SECTION 14300
ELECTRIC HYDRAULIC ELEVATOR

1. GENERAL

1.1. INTENT OF THE CONTRACT DOCUMENTS

A. The full intent, meaning and spirit of the Specification/Contract Documents is to provide a complete and finished product.
B. The Specification establishes the quality of materials and workmanship to be performed. They are not intended to describe every step or detail in the process of the elevator installation. Procedures, craftsmanship and materials of high quality shall be employed where not specifically delineated in the Specifications.

1.2. QUALIFICATION OF CONTRACTOR

A. The successful bidder shall hereinafter be called "Contractor."
B. The Contractor shall be regularly engaged in the business of servicing equipment of the type and character required by this document. It is imperative that the Contractor have satisfactorily maintained and installed equipment of the same manufacture and grade, and to the degree included in the following specifications, for a period of at least five (5) years. The Contractor will be one who is regularly established in the business called for and who, in the judgment of the Elevator Consultant, is financially responsible and able to show evidence of ability, reliability, experience, facilities, equipment, and personnel directly employed or supervised by the Contractor to render prompt and satisfactory service.
C. The Contractor shall cooperate with the Owner, the Owner's representative, the Consultant, and/or other trades, by providing all labor, supervision and materials, as specified, for the successful completion of the work specified herein and any agreed to additional work during the term of the contract.
D. All employees of the Contractor shall wear full laundered uniforms that clearly identify the employee as an agent of the Contractor.
E. The Contractor shall provide all employees servicing the Owner's facilities with pagers.
F. The Owner reserves the right to request removal of any of the Contractor's employees from the project site at any time for any reason.

1.3. WORK SEQUENCE

A. Contractor is advised to make preparations for coordination of its work with that of other trades. Contractor is further advised that due to the normal use of the building, (that of occupied living structure) special effort, cooperation and precautions are necessary so as to minimize the disruption of ordinary functions.
B. The Contractor shall submit a schedule of working hours to the Owner for approval. The schedule is subject to approval and revisions by the Owner.

1.4. WORK HOURS

A. The Contractor is advised that all work will be performed during normal working days of the Elevator Industry not including Saturdays, Sundays and Holidays until completion.

1.5. CONTRACTOR USE OF THE PREMISES

A. Confine operations at the site to areas permitted by: Law, Permits and Contract.

B. Confer with the Owner's Representative and obtain full knowledge of all site rules and regulations affecting the work.
C. Conform to site rules and regulations while engaged in project construction.
D. Site rules and regulations take precedence over others that may exist outside such jurisdiction.
E. Do not unreasonably encumber the site with material or equipment.
F. Do not load the structure with weight that will endanger the building or its inhabitants.
G. Assume full responsibility for the protection and safekeeping of the products stored on the site.
H. Limit the use of the site for work and storage.

1.6. TEMPORARY BARRIER PROTECTION

A. The Contractor shall provide protection, barricades and coverings required by local Building Codes and Ordinances, and shall maintain lights and/or signals as a warning during the work -- removing same when completed.
B. Barrier materials and construction, where dust and accident prevention are required, shall be rigid, durable and maintained in a sightly condition as approved by the Owner.
C. Fire prevention facilities shall include fire-proof barriers where cutting or repairing by torch is involved and fire extinguishers where flammable demolished materials accumulate.

1.7. EQUIPMENT AND HOISTING

A. The Contractor shall furnish adequate equipment and use great care in the hoisting and handling of materials and equipment so as not to damage adjacent and existing construction. All damage to the existing building, adjacent structures, walks, drives and facilities caused by the Contractor's work shall be repaired by the Contractor, at no additional cost to the Owner.

1.8. PRE-CONSTRUCTION MEETING

A. A pre-construction meeting shall be scheduled by the Owner's representative.
B. Attendance:
    1. Owner's Representative and/or Elevator Consultant.
    2. Contractor.
    3. Subcontractor(s).
C. Agenda:
    1. Tentative construction schedule.
    2. Critical work sequencing.
    3. Designation of responsible personnel.
    4. Establishment of a chain of authority.
    5. Processing of field decisions and change orders.
    6. Elevator product information:
        a. Contractor shall submit, for information only, the manufacturer's specifications and installation instructions for each component or product furnished in the system. Include certified laboratory test reports on components as specified or required by ASME/ANSI A17.1. Include a complete listing and description of the performance and operating characteristics. Include a complete description of the operating system(s), documenting fulfillment of the requirements, where applicable.
    7. Elevator shop drawings:
        a. Submit shop drawings that pertain to new equipment installed on any unit.
        b. Assemble the shop drawings into one coordinated submittal.

8. Permits.
9. Safety and first aid procedures.
10. Housekeeping procedures.
11. Security procedures.
12. Progressive payment schedule.
13. Certificate of insurance.
14. Performance bond.
15. Signed contracts.

1.9. CONSTRUCTION SCHEDULE

A. **REQUIRED** - The Contractor shall submit a complete schedule of the work to be performed under this specification. The schedule shall show time lines for completion of each unit covered by this specification.

1.10. PAYMENT AND MANAGEMENT MEETINGS

A. **REQUIRED -** The Contractor shall submit a "schedule of values" for the project. The Schedule of Values will be used to compare actual site completion to determine pay outs to the Contractor. Spreadsheets or AIA documents may be used.
B. The Owner will schedule progress meetings.
C. The Owner and/or the Elevator Consultant will ascertain that the work is expedited consistent with the construction schedule and contract.
D. Meeting dates, time and location will be established at the pre-construction meeting.
E. Attendance:
   1. Owner's Representative and/or Elevator Consultant and/or Architect.
   2. Contractor
F. Agenda:
   1. Review the work progress since the last meeting.

1.11. CHANGE ORDER REQUESTS (See General & Special Conditions)

1.12. TAXES (See General & Special Conditions)

1.13. STORAGE AND PROTECTION

A. Description:
   1. The Contractor shall make arrangements with the Owner for the storage of material and equipment.
   2. The protection and security for stored materials and equipment, on and off the site, is solely the Contractor's responsibility
B. Submittals:
   1. Request for allocation of storage space.
   2. List of materials and equipment to be stored.
   3. Proposed location for storage.
   4. Special storage requirements.
   5. Schedule of anticipated storage dates.

1.14. SUBSTANTIAL COMPLETION

A. Contractor:
   1. Notify the Owner's Representative in writing that the project, or designated portion thereof, is substantially complete.

2. Upon completion of the preliminary Elevator Consultant punch list, the Contractor shall submit the following:
    a. Operation and maintenance data.
    b. Guarantees and warranties.
    c. Interfacing information.

B. The Owner's Representative and/or the Elevator Consultant will prepare a punch list of items to be completed or corrected, as determined by the inspection.
1. The Owner's Representative and/or the Elevator Consultant will prepare and process a certificate of substantial completion, containing:
    a. The date of substantial completion.
    b. A punch list of items to be completed or corrected.
    c. The time within which the Contractor shall complete or correct the work of the listed items.
    d. The date and time that the Owner's Representative will assume possession of the work or the designated portion thereof.
    e. The responsibilities of Ownership and the Contractor for:
        1) Insurance.
        2) Operation of elevators.
        3) Maintenance and cleaning.
2. The Owner's Representative will occupy the project or designated portion thereof, under the provisions stated in the certificate of substantial completion, when:
    a. The Contractor has completed the work listed for completion or correction.
    b. The Contractor has performed a final cleaning.

