.09 PARTS AND PRINTED CIRCUIT BOARDS:
- A. The Contractor shall guarantee the sale of parts and controller boards to the PACC. Such sale shall not be contingent on there being an exchange component.
- 1.10 Materials:
- A. Where stainless steel is specified, it shall be corrosion resisting steel 302 or 304, Condition A with Number 4 finish on exposed surfaces. Stainless steel shall have the grain of belting in the direction of the longest dimension and surfaces shall be smooth and without waves. During installation stainless-steel surfaces shall be protected with suitable material.
 - B. Where cold rolled steel is specified it shall be low-carbon steel rolled to stretcher level standard flatness, complying with ASTM A109.

1.11 MANUFACTURERS:

- A. The following manufacturers equipment, materials and products are acceptable for this project (others may be added if approved by PACC):
1. ThyssenKrupp Elevator Company.
 2. Kone Elevator Company.
 3. Schindler Elevator Company.
 4. Excel Elevator Company.
 5. Hollister-Whitney Company

1.12 Manufacturer Products:

- A. Materials, devices, and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items. The elevator equipment, including controllers, door operators, and supervisory system shall be the product of manufacturers of established reputation, provided such items are capably engineered and produced under coordinated specifications to ensure compatibility with the total operating system.
- B. Manufacturers of equipment assemblies which include components made by others shall assume complete responsibility for the final assembled unit. Components shall be compatible with each other and with the total assembly for the intended service.
- C. Mixing of manufacturers related to a single system or group of components shall be identified in the submittals.

PART 2 – ELEVATOR CHARACTERISTICS:

2.01 ELEVATOR MODERNIZATION REQUIREMENTS:

A. PERFORMANCE:

1. Speed: The speed of the elevator shall not vary by more than +/- 5% under any loading condition.
2. Acceleration: The controlled rate of change of acceleration and retardation of the car shall not exceed 0.1G per ft/s/s and the maximum acceleration and retardation shall not exceed 0.2G per ft/s/s.
3. Capacity: The elevator shall safely lower, stop and hold up to 125% rated load.
4. Leveling: Leveling shall be +/- 1/8" under any loading condition.

5. Starting, stopping, and leveling shall be smooth and comfortable without appreciable steps of acceleration and deceleration.
6. Sound Isolation: Noise level relating to elevator equipment operation in the machine room shall not exceed 80 decibels. All db readings shall be taken 90 cm (3 ft) off the floor and 90 cm (3 ft) from equipment.
7. Airborne Noise: Measured noise level of elevator equipment during operation shall not exceed 50 decibels in elevator lobbies and 60 decibels inside car under any condition including door operation and car ventilation exhaust blower on its highest speed.
8. Door Closing Time: Door operation including closing time shall comply with ASME code and ADA.
9. Floor-to-Floor Travel: Floor-to-floor performance time shall be about 15.0 seconds (from the start of door closing at one floor to 3/4 open at the next floor).
10. Car Call Door Dwell Time: The minimum acceptable time for door to remain fully open after answering a car call shall be adjustable with initial setting at 4 seconds.
11. Hall Call Door Dwell Time: The hall call door dwell time shall be based on code requirements.
12. Nudging: When doors are prevented for closing for 20 seconds due to the failure of the door protection proximity device or due to an obstruction, the doors shall remain open and a buzzer alarm shall sound.

B. OPERATION:

1. The elevator operation at the PACC shall remain "as is" with the new elevator control system except for the changes and additions that are described in this specification.
2. The new microprocessor-based control system shall be programmed to maintain the existing normal sequence of operation except as modified herein.
3. An "Independent Operation" keyed switch shall be included in the car operating station which, when closed, shall permit operation from the car's buttons only. In this mode, hall station buttons/calls will be ignored by the control system.
4. A car without registered calls arriving at a floor where both up and down hall calls are registered shall initially respond to the hall call that is in the direction that the car was traveling. If no car call or hall call is then registered for further travel in that direction, the car shall close its doors and immediately re-open them in response to the hall call in the other direction. The direction lanterns at the hall and inside the car shall indicate the change in direction when the doors re-open.

C. FIREMEN'S SERVICE:

1. Both Phase 1 and Phase 2 Firemen's Service shall be provided.
2. A keyed switch at the 2nd floor hall shall be incorporated in the hall station that includes the up button that will be used to activate Phase 1 and initiate elevator recall.
3. A keyed switch shall be included in the car operating panel to initiate Phase 2 and transfer operation of the elevator to the car operating panel (i.e., operation independent of calls from the hall stations).
4. Include all features and provide equipment per Code requirements.
5. Provide relays, wiring and terminal trips for interconnection to the PACC's fire alarm system.

2.02 TRACTION MACHINE: Characteristics and Options- Elevator #22 or #23 (Basement Traction Elevators)

A. Type and General Characteristics:

- | | |
|-------------------|---|
| 1. Quantity | Two- One for elevator #22 and one for elevator #23 |
| 2. Operation | Simplex (Elevator operate independently) |
| 3. Installed In | 1993 |
| 4. Capacity | 2,500 pounds |
| 5. Speed | 150 feet per minute |
| 6. Floors Served | 2 nd , 3 rd (Grand Hall, Ball Room) |
| 7. Stops/Openings | 2/Front Only |

B. Existing Traction Machine (Basement Traction Machine):

- | | |
|-------------------------|--|
| 1. Motor HP | 15 DC |
| 2. Controls | Ward Leonard Control System |
| 3. Motor RPM | 1150 |
| 4. Motor Frame | 324 AT |
| 5. Worm Gear | 2500# capacity, Speed 150 fpm |
| 6. Existing Worm Gear | Millar Elevator# 53 OD |
| 7. Traction Sheave | Mounted in base frame |
| 8. Deflector Sheave | Mounted in base frame |
| 9. Generator | 10 KW, 240 VDC, 41.5 AMPS, 460 V |
| 10. Motor for Generator | 15 HP; 460 VAC; 1750 RPM; 38.4/19.2 AMPS; 3Ø |

- | | |
|----------------------|--|
| 11. Enclosure | DP (Drip-proof) |
| 12. Temp Rise | 122°F |
| 13. Insulation Class | B |
| 14. Brake | 230 VDC, 0.82 Amps, 280 OHM, 189 Watts. |
| 15. Base Frame | Mounting for Motor, Brake, Worm Gear Reducer,
Traction Sheave and Deflector Sheave. |