1.15. FINAL INSPECTION

A. The Contractor shall notify the Owner's Representative of the following:
1. All aspects of the contract documents have been complied with.
2. All tools, construction equipment and surplus materials have been removed from the site.

B. The Contractor along with the Owner's Representative and/or the Elevator Consultant will make a final inspection to ensure the completion of all of the contract requirements.

C. When the Owner's Representative and/or the Elevator Consultant considers that the work is finally complete, in accordance with the contract document requirements, the Contractor shall then process the close-out.

1.16. CLOSE OUT SUBMITTALS

A. The Contractor shall submit project record documents.

B. The Contractor shall deliver evidence of compliance with the requirements of the governing authorities.

1.17. FINAL ACCEPTANCE

A. Final Acceptance is defined as the date in which all punch list items submitted by the Elevator Consultant are verified as complete. In addition, all drawings, manuals and keys must be submitted, reviewed and accepted by the Elevator Consultant.

1.18. PROJECT RECORD DOCUMENTS

A. The Contractor shall maintain at the project site, one copy of the following:
1. Contract drawings, including details.
2. Project manual.

3. Interpretations and supplemental instructions.
4. Addenda.
5. Reviewed shop drawings.
6. Change orders.
7. Other modifications to the contract.
8. Field test records.
9. All schedules.
10. Correspondence file.
11. Modified electrical drawings.

B. The Contractor shall make documents available at all times for the inspection by the Owner's Representative and/or the Elevator Consultant.

C. At the completion of the project, the Contractor shall deliver the record documents to the Owner's Representative.

D. The Contractor shall accompany the final submittal with a transmittal containing:
1. Date.
2. Project title and number.
3. Contractor's name and address.
4. Title and number of each record document.
5. Certification that each document, as submitted, is complete and accurate.
6. Signature of the Contractor, or his authorized representative.

1.19. MANUAL FOR EQUIPMENT

A. **REQUIRED** - All items listed in this section.

B. Submit three copies of a complete manual in final form.

C. The content, for each unit of the equipment and system, as appropriate, is as follows:
1. Description of unit and component parts:
a. Function, normal operating characteristics and limiting conditions.
b. Complete nomenclature and commercial number of all replaceable parts.
c. Source of all the replaceable parts that are furnished.
2. Operating procedures:
a. Special operating instructions.
3. Maintenance procedures:
a. Routine operations.
4. Servicing and lubrication schedule.
a. List of required lubricants.
5. Manufacturer's current printed operating and maintenance instructions.
6. Manufacturer's description of the sequence of operation.
7. Manufacturer's parts, lists illustrations, assembly drawings and diagrams required for maintenance.
8. As-installed control diagrams by the control manufacturer. In addition to providing three sets of drawings (one for each manual), the Contractor shall furnish and install one set of wiring diagrams in the machine room of each unit receiving a controller modernization. The set of wiring diagrams installed in the machine room shall be laminated.
9. List of the manufacturer's spare parts, current prices and recommended quantities to be maintained on site.
10. Other data as required in pertinent specification sections.

D. Prepare and include additional data when need for such data becomes apparent during instruction to Owner's personnel.

1.20. INSTRUCTION FOR OWNER'S PERSONNEL

A. Prior to the final inspection or acceptance, fully instruct the Owner's designated management and maintenance personnel in the operation of the new equipment.

1.21. GENERAL CONDITIONS

A. The Contractor under this Division of the Work is referred to the General & Special Conditions, all of which are made a part of this Specification.

1.22. SCOPE OF WORK

A. Bidders shall include all labor, materials, demolition and services required for the complete installation of all the elevator equipment as herein specified.

B. In all cases where a device or part of the equipment is herein referred to in the singular, it is intended that such reference shall apply to as many of such devices or parts as are required to make a complete installation.

C. The Contractor fully understands that in all instances when "furnish and install" is referenced, the removal of any old equipment is the responsibility of the Contractor.

D. The Contractor assumes control of any equipment replaced. In addition, the Contractor is responsible for the removal of any old equipment from the site.

E. These specifications cover an upgrade of the elevator plant in a first-class workmanlike manner, in accordance with the drawings and as specified herein. The Contractor shall include all demolition, labor and materials, except that listed under "Related Work By Other Contractors." All work, unless specifically excluded by this specification, shall be completed in accordance with the requirements of the National Electrical Code, the American Standard Safety Code for Elevators, Dumbwaiters and Escalators and any local codes which may govern the requirements of the installation including all revisions and authorized standards to date.

1. The Contractor shall immediately notify the OWNER'S representatives / Architect / Elevator Consultant of any work necessary to meet these requirements that are required and not covered in these specifications.

1.23. DRAWINGS

A. Before beginning fabrication and work, the Contractor shall prepare all drawings necessary to show the general arrangement of the elevator equipment. Drawings and other data which are submitted by the Contractor to the Owner or Architect for his approval shall be returned to the Contractor within twenty (20) days (or sooner, if early delivery is required) after submission.

1.24. PERMITS AND INSPECTIONS

A. The Contractor shall obtain and pay for any necessary Municipal or State inspections and permits as required by the elevator inspection authority, and make such tests as are called for by the regulations of such authorities. These tests shall be made in the presence of such authorities or their authorized representative.

B. The safety test tags shall be placed on each devise tested. The tag shall be signed and dated.

1.25. GUARANTEE

A. The Contractor shall guarantee the material and workmanship of the apparatus furnished by him under these specifications and if promptly notified in writing shall, at his expense, correct any defects in the material or workmanship of such equipment occurring within one (1) year from the date of Final Acceptance, not due to ordinary wear and tear or to accident, alteration, abuse, or improper use, care or maintenance. The correction of such defects constitutes the limit of responsibility. No other guarantees or warranties, expressed or implied, other than of title are extended.

1.26. INTERIM MAINTENANCE

A. The Contractor shall furnish “Interim Full Maintenance” service at no additional cost, on any elevator completed prior to the completion of the last elevator in an elevator bank. The purpose of the Interim Full Maintenance is to provide coverage to the units until the last unit in the bank is complete. All terms and conditions stated in the MAINTENANCE SECTION (1.29) shall apply to this section.

1.27. MAINTENANCE

A. The Contractor shall furnish at no additional cost “full maintenance” with regular time callbacks on any equipment described under this section for a period of TWELVE MONTHS after Final Acceptance of the last elevator in each elevator bank. This maintenance shall include regular examinations, adjustment and lubrication of all elevator equipment. The Contractor shall also repair or replace electrical and mechanical parts of the elevator equipment whenever this is required for the twelve month term. It is understood, however, that the Contractor's obligation for repairs or replacement parts under this maintenance provision applies only to normal wear and tear. Renewals or repairs necessitated by reason of negligence or misuse of the equipment shall not be the responsibility of the Contractor.

B. All work under this maintenance provision shall be performed by competent and trained elevator service personnel under the supervision and direct employ of the Contractor. Work shall be done during the regular working hours and days of the Contractor but emergency call back service shall be available at all times.

C. Under this maintenance provision, it is understood that the Contractor does not assume control or possession of any part of the installation, but that it remains exclusively under the control of the Owner or agent thereof.