C. New Traction Machine (Basement Traction Machine):

- | | |
|-----------------------|---|
| 1. Motor HP | 15 AC (Or other as confirmed by elevator contractor) |
| 2. Controls | AC Drive |
| 3. Motor RPM | 1150 |
| 4. Motor Frame | 284T |
| 5. Worm Gear | 2500# capacity, Speed 150 fpm |
| 6. Existing Worm Gear | Millar Elevator# 53 OD |
| 7. Rope Gripper | Located between Traction and Deflector Sheave |
| 8. Traction Sheave | Mounted in base frame |
| 9. Deflector Sheave | Mounted in base frame |
| 10. Motor Duty | Inverter Duty |
| 11. Enclosure | DP (Drip-proof) |
| 12. Temp Rise | 122°F |
| 13. Insulation Class | F |
| 14. Brake | 230 VDC, 0.82 Amps, 280 OHM, 189 Watts; with brake
open and set switches |
| 15. Base Frame | Mounting for Motor, Brake, Worm Gear Reducer,
Traction Sheave, Rope Gripper, Deflector Sheave. |

2.03 TRACTION MACHINE UPGRADE OPTIONS:

A. Option (1)- Modify exist Traction Machine in place as follows:

1. Replace existing DC motor with new AC motor.
2. Add flexible coupling between motor and brake.
3. Reuse Brake- replace brake linings and add brake set/open switches.

4. Reuse existing Worm Gear Reducer. Inspect worm gear reducer, open inspection cover to inspect gear teeth; check gear backlash, change oil, check breather and report findings.
 5. Reuse existing Traction Sheave and Deflector Sheave
 6. Base- Modify to accept new AC motor, motor coupling to facilitate alignment and rope gripper.
 7. Rope Gripper- mount to existing base frame above deflector sheave. Other less favorable locations would be in the hoistway or at the top of the elevator shaft between the two upper deflector sheaves.
 8. Structural evaluation would be needed to approve a rope gripper location within the hoistway or attached to the traction machine frame. This location will need to support the rope gripper during the loads of emergency braking.
 9. This option requires the elevator contractor to obtain all approvals needed for rope gripper installation and obtain the service of a structural engineering firm to design and approve the installation of the rope gripper as stated herein
- B. Option (2)- New Traction Machine with all new equipment specified in Section (2.02-C).
- C. Option (3)- Remove the existing Traction Machine base frame assembly and send to Manufacturer for modification as follows:
1. Remove DC motor and install new AC motor
 2. Reuse Drum Brake and add Brake Set/Open Switches and new brake liner.
 3. Reuse existing Worm Gear Reducer. Inspect worm gear reducer, open inspection cover to inspect gear teeth; check gear backlash, change oil, check breather and report findings.
 4. Install new rope gripper between traction and deflector sheave. To make room for rope gripper the deflector sheave will need to be raised. There is plenty of room in the Hoistway opening to raise the deflector sheave, by reducing the 20" high hoistway panel above the traction machine.
 5. There is time to remove traction machine and send to manufacturer since there is another elevator that serves this area and both are not used much. But an estimate of this down-time should be included in the bid.
 6. Modify and reuse base frame to install new AC motor and new rope gripper. If base modification is impractical provide new base frame and reuse drum brake, worm gear reducer, traction and deflector sheaves.
 7. All equipment per Section (2.02-C)
- D. Contractor to provide pricing of Option (1), Option (2) and Option (3) in their bid price. PACC will select option after awarding contract.

2.04 WORK TO BE DONE:

A. Pre-Bid Inspection:

- Inspect all sheaves including bearings and shafting.
- Inspect traction sheave bearings and shafting.
- Inspect car roller guides and rails.
- Inspect counter weight roller guides and rails.
- Inspect car traveling cable
- Inspect governors (car and counterweight), its sheaves and wire rope.
- Inspect car drum brake and solenoid release.
- Inspect elevator pit emergency stop buffers for car and counterweight.
- Inspect worm gear reducer for wear and determine if it needs replacement.
 - Check gear backlash
 - Open inspection cover and inspect worm gear
 - Check breather
 - Check gear oil condition
- Include replacement of all worn equipment from pre-bid inspection in elevator modernization quotation.
- Pre-Bid inspection must be done for both elevators #22 and #23 to determine price of modernization of each elevator.

B. Machine Room:

- Controller: Provide new Microprocessor Control System.
- New AC motor
- Modify Traction Machine per Section (3-01-B-1). Option (1) only.
- Provide new Traction Machine assembly per Section (3-01-B-2). Option (2) only
- Modify Traction Machine per Section (3-01-B-3), Option (3) only
- New elevator drum brake- Option (2) only; Reuse Brake Option (1) & Option (2)
- New Elevator Controller Shunt Trip Circuit Breaker
- During construction inspect all sheave bearings for wear and replace if needed.
- During construction inspect all sheaves for wear and replace if needed.
- Lighting: Provide new (LED) with new light motion sensing light switch.
- Receptacle: Provide new 120 VAC GFCI receptacle

C. Hoistway:

- Hoist Rope Grippers: Add to meet current elevator code.
- New Car / Counterweight Wire Rope

- New Car Governor Wire Rope
- New Counterweight Governor Wire Rope
- Leveling Devices: Provide new.
- Limit Switches: Provide new.
- Hoistway Door Interlocks: Provide new.
- Hoistway Door Closer: Provide new.
- Hoistway Door Tracks: Provide new.
- Hoistway Door Hangers: Provide new.
- Hoistway Door Sills: Reuse existing.
- Hoistway Door Frames: Reuse existing. Provide tactile star on both jambs at each landing with floor designator both tactile and in Braille.
- Hoistway Door Panels: Replace
- Hoistway Fascia and Toe Guard: Reuse existing.
- Hoistway Door Unlocking: Include stainless steel escutcheons in all doors with adjustments as needed to account for new car doors.
- Traveling Cables: Provide new. Existing raceways inside the hoistway may be reused if they satisfy NFPA 70 requirements.
- Guide Rails: Reuse existing.

D. Pit:

- Buffers: Car and Counterweight reuse existing.
- Pit Stop Switch: Provide new.
- Pit Lighting: Provide new (LED) with new light motion sensing light switch.
- Pit Receptacle: Provide new 120 VAC GFCI receptacle.