D. The Contractor is advised to submit their standard form “Full Maintenance” contract with pricing for review and approval by the Elevator Consultant.

1.28. RELATED WORK BY OTHER CONTRACTORS

A. Work in conjunction with the elevator installation shall be done in a timely manner to avoid delays. This work must be in accordance with all codes having jurisdiction and the approved drawings of the Contractor.

1. <u>Pit and Hoistway</u>
    a. Legal pit of proper depth, pit drain, and waterproofing for the pit as required.
    b. The hoistway and pit of the elevators are existing.
2. <u>Machine Room</u>
    a. When necessary, the machine rooms shall be modified or constructed by the Owner.

3. Venting of Hoistways
    a. When necessary, the venting of the hoistways shall be the responsibility of the Owner.
4. Electrical Work
    a. Install new electric service to the elevators. The new service shall be 480 VAC.
    b. Furnish and install a new “Earth Ground” to each elevator machine room.

1.29. QUALITY ASSURANCE

A. Installer - Either the elevator manufacturer or a licensee of the manufacturer, who has not less than five years successful experience with the installation of similar elevators, and who is currently under contract for maintenance of similar elevators in the area, and who maintains a service center within 75 miles of the project site.

B. Acceptable Manufacturers: Equipment furnished shall meet or exceed the complete specification of the equipment and be approved by the Owner and/or the Elevator Consultant. Manufacturer's catalog numbers or descriptions used in these specifications, if any, are only intended to establish the general design and quality level of equipment: However, invited bidders must receive approval for the manufacturer of the major components if different than that listed as follows:
1. Controllers
    a. Motion Control Engineering (MCE)
2. The Operating Fixtures shall be supplied by:
    a. Adams Elevator Equipment Company
3. Pump Units
    a. Cemco
    b. Quality Elevator Products
    c. Approved Equal
4. Valves
    a. Maxton
5. Digital Indicators
    a. C.E. Electronics
    b. Adams Elevator
6. Door Equipment
    a. GAL
7. Roller Guides
    a. Hollister Whitney
    b. Approved Equal
8. Hands Free Communication Devices
    a. Vandal Proof Products
9. Car Sling and Platform
    a. Hollister Whitney
    b. Quality Elevator Parts
    c. Approved Equal
10. Cabs or Cab Interiors / Hoistway Door Panels
    a. Eklund
    b. Brice-Southern
    c. Gunderlin Ltd.
    d. Tyler
    e. Interface
    f. Imperial Interiors
    g. Approved Equal
11. Door Restrictor

a. Adams “Hatch Latch”
b. Approved Equal

12. Remote Monitoring
    a. MCE’s Central Monitoring System

C. No exceptions to these component suppliers shall be accepted without the approval of the Elevator Consultant.

D. Applications for approval must be submitted to the Elevator Consultant in writing prior to bid date. Such requests must contain financial information, technical data and descriptive brochures.

E. Requests must be accompanied by a detailed statement outlining the service facility available. Attached must be a list of similar jobs in the area with names of persons to contact for verification of contractor's ability.

F. All work performed under the conditions of this specification shall meet or exceed the latest additions of the following code requirements:

1. ASME A17.1
2. ASME A17.2.1
3. ASME A17.3
4. ASME A17.5
5. ANSI/NFPA 70
6. NFPA 252
7. NFPA 72E
8. IEEE
9. UFAS
10. ANSI/NFPA 101
11. BOCA
12. GROUP 30
13. Local Building and Fire Codes.
14. National Electrical Code.
15. Americans with Disabilities Act.
16. Any other applicable code requirements, whether mentioned in this specification or not.

1.30. DISCREPANCIES

A. If, in the opinion of the Contractor, discrepancies appear in the Elevator Specification, clarification shall be obtained from the Elevator Consultant before proceeding with work.

B. If, in the opinion of the Contractor, discrepancies appear between the General & Special Conditions and the Elevator Specification, the condition that favors the Owner, in the opinion of the Owner, shall rule.

2. PRODUCTS

2.1. OUTLINE OF EQUIPMENT

A. Elevators:

B. Quantity:

C. Capacity:

D. Speed:

E. Travel:

F. Stops/Number of Openings:

G. Location of Reverse Opening(s):

H. Floors Served:

I. Platform Size (Width x Depth):

J. Door Size/Operation:

K. Machine Type/Location:

L. Control:

M. Operation:

N. Entrances

O. Door Panels:

P. Cab:

Q. Operating Fixtures:

R. Power Supply:

S. Optional Features: Fire Service, Independent Service

2.2. HYDRAULIC ELECTRIC

A. Power Unit

1. Only a submersible unit shall be installed. The tank of the pump unit shall be capable of holding 100% greater capacity than required for this project. The Contractor shall fill the tank to capacity with new hydraulic oil.
2. Tank Shutoff - New
3. The power unit shall be mounted on vibration sound dampeners designed to isolate the unit from the building structure.
4. Only Maxton valves shall be used on the power unit. The valves of the power units shall contain, safety check valve, up and down direction and leveling valves, high pressure relief valve, manual lowering valve and a “no pressure sensing device.”
5. The Contractor shall furnish and install a new muffler in the oil line new the power unit. The muffler shall be specifically designed to reduce any noise created by the flow of hydraulic oil.
6. Permissible minimum hydraulic fluid level shall be clearly indicated. Hydraulic fluid shall be of good grade to assure free flow when cool, and have minimum flash point of 400° F. Provide initial supply of hydraulic fluid for operation of elevator.

B. Installation of Equipment

1. Furnish and install connections between the storage tank, pump, muffler, operating valves, and cylinder complete with necessary valves, pipe supports, and fittings. All connections between the discharge side of the pump, check valve, muffler, cylinder, lowering valves shall be of schedule forty (40) steel with screw, flanged, welded, or approved flexible or mechanical couplings. Size of pipe and couplings between cylinder and pumping unit shall be such that fluid pressure loss is limited to 10 pounds.
   a. Do not subject valves, piping, and fittings to working pressure greater than those recommended by the manufacturer.
2. Support all horizontal piping. Place hangers or supports within 12" (305 mm) on each side of every change of direction of pipe line and space supports not over 10' (3050 mm) apart. Secure vertical runs properly with iron clamps at sufficiently close intervals to carry weight of pipe and contents. Provide supports under pipe to floor.
   a. Provide all piping from remote machine room to hoistway, including necessary supports or hangers. If remote piping is underground or in damp, inaccessible areas, install hydraulic piping through PVC sleeve pipe.
3. Install pipe sleeves where pipes pass through walls or floors. After installation of piping, equip the sleeves with snug fitting inner liner of either glass or mineral wool insulation.
4. Install blowout proof, non-hammering, oil hydraulic muffler in the hydraulic fluid supply pressure line near power unit in machine room. Design muffler to reduce to a minimum any pulsation or noises that may be transmitted through the hydraulic fluid into the hoistway.

5. Solenoids shall operate and arrange control valves so hydraulic fluid flow will be controlled on positive and gradual manner to insure smooth starting and stopping of elevator.
6. Provide safety check valve between cylinder and flexible pump connection which will hold elevator with specified load at any point when pump stops or pressure drops below minimum operating levels.
7. The Contractor is advised to use the minimum number of vitraulic fittings possible for the installation of the pump unit. All piping shall meet or exceed current ASME code requirements.