E. Car:

- Car Interior Panels: Provide new Stainless-steel panels.
- Car Ceiling: Provide new Stainless Steel with LED lighting.
- Car Floor Covering: Provide New vinyl flooring.
- Car Door: Provide new Stainless-Steel panel or new door.
- Car Sill/Threshold: Re-use existing.
- Car Apron/Toe Guard: Provide new if worn or damaged.
- Door Operator: Provide new with closed-loop operation.
- Car Ventilation Fan: Provide new.
- Car Roller Guides: Provide new rollers if needed.
- Communications: Provide new. Incorporate in Car Operating Panel.
- Car Door Interlock Contact: Provide new.

- Car Interior Lighting: Provide new (LED).
- Emergency Battery for car ceiling LED lights. Bid as an Option
- Cartop Operating Station: Provide new. Include new LED light with light switch and new 120 VAC GFCI duplex receptacle.
- Cartop Handrail: Provide new higher railings meeting current code.
- Car Door Hangers: Provide new.
- Car Door Track: Provide new.
- Door Protection: Provide new infrared full-length protection.
- Car Operating Panel: Provide new with car position indicator. Include all existing features and functionality. Include communications.
- Traveling Cable: Provide new.

F. Counter Weight:

- Roller Guides: Provide new rollers if needed.
- Buffer: Reuse existing

G. Halls:

- Firemen's Service: Provide new Phase 1 at Lower Floor Hall (incorporate with hall button) and Phase 2 (Car Operating Panel).
- Hoistway Access Switch: Provide new at 2nd Floor (Grand Hall) and 3rd Floor (Ball Room)
- Digital Corridor Arrival Lantern/Car Position Indicator: Provide new at each Floor above hall door.
- Hall Buttons: Provide new brushed stainless-steel surface mount type at all two landings.
- Hall Doors: Include replacement of Hall doors at both landings.

PART 3 – EQUIPMENT CHARACTERISTICS:

3.01 Traction Machine:

- A. Existing motor is DC and speed control is a Ward Leonard drive system and will be replaced by an Elevator Controller/AC motor.
- B. Existing Traction Machine consist of DC motor, brake, fixed coupling, worm gear reducer, traction sheave and deflector sheave mounted on an equipment frame. Upgrade options are as follows.

1. Option (1): Provide new AC Motor, new alignment flexible coupling and reuse the following- Brake, Worm Gear Reducer, traction Sheave, Deflector Sheave and Base Frame.
 - a. Brake will be updated with the addition of brake set and brake off switches and installation of new brake pads.
 - b. Base frame will be modified to mount new AC motor and installation of alignment coupling.
 - c. Motor Coupling: Provide a new modification coupling to be installed between the brake and the motor drive shaft. This coupling shall consist of two machined flanges separated by an inner hub to absorb misalignment and vibration. With this coupling the Worm Gear reducer input shaft shall support the brake drum used to lock the car in position when it stops.
 - d. Provide a location and mounting provisions for the new rope gripper located above traction machine and mounted to the hoistway structure or between the two deflector sheaves located at the top of the elevator hoistway.
 - e. Worm Gear Reducer shall be inspected for issues by performing the following: Remove gear reducer inspection cover to check worm gear wear and backlash, replace oil and air filter/breather.
 - f. If worm gear reducer is found unusable or needs repair bid Option (2) only.
 - g. The DC Motor and Generator will be removed and is being replaced by an AC motor/elevator control system.

2. Option (2): Provide the following new equipment mounted on a new base frame: AC Motor, Brake, Worm Gear Reducer, Rope Gripper, Traction Sheave and Deflector Sheave.
 - a. New Traction Machine with all new equipment specified in Section (2.02-C).
 - b. Rope Gripper- mount between the traction and deflector sheaves and fastened gripper to base frame.
 - c. All equipment shall be mounted on a base frame similar to existing frame and all equipment shall be aligned at the factory.
 - d. The DC Motor and Generator will be removed and is being replaced by an AC motor/elevator control system.

3. Option (3)- Remove the existing Traction Machine base frame assembly and send to Manufacturer for modification per Section (2.03-C)
 - a. Modified Traction Machine with all equipment specified in Section (2.02-C).
 - b. Mount AC Motor (N), Brake (E), Worm Gear Reducer (E), rope gripper (N), Traction Sheave (E) and Deflector Sheave (E), on the existing base frame modified at factory.

- c. All equipment shall be mounted on a base frame similar to existing frame and all equipment shall be aligned at factory.
 - d. The DC Motor and Generator will be removed and is being replaced by an AC motor/VFD elevator control system.
- C. For each elevator provide a new Traction Machine per Option (1) or Option (2) or Option (3) with both elevator #22 and #23 using the same option.
- D. The motor shall be AC, high starting torque, single-speed, inverter duty, of a standard manufacturer with duty rating that complies with the speed and loads detailed in this specification.
- E. New Traction Machine brake shall be a drum type, solenoid released and shall stop and hold the elevator with 125 percent of rated load. New brake is for Option (2) only.

3.02 DEFLECTOR SHEAVES:

- A. Inspect and reuse existing deflector sheaves.
- B. If sheaves need replacing provide the following:
 - a. Replace all sheave in-kind. Sheaves shall be of same size, material and rating as existing sheaves.
 - b. Sheaves on car and counterweight shall be provided with metal guards that prevent foreign objects from falling between ropes and sheave grooves and to prevent ropes from jumping out of grooves. Securely fasten guard to sheave support beams.

3.03 HOIST ROPES:

- A. Replace all hoist ropes in-kind. Provide elevator with the required number, type and size of ropes to ensure adequate traction and required safety factor. Hoisting ropes shall be pre-formed and five (5) 1/2"Ø 8 x 19 or 8 x 25 traction steel.
- B. Wire ropes to be made to and meet the latest revisions of standard ASTM A1023.
- C. Securely attach a corrosion resistant metal data tag near hoisting ropes connection to car top.

3.04 HOIST ROPE GRIPPER:

- A. To be installed to meet current elevator code.
- B. Locate Rope Gripper as follows:

1. Rope Gripper located on the Traction Machine base frame and between the traction and deflector sheave. This is probably only feasible for Option (2) or Option (3) since Traction Machine existing sheaves are too close to mount gripper between them.
2. Rope Gripper located between the two deflector sheaves located at the top of the elevator hoistway.
3. Rope Gripper located above and near Traction Machine and mounted to the hoistway structure.