C. Cylinder

1. The plunger shall be accurately and grounded seamless steel. The bottom of the plunger shall be fitted with a heavy steel disc welded in place and provided with a suitable extended edge to provide a positive stop designed to prevent the plunger from leaving the cylinder. The top of the plunger shall be provided with an internal welded steel disc drilled and tapped for fastening the plunger to the car ram header.
2. The cylinder shall be machined from steel pipe with a machined flange at the upper end and a heavy steel bulkhead welded in the lower end. Each section of the cylinder shall be threaded. Each threaded section shall be welded by a certified welder when coupled. The cylinder shall be provided with a suitable steel fitting for connecting at an oil line and with an air bleeder.
3. A steel packing gland with a phenolic guide bearing, a wiper ring and packing especially designed for hydraulic elevator service shall be provided. An oil collector system shall be furnished to return the oil leakage back to the storage tank.
4. The cylinder installation shall proceed in the following manner:
    a. The cylinder shall be installed in a casing not less than twelve inches greater in diameter than the diameter of the cylinder.
    b. The bottom of the casing shall be sealed with concrete.
    c. The cylinder shall be placed in a PVC sleeve capped at the bottom.
    d. The PVC shall be not less than four to six inches in diameter greater than the diameter of the cylinder.
    e. The cylinder shall rest on the capped bottom of the PVC sleeve.
    f. The area between the PVC and casing will be backfilled with clean sand to a distance of not less than three feet from the bottom of the plumbed cylinder.
    g. The area between the PVC and the cylinder will be backfilled with clean gravel to a distance of not less than three feet from the bottom of the plumbed cylinder.
    h. The top of the PVC shall protrude above ground and be sealed water tight . It will contain a removable plug for inspection.
    i. The cylinder shall be securely fastened to the pit floor by any means necessary to prevent movement.

2.3. POWER SUPPLY

A. Main Line Disconnect
1. The Contractor shall furnish and install new piping and wiring from the new disconnect to the elevator equipment.
2. The Contractor shall furnish and install a new “earth ground” from the new disconnect to the entire elevator system.

2.4. CONTROL

A. Controller
1. The controller shall be furnished by Motion Control Engineering (MCE).
2. The controller shall have a remote monitoring system including all necessary components to communicate with a remote location. Components shall include but are not limited to: a computer, display, printer, terminal servers, all software, all software licenses and modems, if necessary. The CMS shall be compatible with the system currently in place at WMU facilities.
3. A controller shall be provided to control the starting, acceleration, deceleration, and stopping of the elevator. The controller shall provide control and logic functions for car movement, car position, door operation, and safety circuit monitoring. In the event of power failure or activation of any safety device, the car shall be safely stopped.
4. The controller shall contain various sections consisting of solid state printed circuit boards for speed control, car position, timing, and indicating circuits, logic relays for car operation and signaling circuits, power contactors for motor control and door operation, and power supplies with suitable circuit protective devices.
5. All controller wiring shall be installed in a neat and workman-like manner. Wiring shall be terminated at studs or terminal blocks, using connections that assure electrical and mechanical integrity.
6. The control equipment shall be securely mounted to steel supports in a free-standing steel cabinet designed for floor mounting. Removable cabinet doors shall be provided.
7. The controller shall be certified by a recognized testing laboratory.(UL or CSA)
8. The Contractor is advised to pay particular attention to the height requirements of the existing machine room.

B. Remote Monitoring
1. The controller shall have a remote monitoring system including all necessary components to communicate with a remote location. Components shall include but are not limited to: terminal servers, all software, all software licenses and modems, if necessary. The CMS shall be compatible with the system currently in place at WMU facilities. All signals from the

controller shall be sent to the CMS computer currently in place at WMU's Maintenance Services facility.

2. All faults of the control system shall be accessible remotely.
3. All faults shall report immediately to the Central Station.
4. Historical traffic analysis and graphic real time display of elevator operation shall be provided.

C. Special Features

1. Door Hold Button shall be installed on all Service Elevators.
   a. Provide a momentary car button located in the car operating panel. The button shall be identified as "DOOR HOLD." The button, when activated, shall extend the normal door open time to approximately 20-60 seconds (time shall be adjustable) to permit loading and unloading of the elevator. The extended door time shall be canceled upon registration of a car call or activation of the door close button. Once the door time is canceled, normal door time shall be reinstated.

2.5. OPERATION

A. Simplex or Group Selective Collective Operation

1. Waiting passengers in the hallway shall momentarily press the hall button for the direction they wish to travel. Upon entering a car the passengers shall press the car button corresponding to the floor to which they wish to go. The direction of car travel shall be established and the doors closed. After the door interlock circuits are established, the car shall start and accelerate away from the floor. The car shall slow down and stop at the first floor for which a car button has been pressed or for which a hall call has been registered corresponding to the direction in which the car has been traveling. The stops shall be made in the natural order of floors for each direction of travel irrespective of the order in which the calls were registered.
2. While the car is traveling in the up direction, down calls shall be bypassed but remain registered to be answered on the return trip. After the last passenger has left the car and there are no calls registered above, the car shall automatically reverse and answer down calls. If, while the car is traveling up, a down call should be registered above the highest car or up hall call, the car shall continue up to serve that call. As the car travels in the down direction up calls shall be by-passed but remain registered to be answered on the return trip. If, while the car is traveling down, an up hall call should be registered below the lowest car or down hall call, the car shall continue down to serve that call.
3. A car call or hall call for the next direction of travel of the car shall be canceled as the doors open in response to the call and be held canceled until the doors close preparatory to the car leaving the floor.
4. When the car stops at a floor, a sufficient time shall elapse after the doors are opened to permit passengers to enter or leave. After each stop is made the doors shall be closed and the car shall be restarted until all registered calls are answered. Should

no calls remain to be answered, the doors shall be reclosed and the car remain parked at that floor.

5. Timed Door Control - Varying door times according to traffic.
6. The system shall provide continuously changing operation in various peak traffic situations which include predominantly one-way, intense directional traffic with opposite direction traffic, balanced two-way traffic, light traffic and occasional traffic. All traffic analysis shall be done by optimization and call allocation. All program changes shall be selected automatically.

B. Disabled
   1. The elevator shall be rendered inoperable automatically in the event of a malfunction in the running circuits. The system shall automatically adjust for an out of service elevator.

C. Door Monitoring
   1. Should the doors of a car fail to close within a predetermined time after normal door timing expires, "final timing" becomes effective permitting the door operator motor to close the doors at reduced speed and torque irrespective of door protective devices.

2.6. AUXILIARY OPERATIONS

A. The following operation is for the use of firemen and other authorized personnel as required by code or local authorities.
   1. Automatic passenger elevators shall conform to the following:
   2. A three position (on, off, and by-pass) key-operated switch shall be provided at the main floor for each single elevator or each group of elevators. The key shall be removable only in the "on" and "off" positions. When the switch is in the "on" position, all elevators controlled by this switch and which are on automatic service shall return non-stop to the main floor, and the doors shall open and remain open.
   3. An elevator traveling away from the main floor shall reverse at the next available floor without opening its doors.
   4. Elevators equipped with automatic power-operated doors and standing at a floor other than the main floor, with doors open, shall close the doors without delay and proceed to the main floor.
   5. Door reopening devices for power-operated doors which are sensitive to smoke, heat or flame shall be rendered inoperative.
   6. All car and corridor call buttons shall be rendered inoperative and all call registered lights and direction lanterns shall be extinguished and remain inoperative.
   7. A car stopped at a landing shall have its "Emergency Stop Switch" rendered inoperative as soon as the doors are closed and it starts toward the main floor. A moving car, traveling to or away from the main floor, shall have its "Emergency Stop Switch" rendered inoperative immediately.
   8. A sensor in each elevator lobby, which when activated prevents cars from stopping at that floor, shall not be substituted for the above requirements.