C. Rope Gripper Type:

1. Solenoid release preferred if available
2. Hydraulic release

D. Acceptable Manufacturer of Rope Gripper are as follows, others may be use if approved before the bid:

1. Hollister-Whitney Rope Gripper

3.05 GOVERNOR ROPES:

- A. Replace all governor ropes in-kind. Provided Governor Rope shall be 6 x 19 or 8 x 19 wire rope, preformed traction steel, uncoated, fiber core, with a minimum nominal diameter of (.500 in.) having a minimum safety factor of 5.
- B. Existing car and counterweight Governor rope is 1/2" \emptyset with one (1) rope for car and one (1) rope for counterweight.
- C. Wire ropes to be made to and meet the latest revisions of standard ASTM A1023.
- D. Under normal operation rope shall run free and clear of governor jaws, rope guards, and other stationary parts.
- E. Securely attach governor rope tag to governor rope.

3.06 SPEED GOVERNOR:

- A. Inspect car and counterweight governor and if serviceable reuse or repair.
- B. If after inspection it's found they are not serviceable replace in-kind.

3.07 VENTILATION FAN:

- A. Replace existing two (2) speed ventilation fan with similar CFM, HP, Voltage and Phase.

- B. Blower unit is arranged to exhaust through an opening in the canopy. If required provide a new stainless or chrome plated fan grill on the interior side of the opening. Provide new screening over intake and exhaust end of blower.
- C. Mount fan on top of car with rubber isolation to prevent transmission of vibration to car structure. Provide a 3-position switch to control the unit in the service panel.

3.08 ELEVATOR LEVELING:

- A. The elevator control system shall provide two-way (i.e., up and down) leveling and shall be designed for automatic flush leveling of the car in both directions. Leveling control shall be done using a sensing system that, once in place and operational, requires no periodic adjustment.

3.09 TERMINAL LIMIT SWITCHES:

- A. New mechanical travel limit switches shall be provided to stop the motion of the car at its upper and lower limits.
- B. Switches shall be equipped with engaging arms with polyurethane rollers for engagement with cams on the car.

3.10 HOISTWAY DOOR INTERLOCKS:

- A. Provide new interlocks and door release roller assemblies at each entrance (two on Elevator #22 and Elevator #23).
- B. Each hoistway electrical/mechanical interlock will function as hoistway unit system, to prevent operation of car until all doors are locked in the closed position unless car is operating in leveling zone or hoistway access switch is used.

3.11 HOISTWAY DOOR UNLOCKING DEVICES:

- A. If new hall doors are provided, provide new hoistway door unlocking devices.

3.12 HOISTWAY DOOR CLOSERS:

- A. Provide new hoistway door closers to ensure that elevator doors are automatically shut when the car leaves the landing.

3.13 HOISTWAY DOOR HANGERS AND TRACKS:

- A. Provide new rolling assemblies and door tracks fastened to the top of the door panels to support the doors and allow horizontal sliding movement of the door panel.

3.14 CAR DOOR AND HOISTWAY DOOR SILLS:

- A. Re-use and clean existing car door and hoistway door sills.

3.15 HALL DOOR FRAMES:

- A. Re-use and clean existing hoistway door frames.
- B. Provide new Braille jamb plates and new Code-required signage at all halls.

3.16 HOISTWAY ACCESS SWITCH:

- A. Provide new hoistway access key switches at the top and bottom landings. These switches are to move the car up at the bottom landing to facilitate pit inspection and work and to move the car down at the top landing to provide access to the car top. These switches shall be located in their current location.
- B. Exposed portion of each access switch or its faceplate shall have legible, indelible legends to indicate "UP", "DOWN", and "OFF" positions.
- C. Each access switch shall be a constant pressure cylinder type lock having not less than five pins or five stainless steel disc combination with key removable only when switch is in the "OFF" position.
- D. Lock shall not be operable by any other key which will operate any other lock or device used for any other purpose at the PACC.
- E. Arrange the hoistway switch to initiate and maintain movement of the car. When the elevator is operated in the down direction from the top terminal landing, limit the zone of travel to a distance not greater than the top of the car crosshead level with the top floor. Submit design for approval.
- F. Provide emergency access for all hoistway entrances, keyways for passenger and service elevators.

3.17 TRAVELING CABLES:

- A. Provide new traveling cables for each elevator.
- B. All conductors to the car shall be installed in a flexible traveling cable conforming to the requirements of NEC.
- C. Traveling cables shall run from the junction box on the car directly to the elevator controller. Junction boxes on the car shall be equipped with terminal blocks.
- D. Terminal blocks shall have permanent indelible identifying numbers for each connection.
- E. Provide shielded wires for the telephone system within the traveling cable, one (1) RG-6 Ethernet cable for Wi-Fi, two (2) pair 14-gauge wires for 110 Volt power supply, and wire for video display monitor if specified.
- F. If traveling cable contacts, the hoistway or elevator due to sway or change in position, provide shields or pads to the elevator and hoistway to prevent damage to the traveling cables.
- G. Cables shall be UL-labelled fire and moisture resistant and manufactured for elevator hoistway applications.
- H. Cables shall include 10 per cent spare conductors.

3.18 MICROPROCESSOR CONTROL SYSTEM:

- A. Provide a microprocessor-based Elevator Controller in a steel frame NEMA Type 1 General Purpose Enclosure that includes a main disconnect switch, power supplies, relays, timers, switches and all other required components.
- B. Elevator Controller Enclosure shall be securely attached to the building structure.
- C. Microprocessor control system shall have absolute position/speed feedback to control dispatching, signal functions, door operation, and VFD Drive for hoist motor speed control.
- D. Include complete details of the control system components and printed circuit boards, together with a complete operational description, shall be submitted for approval. Add Regenerative Drive when economically advantages to the PACC.
- E. Elevator failure may result from many reasons some of which can be failure of the motor, control system, elevator overspeed, doors failure to close or open, elevator failure to start moving and failure to stop at the correct landing.