9. In addition to the key-operated switch required in "1" above, heat and smoke or products of combustion sensing devices shall be furnished and installed in each elevator lobby at each floor, the main floor, top of the hoistway, and in the machine room. The activation of a sensing device in any elevator lobby shall cause all cars in all groups that serve that lobby to return non-stop to the main floor. The key-operated switch when moved to the "by-pass" position, shall restore normal service independent of the sensing devices. Sensors at each floor shall be connected separately from sensors at the main floor.
10. Alternate Floor Fire Service: (if applicable) - The activation of a sensing device at the lobby (item 2. above) shall cause all elevators to return non-stop to the alternate floor and the doors shall open and remain open. (The alternate fire service floor shall be defined as any building floor other than the main fire service floor). A sign containing pertinent information regarding Fire Service operation shall be conspicuously located above the three position switch.
11. Operation of the elevators shall conform to "Firefighters' Service." When sensing devices are activated, the elevators shall return non-stop to the main floor and the doors shall open and remain open. When building sensors activate at the main fire service floor, elevators shall automatically be dispatched to that building floor which has been designated "alternate" fire service floor where the elevator doors shall open and remain open.
12. The Contractor shall furnish and install Fire Service Pictographs at each landing of the elevator integrated with the new hall stations.
13. The Contractor shall furnish and install an Adams Fire Service Key Box. (Part A-920a1, City of Chicago key). The box shall be securely mounted on the main landing floor adjacent to the hatch door buck.

B. Independent Service Operation
1. Independent service operation shall permit all elevators to be removed from the group control and used without interfering with the normal operation of the remainder of the group.
2. A two position switch shall be provided in the car operating panel for each elevator requiring independent service.
3. When the switch is placed in the independent service position, the mode of operation shall be amended as follows:
   a. Existing car calls shall be canceled.
   b. The cars shall bypass landing calls.
   c. Continuous pressure on the car button of the selected floor shall close the doors and start the car toward the selected floor. Pressure shall be required on the button until the car starts. Releasing the car button before the car starts shall cause the doors to automatically reopen.
   d. After the car has arrived at the floor and the doors have automatically opened, the cars shall remain until another car button is pressed or until the key switch is returned to the normal position.

e. Hall lanterns and car direction arrows shall be inoperative for the independent service car.

f. Should all cars be put on independent service, all hall calls registered shall be canceled. Further registration of hall calls shall be inhibited.

C. Load By - Pass Operation

1. The Contractor shall furnish and install load by-pass operation for the elevator. The load by-pass operation should function as per Controller manufacturer recommendations but not less than the following when the elevator contains a load of 80% of capacity:

a. By-pass hall calls.

b. Respond to car calls only.

c. Cancel hall calls only if elevator stops for a car call.

D. Security Feature

1. The system shall contain the ability to turn any car or hall call button on or off through the use of the Central Remote Monitor station.

2.7. HOISTWAY EQUIPMENT

A. Access Switches

1. Furnish and install top and bottom hoistway access switches and associated devices in accordance with requirements of the latest Edition of the American Standard Safety Code for Elevators, Dumbwaiters, and Escalators, and as permitted by the Local Code.

B. Top of Car Operating Device

1. An operating device shall be provided on the top of the car located between the car crosshead and hoistway door, complete with an Emergency Stop Switch, a Selection Switch, UP and DOWN Operating Buttons, Fire Service Buzzer, Electrical Duplex, and Light Socket with Light Guard. This device shall comply with ASME A17.1 and local codes.

a. Operation from the top of the car shall not be permissible unless all electric door contacts are closed.

C. Pit Stop Switch

1. A switch shall be located in each elevator pit, in accordance with ASME A17.1 and local codes, which when turned to the "OFF" position will cause the electric power to be removed from the elevator motor and brake. Each pit switch shall have identification corresponding to each unit.

D. Landing Doors Tracks, Hanger, Rollers, etc.

1. The Contractor shall furnish and install a complete new hoistway door package. The installation includes, but is not limited to, tracks, hangers, hanger rollers, clutch assemblies, closures, interlocks, pick-up assemblies and gibs with fire stops.

E. Electric Wiring

1. Complete new insulated wiring shall be furnished and installed to connect all parts of the equipment furnished by the elevator contractor. Wiring shall conform to the requirements of the latest edition of the National Electrical Code.

2. All wiring shall have a flame retarding, moisture resisting outer cover and shall be run in metal conduit, flexible metallic tubing, or wire ducts.
3. Traveling cables shall have a flame retarding and moisture resisting outer cover. They shall be flexible and suitably suspended to relieve strains in the individual conductors.
    a. The traveling cables shall contain at least two sets of shielded cables in each cable. In addition, the Contractor shall furnish and install a traveling cable containing coaxial cable. The Contractor is required to submit to the Elevator Contractor a copy of the vendor invoice indicating the type of traveling cable installed on each individual elevator.
    b. At least 15% of the wires contained in the traveling cables shall be spares for future use.
    c. The traveling cables shall be installed directly from the elevator to the controller located in the machine room.
4. Terminal blocks shall be coded to identify the circuits.
5. A separate 120 volt single phase protected branch circuit from a normal/emergency source terminated at the controller for car lighting, infrared edges, and fan.

F. Machine Finish and Painting
1. All Surfaces of machines and motors, car slings, controllers, etc., shall be painted with rust resisting paint in the manufacturer's standard color.

G. Emergency Alarm Bell
1. An alarm bell shall be provided and located per code. When the emergency alarm bell button or emergency stop button in the car is pressed, the alarm bell shall sound. The alarm bell shall contain a battery backup in the event of electrical power failure.

H. Load Weighing Devices
1. The Contractor shall furnish and install a load weighing device on the elevator. The device shall be capable of determining the load in the elevator plus or minus 250 lbs.

I. Guide Rails
1. The car guide rails shall be aligned so that the faces of the rails are plumb within one-sixteenth (1/16) of an inch in 100 feet of travel.
2. The Contractor shall furnish and install planed steel T sections suitable for elevator travel, car weight with brackets for attachment to building structure.
3. If necessary, reinforcement shall be used by the Contractor as outlined by ASME A17.1.

J. Rail Brackets
1. The Contractor shall furnish and install new rail brackets for the car rails that meet the job specifications and current ASME A17.1 code requirements.

K. Buffers
1. The Contractor shall furnish and install new car and counterweight buffers that meet or exceeds current ASME 17.1 requirements.

2. The Contractor shall supply any blocking beams or supports needed for the buffers.
3. A reduced stroke buffer may be necessary due to pit depth limitations (see architectural prints).

L. Buffer Switch
1. The Contractor shall furnish and install a new buffer switch(es) in accordance with the current ASME A17.1 code requirements.