1. The elevator control system shall be designed such that if there is an elevator failure the brake shall be engaged, the car should remain at its current level and the doors open if the car is at the proper landing level.
 2. If the car fails to reach its landing in the up or down direction when elevator failure occurs, the motor should stop, the brake should be applied and the control system should signal an alarm.
- F. Manual controls shall be provided to lower the elevator car down to the lowest terminal landing if elevator failure occurs. Power operated doors will automatically open when the car reaches that landing to allow passengers to disembark. The doors will then automatically close and all control buttons except for the "door open" button in the car operating panel shall be made inoperative. The malfunction can then be corrected after which the elevator can be placed back into service.
- G. Recommended Elevator Control Systems Manufacturers are as follows and others may be added if approved by PACC engineer:
1. Smartrise Universal AC Traction Controller
 2. Nidec Motion 4000 for AC Traction Elevators
 3. VC Vision 2.0 controller for AC Traction Elevators
 4. Kone Elevator Controller
- H. Provide Recommended Spare Parts for Elevator Controller.
- I. Controller manufacturer shall provide factory training, engineering and technical support, including all manuals, wiring diagrams, and tools necessary for adjusting, maintenance, repair, and testing of equipment for the Elevator Maintenance Service Provider.
- J. The Elevator Controller shall include a motion control system to perform all functions of safe elevator motion, speed control and elevator door control. The motion control system shall include all hardware and software that is required to connect, transfer and interrupt power and shall provide overload protection for the equipment.
- 3.19 GUIDE RAILS AND BUFFERS:
- A. Guide rails for both elevators are to be re-used. Guides for each elevator shall be thoroughly cleaned and re-lubricated. Connections to the building structure shall be inspected to ensure integrity.
 - B. Each elevator's car and counterweight buffers shall be inspected for defects, tested and re-used if passes testing. Remove all dirt, debris, rust and paint with an epoxy coating.

3.20 PIT STOP SWITCHES:

- A. Provide new pit emergency stop switches. Switches shall be maintained, red color, emergency stop pushbutton with a yellow back plate in a cast metal Switches shall be NEMA 13 device box. All circuits to the switch shall be Class 1.
- B. An annunciator lamp shall illuminate on the Elevator Control Panel when the emergency stop pushbutton is push in and shall remain lit until the button is pulled out and the system is rest at the Elevator Control Panel.
- C. When pushed into the stop position, the emergency switch shall engage the safe torque off function of the elevator control system variable frequency drive.

3.21 HALL DOORS:

- A. Provide all new hall door panels. Elevator #22 and #23 have two landings.
- B. Doors are single-speed side sliding.
- C. Doors shall have a 16-gauge steel fronts with 316 stainless steel panels finish similar to door stainless steel frame.
- D. Hall doors shall be UL fire-rated for 1.5 hours.

3.22 CAR DOORS:

- A. Provide new stainless steel car doors for each elevator. Stainless steel door panel finish to match car interior panels.
- B. Car doors shall be UL fire-rated for 1.5 hours.

3.23 CAR INTERIOR PANELS:

- A. Replace the existing car interior panels with new panels.
- B. New panels shall be stainless steel. Provide small samples of panels with the following finishes: Satin, Linen, Random Swirl and two other textured finishes, for approval by PACC.
- C. Interior shall include a 4-inch flat bar handrail.
- D. Existing flooring shall be replaced with a vinyl stone pattern floor. Provide small floor samples for approval by PACC.
- E. Provide new toe kicks.

- F. Provide new modular downlight ceiling with brushed or satin stainless panels and LED lighting.
- G. A new 120 VAC, duplex, GFCI receptacle shall be included.

3.24 CAR DOOR INTERLOCK CONTACT:

- A. Provide new car door interlock contact on each new car door.

3.25 CAR DOOR ROLLER GUIDES, HANGERS AND TRACKS:

- A. Provide new car door roller guides, hangers and tracks for each new car door.

3.26 DOOR OPERATORS:

- A. Provide a new door operator for each elevator car.
- B. Door operators shall have the "closed loop" feature, capable of opening doors at not less than 1.5 feet per second and accomplishing reversal in 2.5 inches maximum of door movement.
- C. Doors shall open automatically when the car arrives at a floor landing to permit passengers to get on or get off the car. After a timed interval, the doors shall automatically close. The opening and closing shall be done smoothly and shall be cushioned at both limits of travel.
- D. The operator shall be arranged such that the door cannot be opened by hand from inside the car in case of a power failure if the car is within the leveling zone at a landing.
- E. The elevator car shall not be able to move away from a landing until the car door is fully closed. Door closure shall be monitored with a contact switch that will prevent elevator operation if the door is not fully closed.

3.27 DOOR PROTECTION/RE-OPENING AND CONTROL DEVICE:

- A. Provide new infrared full screen full-height of door control device with differential timing, nudging and interrupted beam time.
- B. Recommended infrared door control device manufacturers are as follows and others may be added if approved by PACC engineer:
 - 1. Janus Elevator E200 Safety Edge
 - 2. CEDES Corporation cegard/Max-NT
 - 3. Mitsubishi Electric Multi-Beam Door Sensor

3.28 ELEVATOR FIXTURES:

- A. Standard fixtures for Car Operating Panels, Hall Stations and Lanterns may be considered or offered if they meet this specification.
- B. Recommended Elevator fixture manufacturers are as follows and others may be added if approved by PACC engineer:
 - 1. EPCO Elevator Products Corporation
 - 2. Innovation Industries Inc.
 - 3. Lift Solutions Inc.
 - 4. Schindler Elevator
 - 5. Kone Elevator
 - 6. ThyssenKrupp Elevator Company

3.29 CAR OPERATING PANEL:

- A. There are standard car operating panel that can be modified to meet the following requirements and should be considered. Submit samples to PACC for approval of selected Car Operating Panel.
- B. Provide a new finished stainless-steel car operating panel for each elevator located near the existing panel opening and relocate if the top floor car call push button is more than 48 in above the finished floor.
- C. Button Type:
 - 1. Call buttons- Bar Push Button with a minimum width of 0.75", minimum length of 3" and shall contain an integral LED white light which shall illuminate upon registration of a call and shall extinguish when that call is answered.
 - 2. Other Buttons- Round Push Buttons with a minimum of 1" dia.
 - 3. Buttons- If required shall contain an integral LED white light which shall illuminate upon pressing.
 - 4. Car bar buttons, round buttons and indicator lights shall be engraved with a black color below the surface by a minimum of 0.03".
 - 5. Indicator Light - Round with a minimum 1" Dia and LED illuminated
- D. All terminology and tactile symbols on the faceplate shall be 0.25 in letters to identify all devices in the faceplate. The tactile symbols with contrasting background shall be 0.5 in high raised .030 in on the plate.
- E. The upper section shall contain the following items in order listed from top to bottom:

1. Elevator number, 0.50 in high with black paint for contrast.
 2. Capacity plate information with black paint for contrast with freight loading class and number of passengers allowed.
 3. LED illuminated digital car position indicator with direction arrows.
 4. Key operated Independent Service Switch on the face of panel.
 5. Provide a Door Hold Button on the faceplate and it shall have "DOOR HOLD" indelibly marked on the button. Button shall light when activated. When activated, the door shall stay open for a maximum of one minute. To override push a car call button or door close button.
 6. Complete set of call bar push buttons with LED white light illuminated, corresponding to the floors served. These bar buttons shall be legibly and indelibly identified by a floor name and letters not less than 0.50 in. high in the face of the call bar button.
 7. Call cancel button shall be located below the call bar buttons and shall have "CALL CANCEL" legibly and indelibly identified by letters in the face of the respective button.
 8. Door Open and Door Close buttons shall be located below the car call buttons. They shall have "OPEN" and "CLOSE" legibly and indelibly identified by letters in the face of the respective button. The Door Open button shall be located closest to the door jamb.
 9. Red Emergency Alarm button that shall be located below the car operating buttons. Mount the emergency alarm button not lower than 35 in. above the finished floor. It shall be connected to audible signaling devices. Provide audible signaling devices including the necessary wiring.
 10. Provide "HELP" button with tactile symbol signage and Braille adjacent to button mounted integral with car operating panels. Emergency Help push button shall activate two-way communications by Auto Dial telephone system that is compatible with the PACC telephone system. Help button shall be LED white light illuminated and flash when call is acknowledged. Legibly and indelibly label the button "HELP" in the face of the button with 0.50 in. high letters.
 11. Floor passing audible signal shall be included.
- F. Key-operated switches shall be provided in the service operation panel in the lower section. These key switches shall contain the following items:
1. Light switch labeled "LIGHTS" for controlling interior car lighting with its two positions marked "ON" and "OFF".
 2. Inspection service switch that will disconnect normal operation and activate hoistway access switches at terminal landings. Switch shall be labeled "ACCESS ENABLE" with its two positions marked "ON" and "OFF".
 3. Three-position switch labeled "FAN" with its positions marked "HIGH", "LOW" and "OFF" for controlling car ventilating blower.

4. Two-position, spring return, toggle switch or push button to test the emergency light and alarm device. It shall be labeled "TEST EMERGENCY LIGHT AND ALARM".
 5. Independent service switch labeled "ON" AND "OFF".
 6. Car stop switch
- G. The panels shall include self-illuminating floor registration bar buttons with markings as described below.
1. For Elevator #22 and #23 make the Text and bar buttons as follows:
 - a. Floor Two: Mark the text/braille panel marking "2" and the illuminated bar button labeled "Grand Hall level".
 - b. Floor Three: Mark the text/braille panel marking "3" and the illuminated bar button labeled "Ball Room Level".
- H. All buttons shall be designated by raised markings with Braille, applied with concealed fasteners to meet ADA requirements.
- I. Fasten car operating panel and signal device faceplates with stainless steel tamperproof screws.
- J. Submit design of car operating panel for approval by PACC.

3.30 HALL OPERATING PANEL:

- A. There are Standard Hall Operating Panels that meet most of the following requirements which should be considered. Submit samples to PACC for approval of selected Hall Operating Panel.
- B. Provide a new finished stainless steel Hall Operating Panel for elevator operation and signaling device. Locate the centerline of the hall push buttons at existing opening or 42 in. above the corridor floor.
- C. Fasten hall operating panel and signal device faceplates with stainless steel tamperproof screws.
- D. All terminology and tactile symbols on the faceplate shall be raised 0.03 inch with contrasting background on square or rectangular plates. The handicapped markings with contrasting background shall be 0.5 in. high raised 0.03 in on the plate, square or rectangular. Use 0.25 in. letters to identify all other devices in the faceplate.
- E. Provide one hall call button for each elevator or group of elevators as shown on contract drawings.

- F. Each button shall contain an integral registration LED white light which shall illuminate upon registration of a call and shall extinguish when that call is answered.
- G. The direction of each button shall be legibly and indelibly identified by arrows not less than 0.50 in. high in the face of each button.
- H. Hall push buttons shall not re-open the doors while the car and hoistway doors are closing at that floor, the call shall be registered for the next available elevator. Calls registered shall be canceled if closing doors are re-opened by means of "DOOR OPEN" button or infrared curtain unit.
- I. Provide emergency power indicator light, medical emergency key switch and indicator light, fire service recall key switch and indicator light, fire recall instruction, communication failure light, audible enunciator, and reset key switch in a separate fixture at the designated main floor.
- J. Submit design of hall pushbutton fixtures for approval by PACC.

3.31 CAR POSITION INDICATOR:

- A. There are Standard Car Position Indicators that meet most of the following requirements which should be considered. Submit samples to PACC for approval of selected Car Position Indicator.
- B. Provide an alpha-numeric digital car position indicator in the main car operating panel, consisting of numerals and arrows not less than 2 in. high, to indicate position of car and direction of car travel. Locate position indicator at the top of the main car operating panel, illuminated by light emitting diodes.
- C. Submit design of position indicator for approval by PACC.

3.32 DIGITAL CORRIDOR ARRIVAL LANTERN/POSITION INDICATOR:

- A. There are Standard Car Lantern Position Indicators that meet most of the following requirements which should be considered. Submit samples to PACC for approval of selected Car Position Indicator.
- B. Provide elevator with a combination corridor lantern/position indicator digital display mounted over the hoistway entrances at each floor.
- C. Provide each hall with "UP" and "DOWN" digital arrow lanterns similar to the existing size. The lenses in each lantern shall be illuminated green to indicate "UP" travel and red to indicate "DOWN" travel.

- D. Each lens shall be LED illuminated of proper intensity and shielded to illuminate individual lens only.
- E. Lanterns shall signal in advance of car arrival at the hall indicating the direction of travel. Corridor lanterns shall not be illuminated when a car passes a floor without stopping. Each lantern shall be equipped with an audible electronic chime which shall sound once for "UPWARD" bound car and twice for "DOWNWARD" bound car. Audible signal shall not sound when a car passes the floor without stopping. Provide adjustable sound level on audible signal.
- F. Lantern/Position Indicator faceplate shall be finished stainless steel. Numerals shall be not less than 2.5 in. high with direction arrows. Cover plates shall be readily removable for re-lamping. The appropriate direction arrow shall be illuminated during entire travel of car in corresponding direction.
- G. Submit design of position indicator for approval by PACC.