M. Emergency Terminal Speed Limiting Devices
1. As required by ASME A17.1.

N. Normal Stopping Devices
1. Slow-down and normal stopping devices shall be furnished and installed for each car. These devices shall be so arranged that, as the car approaches either terminal landing, a series of activation devices mounted in the hoistway shall activate bi-stable magnetic reed switches mounted on the car and automatically bring the elevator to a smooth stop at the terminal floor.

O. Final Limit Switches
1. In addition to the normal limit stops, a hoistway final limit switch shall be installed at the top and at the bottom of each hoistway. These final limit switches shall be operated by a fixed cam securely attached to the car. The switches shall be so located that they are operated should the car travel a predetermined distance above or below the upper or lower terminal floor. These limit switches shall be independent of any other stopping devices, shall be positively opened without the use of springs and shall cut off all power from the motors and brakes and prevent the operation of the car in either direction.
2. Final limit switches shall be so located that they open at or about the time the buffer is engaged by the car or counterweight.

P. Automatic Two-Way Leveling
1. Each elevator car shall have two-way leveling to automatically bring the car to a stop approximately level with any floor for which a stop has been initiated, regardless of load, rope stretch or direction of travel.
2. Automatic leveling control shall permit the synchronization of door opening with the stopping of the car at a floor.
3. Moveable selector tapes of any kind shall not be allowed for this application.

Q. Selector
1. Furnish manufacturer's standard selector. Selector shall be electrical and may be integrated with the controller on top of the car or in the hoistway.
2. Vane actuated switches may be infrared optical switches to sense the position of the elevator in the hoistway. They shall provide for stepping, leveling, door zone and optional floor encoding signals. The vane switches should be installed compactly in a steel enclosure with adequate capability, and must include labeled terminals for electrical interconnection.
3. Steel tape and magnetic strip switches may consist of a steel tape with mounting hardware to accommodate the complete

travel of the elevator, a car top assembly with tape guides, sensors and magnetic strips for stepping, leveling and optional floor encoding. Each output signal shall be isolated.

4. Moveable selector tapes of any kind shall not be allowed for this application.

2.8. CAR EQUIPMENT

A. Power Door Operation

1. The car and hoistway doors shall be operated quietly and smoothly by an electric operator which shall open and close the car door and respective hoistway door simultaneously. The doors shall open automatically when the car is leveling at the respective floor and, when operating without an attendant, shall close after a predetermined time has elapsed. Momentary pressure on the "Open Door" button in the car shall cause the doors to remain open or, if closing, to reopen and reset the time interval. Only door operators in which parts are readily available via a catalogue to the general public will be allowed. The operators shall be microprocessor based and easily adjusted with potentiometers. Only GAL door equipment shall be used.
2. The door opening and closing speed shall be dictated by code requirements and industry standards. Door closing force shall be as allowed by code. The door operator shall be so arranged that in case of interruption or failure of electric power from any cause, the doors can be operated by hand from within the car if within specified door opening zone.
3. An electric contact for the car doors shall be provided which shall prevent elevator movement away from the floor unless the door is in the closed position as defined by code.
4. Each hoistway door shall be equipped with an auxiliary door closing device and a positive electro-mechanical interlock to prevent the operation of the elevator until the interlock circuit is established and the doors are locked.
5. The power door operator shall have closed loop circuitry to ensure proper door operation under any stacking effect.

B. Car Door Tracks, Hangers, Rollers, etc.

1. The Contractor shall furnish and install, but is not limited to, new car door tracks, hangers, rollers, clutch devices, gate locks, etc. The assembly shall be a complete installation.

C. Door Restrictive Device

1. The Contractor shall furnish and install a new Adams Hatch Latch Restrictor Device. Other restrictor devices may be installed by the Contractor provided they are preapproved by the Elevator Consultant.

D. Door Infrared Edge

1. The Contractor shall ensure that the power supply of the Infrared Curtain has its own power feed.
2. The Contractor shall furnish and install a new “infrared curtain”. The Infrared Curtain shall be capable of sensing an object approximately 6” into the corridor

E. Door Nudging Feature

1. Should the doors be prevented from closing beyond a reasonable time by operation of either the photo-electronic safe ray, safe edge door protective devices, or infrared edges, these devices shall be rendered inoperative, the buzzer shall sound and the doors shall close at reduced speed and torque. The buzzer shall sound continuously until the doors are fully closed. The doors shall resume normal closing speed as soon as door-protective devices are restored to normal.
2. The Contractor shall ensure that the existing operator will perform under a reduced torque condition when on Fire Operation.

F. Car Frames
1. The car frame and sling shall consist of structural members which are securely welded or bolted together and shall be so reinforced and braced as to relieve the car enclosure of undue strains.

G. Car Platforms
1. The underside of the platform shall be fire rated.
2. The platform shall consist of a structural steel frame with a wood floor. This flooring shall be recessed to accept the thickness of the specified flooring.
3. The platform shall be mounted on rubber pads to create an isolating cushion between the car and the steel car frame.
4. The platform shall contain a steel toe guard at the leading edge of the car entrance.

H. Platform Isolation
1. The Contractor shall furnish and install isolation cushions between the car and the steel car frame.

I. Car Guides
1. The Contractor shall furnish and install new roller guides. Each roller guide shall consist of at least three rollers approximately 6” in diameter. The roller guides shall provide continuous contact with the guide rails as a result of spring tension.

2.9. OPERATING FIXTURES

A. General Requirements
1. The finish of all car and hall operating fixtures shall be #4 finish stainless steel.
2. All car and hall fixtures shall be illuminated by LED’s.

B. Car Operating Panel
1. The Car Operating Panel shall contain floor buttons which illuminate when pressed and remain illuminated until the floor stop is made. The panel shall also contain all code related features such as emergency light and bell, emergency stop keyswitch, illuminated alarm button, fire service, fire service jewel, fire service cancel button, door open, door close, door hold, if applicable, keyed light and fan switches, integrated segmented position indicator, alarm bell, emergency lighting and any other buttons or switches which may be required for the particular application including any ADA requirements. The car operating panel or front return panel shall be hinged for easy

access. The car operating panel shall contain an integrated certificate holder compatible with the State of Michigan license.

2. All operating keyswitches used shall be barrel lock type. Five sets of keys shall be provided for each keyswitch.
3. Car capacity, “No Smoking” signage, “Hand’s Free” communication instructions and unit # shall be engraved on the panel.

C. Car Buttons
1. Buttons shall be made of stainless steel with integral floor designations. Only Adams Vandal Resistant Fixtures shall be installed. The Contractor is advised to submit detailed drawings of the fixtures for approval.
2. The assembly shall contain an illuminating LED call registration and a tactile plate with raised braille codes and numerical equivalents (or other identification as required). Incandescent fixture lighting will not be allowed.
3. The cover plate shall be #4 finish stainless steel.