3.33 CAR TOP MAINTENANCE OPERATING STATION:

- A. Car top maintenance operating station shall include as a minimum the following controls:
 - a. "Up" button and "Dn" button
 - b. "Alarm" and "Fire service button"
 - c. "Run"/"Stop" switch and "Enable/Safe" button
 - d. "Light" On/Off switch
 - e. Ceramic incandescent light bulb socket
 - f. "Operate/Inspection" switch
 - g. 3-Prong electrical outlet, 15A 125VAC
 - h. Battery Type- Maintenance Free LiFePO4 or Nickel-Cadmium and solid-state circuitry
 - i. Two-position emergency stop switch, when operated, shall interrupt power supply and stop the elevator independently of regular operating devices. Emergency stop switch shall be marked "PUSH TO STOP" and "PULL TO RUN".
- B. Provide cut sheet of maintenance station to PACC for approval.

3.34 COMMUNICATIONS SYSTEM (Emergency):

- A. Each car shall have an emergency communication system. The emergency communication system shall comply with Federal Communications Commission (FCC) regulations and all requirements of the Americans with Disabilities Act (ADA).

- B. Provide a two-way emergency communication device in the car with automatic dialing, tracking and recall features with shielded wiring to car controller in machine room.
- C. Provide dialer with automatic rollover capability with two numbers and communications between the elevator car and a point outside of the hoistway. Each elevator shall have individual phone numbers.
- D. The auto dial system may be in the main or auxiliary car operating panel. The speaker and dial controller shall be mounted on the backside of the perforated stainless-steel plate cover.
- E. The emergency communication system shall include both audio and visual two-way communications.
- F. "HELP" button shall illuminate and flash when call is acknowledged. Button shall match floor push button design.
- G. Provide "HELP" button tactile symbol signage and Braille adjacent to button mounted integral with car operating panels.
- H. The system shall be programmed to automatically dial a programmable number that is outside of the hoistway and will be answered during normal operation by a PACC representative who can work to resolve the emergency. The emergency communication system shall provide the receiving representative with the building and elevator number from which the emergency call was placed.
- I. If the operator ends the call, the passenger shall be able to redial the telephone immediately.
- J. Visual messages shall be provided to indicate the status of the actions being taken in response to the emergency call.
- K. The emergency communication system shall be mounted behind the car operating panel.
- L. Raised letter and Braille shall be integrated and permanently marked on the operating panel identifying the device as a speech independent emergency telephone

3.35 PIT LIGHTING AND RECEPTACLE:

- A. Replace existing pit lighting, receptacle and light switch. Where possible, maintain existing 120 VAC circuit to this equipment. Provide new conduit and wire as required. Separate branch circuits shall be provided for the pit lighting and new GFCI receptacle.
- B. New light shall be 120 VAC LED fixture with guards to prevent accidental damage and shall provide a minimum of 30 foot-candles of illumination in the pit.

- C. New receptacle shall be 120 VAC, duplex GFCI type in cast iron device box.
- D. Light Switch shall be 20 Amp, 120 Volt, specification grade.
- E. Light and receptacle shall be located so that they are out of the way of elevator equipment. Light switch shall be a minimum of 18 inches above the lowest hall door sill and adjacent to (not behind) the pit access ladder.

3.36 MACHINE ROOM LIGHTING AND RECEPTACLE:

- A. Replace existing machine lighting, receptacle and light switch. Where possible, maintain existing 120 VAC circuit to this equipment. Provide new conduit and wire as required. Separate branch circuits shall be provided for the machine room lighting and new GFCI receptacle.
- B. New light shall be 120 VAC LED fixture with guards to prevent accidental damage and shall provide a minimum of 50 foot-candles of illumination in the pit.
- C. New receptacle shall be 120 VAC, duplex GFCI type in cast iron device box.
- D. Light Switch shall be 20 Amp, 120 Volt, specification grade, motion sensing with an on/off switch.
- E. Light fixture and receptacle shall be located at the same locations as the existing.

3.37 ELEVATOR SHUNT TRIP CIRCUIT BREAKER

- A. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components must be completely isolated from handle and accessory mounting area.
- B. Circuit breakers shall have toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. Circuit-breaker handle must be over center, be trip free, and reside in tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon must be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with push-to-trip button, located on face of circuit breaker to mechanically operate circuit-breaker tripping mechanism for maintenance and testing purposes.
- C. Maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings must be clearly marked on face of circuit breaker.
- D. MCCBs must be equipped with device for locking in isolated position.
- E. Lugs must be suitable for 60 deg C rated wire on 125 A circuit breakers and below

- F. Standard: Comply with UL 489 with required interrupting capacity for available fault currents.
- G. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal element for low-level overloads and instantaneous magnetic trip element for short circuits.
- H. Features and Accessories – raceways and wires for which shall be provided by the electrical contractor
 - a. Shunt Trip: A 24 VDC shunt trip coil that will be energized from a 24 VDC circuit from the fire alarm system after receiving a signal from the elevator control panel following the activation of the heat detector in the machine room or hoistway.
 - b. The Elevator Control Panel shall provide a normally open, dry contact that closes when the 24VDC shunt trip voltage is available and opens when it is not. The contact shall be monitored by the fire alarm system.
 - c. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts shall be monitored by the fire alarm system. The contact will be monitored by the fire alarm system.
 - d. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material

3.38 SURGE PROTECTION

- A. General Characteristics:
 - a. Reference Standards: UL 1449, Type 2
 - b. MCOV: Not less than 125 percent of nominal system voltage for 208Y/120 V and 120/240 V power systems, and not less than 115 percent of nominal system voltage for 480Y/277 V power systems.
 - c. Peak Surge Current Rating: Minimum single-pulse surge current withstand rating per phase must not be less than 100 kA. Peak surge current rating must be arithmetic sum of the ratings of individual MOVs in a given mode.
 - d. Protection modes and UL 1449 VPR for grounded wye circuits with **480Y/277 V**, three-phase, four-wire circuits must not exceed the following:
 - a) Line to Neutral: **1200 V for 480Y/277 V**
 - b) Line to Ground: **1200 V for 480Y/277 V**
 - c) Neutral to Ground: **1200 V for 480Y/277 V**
 - d) Line to Line: **2000 V for 480Y/277 V**
 - e. SCCR: Equal or exceed **100 kA**.
 - f. I_n Rating: **20 kA**.

B. Options:

- a. Include LED indicator lights for power and protection status.
- b. Include internal thermal protection that disconnects the SPD before damaging internal suppressor components.