D. Hall push buttons
1. Buttons shall be made of stainless steel with integral floor designations. Only Adams Vandal Resistant Fixtures shall be installed. The Contractor is advised to submit detailed drawings of the fixtures for approval.
2. The assembly shall contain an illuminating LED call registration and a tactile plate with raised braille codes and numerical equivalents (or other identification as required). Incandescent fixture lighting will not be allowed.
3. All hall fixtures shall be mounted at current ADA height requirements.
4. The top, bottom and intermediate hall push buttons shall have an oversized plate. The plate above the operating buttons shall contain the Fire Service Pictograph. The oversized plate shall be securely mounted to a new fixture box with vandal resistant screws. Drawings of the fixture shall be submitted to the Elevator Consultant for approval. The assembly shall contain a illuminating LED call registration bar and an tactile plate with raised braille codes and numerical equivalents (or other identification as required). The plate finishes shall be #4 Stainless Steel.

E. Hall Lanterns.
1. Hall Lanterns will be required on any bank of elevators with three or more elevators in the bank.
2. The Contractor shall furnish and install new hall lanterns for the elevators. The new fixture shall be surface mounted. The approximate size of the new lantern will be 6” X 12.” The fixture components shall be manufactured by CE Electronics, model # ASB30-MC. The hall lanterns shall mount horizontally above and centered over each entrance frame.
3. The hall lanterns shall be #4 finish stainless steel.
4. A gong shall sound indicating direction of travel, once for up, twice for down.
5. The Contractor is advised to submit detailed drawings to the Elevator Consultant for Approval.

F. Car Lanterns
   1. Car lanterns shall be used for any bank of duplex elevators and simplex elevators.
   2. The Contractor shall furnish and install new car lanterns. The car lanterns shall be Adams Vandal Resistant car lanterns and shall be illuminated by LED's.
   3. Car Lanterns shall be mounted in the following manner: Center Opening Doors - One on each door frame, Side Opening Doors - mounted in line of sight to the hall button.

G. Car Position Indicator (Segmented)
   1. A 2" high L.E.D. Segmented Position Indicator shall be provided in each car operating fixture. It shall indicate the floor at which the car is stopped or passing and the direction the car is traveling.
   2. The lens cover shall be as vandal resistant as possible and be capable of sustaining a blow without breaking the lens or the mounting screws of the fixture.

H. Communication System
   1. A telephone box shall be mounted below the new car operating fixture. It shall have a cover plate the same size as the new car operating panel cover and abut to the operating fixture to create a finished look. The cover of the telephone box shall contain a cutout for the installation of the existing communication device. The telephone cover plate shall be removable for servicing by WMU personnel. The cover plate shall be flush mounted. WMU shall supply the ADA phone.

I. Passing Gong
   1. A passing gong will identify the location of the elevator by signaling at the passing of each floor.

J. Smoke Sensors
   1. The Contractor shall furnish and install smoke sensors in accordance with the latest addition of the ASME A.17.1 code requirements and/or local code authority requirements. Only **Simplex** equipment (generic name, GENTEX) shall be used by the Contractor.

K. Handicap Provisions
   1. When new fixtures are installed, they shall meet or exceed the current ADA code requirements.
   2. Provisions for use by the handicapped are to be furnished in accordance with current local and national codes.
   3. Car operating panels shall be mounted so that the dimension from the floor to the center line of the highest button does not exceed code allowed height restrictions and the dimension from the floor to the center line of the emergency feature does not exceed 35 inches.
   4. Provide floor designations on both the hoistway door jambs visible from within the car and from the elevator lobby at a height of 60 inches above the floor. Designations shall be a minimum of 2 1/2 inches high.
   5. Furnish car control symbol designations adjacent to the car elements. Provide raised floor numerals adjacent to the car

buttons. Numerals shall be integral with the car front return panel and not of the applied type.

L. Access Keyswitches
1. The Contractor shall furnish and install new top and bottom access keyswitches.

M. Phase I Fire Service Keyswitch
1. The Contractor shall furnish and install new Phase I Fire Service Keyswitch at the Main landing as per code requirements of the local enforcing authority.

2.10. ELEVATOR ENCLOSURES

A. Cab - Passenger Elevators in Office and Classroom Buildings
1. Cab Shell and Related Cab Equipment
a. The Contractor shall furnish and install a new cab. The type, style, and composition of the panels shall be determined by WMU architects. The panels shall be removable. The front returns, transom and door frames will be #4 finish stainless steel panel. The front returns shall contain cutouts for the new car operating panel and the telephone box. All the reveals of the cab shall be #4 finish stainless steel. The Contractor is advised to submit a detailed drawing of the car interior to the Architect of Record and/or Elevator Consultant for approval.
b. The cab interior height shall be at least 96."
c. Car Doors
1) The car door shall be #4 finish stainless steel. The car doors shall contain a cavity for the installation of an astragal. Surface mounted astragals will be allowed provided that the astragal is inserted into a molding. The Contractor is advised to submit a detailed drawing of the car doors to the Elevator Consultant for approval.
2) The new car doors shall WMU insignia engraved on each door panel. The Contractor is advise to submit a detailed drawing of the car doors to the Elevator Consultant for approval.
3) The Contractor shall furnish and install new car door tracks, hangers, rollers, and gate switches. The new car door package shall contain a door restrictive device.
d. Car Sills
1) New nickel alloy car sills shall be installed on the elevator.
e. Door Restrictors
1) The elevator cab door(s) will contain a restrictive device that does not allow the car door(s) to be opened outside of the landing zone.
f. Fan

1) The Contractor shall furnish and install a new two speed fan.

g. Handrails

1) A 3/8" X 6" bar handrail with #4 brushed stainless steel finish shall be located on the side and rear walls of the cab. The handrails shall be mounted at the ADA height requirements.

h. Flooring

1) The Contractor shall furnish and install heavy vinyl cab floor covering. Representatives of the OWNER shall determine the design and finish of the flooring. The cab flooring shall be ARMSTRONG VCT 12”X12”X 1/8” . The color of the flooring shall be approved by WMU Architects.

i. Canopy

1) Cab canopy shall be at least 14 gauge stainless steel, #4 finish. The canopy shall contain an emergency exit as required by code. The escape hatch shall be securely fastened from the top of the elevator. The canopy shall contain a fan vent. The fan vent holes shall not exceed ¼” in diameter. Slotted holes will not be permitted.

j. Cab Lighting

1) Cab lighting shall consist of one 12” X 48” fixture recessed in the ceiling of the cab that is vandal resistant in nature. Emergency lighting shall be incorporated into the contents of this fixture. The lens cover shall be frosted, at least ¼” thick and securely fastened to the fixture. The fixture bulbs shall be accessible from the car top. The fixture enclosure shall withstand the weight of a 250 lb. individual.