3.39 ELECTRICAL WIRING:

- A. Electrical wiring shall comply with the requirements of ASME 17.1 and NFPA 70 (National Electrical Code (NEC) and all local codes. Wiring (other than the Car Traveling Cable) shall be 600 Volt insulated wire that includes a flame retardant and moisture-resisting outer cover.
- B. All wiring shall be sized per the NEC and installed in wireway or conduit. Connect motor or other items subject to movement, vibration or removal to the conduit systems with flexible, steel conduits.
- C. All conduit terminating in steel cabinets, junction boxes, wireways, switch boxes, outlet boxes and similar locations shall have insulation bushings.
- D. Joints or splices are not permitted in wiring except at outlets.
- E. All wiring must test free from short circuits or ground faults. Insulation resistance between individual external conductors and between conductors and ground shall be a minimum of one megohm.
- F. Wiring shall be included for all devices that are installed on this project.
 1. The existing wireway in the hoistway and between the machine room and the hoistway can be re-used if:
 - a. It is in good condition.
 - b. It is properly sized for the number of conductors and cables that are to be installed in it.
 2. Provide new wireway between the machine room and the hoistway as required. Wireway shall be steel, NEMA 12.
 3. New conduit shall be rigid galvanized steel.
 4. Provide complete wiring to connect all parts of the equipment. Properly ground all components as required by the National Electrical Code.
 5. Provide 10 per cent spare wires between the controller in the machine room and the main junction box in the hoistway.

6. All wires shall be properly tagged and identified with clear markings. Wire numbers that are consistent with the system control diagrams shall be placed on each end of each wire and all termination points and splices.
7. All wiring shall be tested point to point. The entire wiring system shall be tested for insulation to ground.

3.40 EMERGENCY CAR LIGHTING BATTERY BACK-UP (OPTIONAL):

- A. Battery backup for car's LED lighting shall power lighting during the shift over time between power downtime and standby generator startup. Thus, this battery can be small since it only needs to last a few minutes.
- B. The specified battery backup inverter requires 120 Volts input and provides 120 Volts output, 25 watts power and automatic charging all within a 3" x 3" x 18" long enclosure. This battery will be installed within the power feed to a minimum of two ceiling LED lights until the load reaches about 30 Watts.
- C. The emergency lighting shall illuminate through the architecturally specified LED lighting designs, for an uncompromised cab interior.
- D. Each battery unit consists of a battery, charger and electronic circuitry in one steel case. It provides power to the input side of the LED fixtures.
- E. Upon failure of normal power, the battery instantly begins providing emergency power to the connected lighting load for a minimum of 90 minutes. When normal power is restored, the battery automatically returns to charge mode. The battery capacity is fully restored in about 24 hours.
- F. Battery Specifications:
 1. Listed to UL924 Field or Factory Installation (Indoor and Damp) Output Class 2 Compliant.
 2. Illumination Time 90 Minutes.
 3. Maximum Load Power 25 W
 4. Full Warranty 5 years
 5. AC Input Voltage 120 or 277 VAC, 60 Hz
 6. Output Voltage 120 VAC, 60Hz
 7. Test Switch Single Pole (Momentary)
 8. Battery Type- Maintenance Free LiFePO4 or Nickel-Cadmium
 9. Battery Recharge Time about 24 Hours.
 10. Charging Indicator Light LED

11. Temperature Rating (Ambient) 32° F to 122° F
 12. Weight 5 lbs. (2.3 kg)
 13. Approximate size is 3" x 3" x 18" long metal case.
 14. Battery shall allow the connected fixture(s) to be on, off, switched or dimmed without affecting emergency operation.
- G. The following battery manufacturers equipment products are acceptable for this project (others may be added if approved by PACC):
1. Fulham Model# FHUPS1-UNV-25L-SD
 2. Bodine Model# ELI-S-20 battery inverter
 3. ECI MerLite 2000 Series
- 3.41 TOP OF CAR HANDRAIL:
- A. Provide new code-compliant top of car handrail.

PART 4 – PROJECT EXECUTION:

4.01 EXECUTION:

- A. Modernize Elevator #22 first and once this is complete and commissioned Elevator #23 modernization shall begin.
- B. Acceptable Installers: The work for the elevator modernizations shall be done by the elevator manufacturer or elevator contractor.
- C. Examination: Prior to beginning the work, the elevator contractor shall carefully examine the hoistway, hoistway openings, pits and machine rooms. All critical dimensions shall be field-verified. The contractor shall examine all other conditions under which the modernizations are to be completed.
- D. The contractor shall notify the PACC in writing of any dimension discrepancies or other conditions detrimental to the proper installation for the modernizations or performance of the elevators after the modernizations. Work shall not begin until all unsatisfactory conditions are corrected.
- E. Installation: Comply with the manufacturer's instructions and recommendations for all work required during the modernizations.

- F. Demonstration: The contractor shall make a final check of both elevators that were modernized to ensure operation is per the specifications. Each elevator shall run in “test mode” for 24 hours prior to being turned over to the PACC.

4.02 PROJECT SPECIFIC WORK SCHEDULE:

- A. All work generating a high level of noise (e.g., drilling, cutting, etc.) shall be done after hours unless approved otherwise by the PACC.
- B. Any electrical outages shall be approved by the PACC prior to electrical equipment being de-energized.

PART 5 – PROJECT BIDDING:

5.01 BID:

- A. The contractor’s bid shall include the items listed below.
1. Base Bid Cost for Modernization of Elevators #22 & #23 per this Specification and including any required repairs. Provide six (6) bids as follows:
 - a. Provide bid for Elevator #22 Modernization with Elevator #22 Repairs and Traction Machine Option (1) modification.
 - b. Provide bid for Elevator #22 Modernization with Elevator #22 Repairs and Traction Machine Option (2) modification.
 - c. Provide bid for Elevator #22 Modernization with Elevator #22 Repairs and Traction Machine Option (3) modification.
 - d. Provide bid for Elevator #23 Modernization with Elevator #23 Repairs and Traction Machine Option (1) modification.
 - e. Provide bid for Elevator #23 Modernization with Elevator #23 Repairs and Traction Machine Option (2) modification.
 - f. Provide bid for Elevator #23 Modernization with Elevator #23 Repairs and Traction Machine Option (3) modification.
 2. Bid Options:
 - a. Include as a separate cost for car battery back-up per Section (3-38).
 3. Full Maintenance Bid for equipment warranty period per Section (1-07).