B. Cab - Service Elevators and Dormitories

1. Cab Shell and Related Cab Equipment

a. The walls shall be 14 gauge rigidized stainless steel. The side walls shall contain vents as required by code. The vent holes shall be as small as possible. The side walls shall contain reinforcement on the hatch side of the walls. The reinforcement shall be installed at ADA handrail height requirements. The reinforcement shall be 3/16” thick by 6” wide.

b. Cab return panels shall be 12 gauge stainless steel, #4 finish.

c. The height of the interior of the cab shall be at least 96.”

d. Cab Canopy

1) The canopy shall be 14 gauge stainless steel, #4 finish. The canopy shall contain an emergency exit as required by code. The escape hatch shall be securely fastened from

the top of the elevator. The canopy shall contain a fan vent. The fan vent holes shall not exceed ¼" in diameter. Slotted holes will not be permitted.

e. Flooring
   1) The cab flooring shall be 1/8" aluminum diamond plate. Careful consideration should be taken by the Contractor to minimize seams in the floor. Contractor shall note that the elevator has wind-up safety planks. The edges of the floor that meet the side walls, rear wall and returns shall be caulked.

f. Cab Lighting
   1) Cab lighting shall consist of one 12" X 48" fixture recessed in the ceiling of the cab that is vandal resistant in nature. Emergency lighting shall be incorporated into the contents of this fixture. The lens cover shall be frosted, at least ¼" thick and securely fastened to the fixture. The fixture bulbs shall be accessible from the car top. The fixture enclosure shall withstand the weight of a 250 lb. individual.

g. Cab Handrails
   1) Cab handrails shall be a minimum of six inches wide and 3/16' thick. One handrail shall be mounted as per handicap height requirements and shall be on the rear and side walls of the cab. A second handrail shall be mounted six inches off the floor and shall be on all sides of the cab including the front return panels.

h. Cab Security
   1) The Contractor shall assist WMU's security company in the mounting of a surveillance camera in the interior of the cab. The Contractor shall furnish and install the coaxial cable from the elevator to the lobby office as directed by WMU personnel. The Contractor shall provide the power supply for the surveillance equipment.

i. Car Doors
   1) The Contractor shall furnish and install new car doors. The car doors shall be rigidized stainless steel and contain a kick plate at least 1/8 inch thick of #4 finish stainless steel. (submit sample to Elevator Consultant for approval) The Contractor shall furnish and install two gibs per car panel.

j. Car Sills
   1) The Contractor shall furnish and install new nickel alloy car sills.

k. Fan

1) The Contractor shall furnish and install a new fan assembly.

C. Cab Weight Variances

1. The Contractor shall ensure that proper compensation of the elevator upon completion. Counterweights shall be added or deleted accordingly. In addition, the elevator shall be adjusted for a smooth, consistent ride.
2. The Contractor shall take special care to ensure that the elevator levels properly under all load conditions at all times.

2.11. HOISTWAY ENTRANCES

A. Hoistway Entrances and Hoistway Door Panels

1. The Contractor shall furnish and install new entrances.
2. Hoistway entrance assemblies shall be provided in accordance with the ASME A17.1 code and/or local codes. The entrances shall consist of flush hollow metal door panels, bolted unit type frames, sills, tracks, hangers, hanger covers, fascia plates, struts, sight guards and hardware.
3. The frames shall be fabricated of No. 14 U.S. gauge steel. The frame shall be securely fastened to the sill and header mounting.
4. Struts shall be designed to hang the full height of the entrance and shall be fastened to the hoistway wall or floor slab at each floor.
5. Headers shall be fabricated of No. 12 U.S. gauge steel.
6. Fascia, hanger covers, toe guards and dust covers shall be fabricated of No. 16 U.S. gauge steel.
7. The doors shall be flush hollow metal panels fabricated of No. 16 U.S. gauge steel. They shall be reinforced with continuous members and have removable non-metallic gibs to run in the sills. Door panels shall have the appropriate Underwriter's Lab 1 ½ hour fire label. Door unlocking devices shall be provided as allowed by code and sight guards shall be provided for all entrances.
8. The hoistway door panels shall be rigidized stainless steel (minimum at least 12 gauge combined). The edges of the door shall wrap the edge of each panel and be tack welded on the backside. The panels shall contain a cavity for the installation of an astragal. Surface mounted astragals will be allowed provided that the astragal is inserted into a molding. Each hoistway door panel shall have a kick plate at least 1/8 inches thick. The kick plate shall be #4 finish stainless steel. The Contractor is advise to submit a detailed drawing of the car doors to the Elevator Consultant for approval.
9. The hoistway door panels shall be labeled by a recognized testing authority (CSA, UL)
10. The hoistway door panels shall contain reinforcement that corresponds to the pick-up roller and closure assemblies.
11. Each opening shall contain a hole for allowing the use of an "emergency release key." Each hole shall contain a Safety Plug

Lock manufactured by TRI-LOK MFG. & MAINT. CORP., Pelham, New York.

12. Each hoistway door panel shall contain two gibs with fire stops.

B. Fascia, Covers and Platform Guards

1. Fascia, including hanger covers, platform guards and dust covers, shall be fabricated of No. 16 U.S. gauge steel. Fascia shall span the width of the opening plus 6 inches. Dust cover shall extend a minimum of 8 inches above the header and the platform guard shall extend a minimum 8" below the sill. Both shall return to the wall at a 60° angle.

2.12. IDENTIFICATION OF EQUIPMENT

A. Hoist Motor and Main Disconnect Identification

1. The Contractor shall furnish and install decals or paint identification numbers on each unit hoist machine and main line disconnect.

B. Miscellaneous Disconnects

1. The Contractor shall furnish and install decals or paint identification on any and all disconnect switches associated with the elevators.

C. Hoistway Door Identification

1. The Contractor shall paint at the top and bottom (approximately six inches from the top and bottom edge) of each hoistway door panel identification of the corresponding floor.

2.13. MISCELLANEOUS UPGRADES

A. Pit Ladder

1. The Contractor shall install new pit ladder if the current ladder does not meet ASME A17.1 code requirements.

B. Pit Lighting and Outlets

1. The Contractor shall install pit lighting to conform to the latest addition of the ASME A17.1 code requirements.

3. EXECUTION

3.1. PERFORMANCE STANDARDS

A. The elevator shall be capable of meeting the highest standards of the industry and specifically the following:

1. Contract speed shall mean speed in the “UP” direction with full capacity load in the car. Speed variation under any load condition, regardless of direction, shall be no more than 2% percent.
2. The controlled rate of change of acceleration and retardation of the car shall not exceed 0.1G per sec. and the maximum acceleration and retardation shall not exceed 0.2G per sec.
3. Starting, stopping, and leveling shall be smooth and comfortable without appreciable steps of acceleration and deceleration. Stopping shall be without bumps or jars.
4. Full speed running shall be quiet and free from vibration and swaying. When the car is standing at the floor with doors open, it shall remain firmly stopped and shall not “teeter”.
5. The car shall not move from side to side during the process of opening and closing the doors.
6. The minimum acceptable time from notification that a car is answering a hall call (lantern and audible signal) until the doors of that car start to close shall be 4 seconds.
7. The time from when the door is blocked until nudging feature starts shall comply with ASME A17.1 and local codes and shall not be less than 20 seconds. The car doors shall operate at a reduced torque mode upon activation of nudging feature.
8. Accuracy of leveling shall be $\pm$ 1/8" under all load conditions.
9. Door opening time is the elapsed time measured in seconds from the time the car door starts to open until the car door opening motion stops. Measured at a typical landing.
10. Door closing time is the elapsed time measured in seconds from the time the car door starts to close until the car door motion stops. Measured at a typical landing.
11. Door closing force is the force necessary to prevent closing of the hoistway and the car door from rest shall be not more than 30 lbf. (133N). This force shall be measured on the leading edge of the door with the door at any point between 1/3 and 2/3 of its travel. Door closing force shall not exceed the requirements of Rule 112.4 ASME A17.1.

3.2. DOOR TIMES

A. The door opening time and close times shall correspond to the times indicated in the tables below for each door size:
1. 36” Single Slide - Open 2.5, Close 3.6
2. 36” Two Speed - Open 2.1, Close 3.3
3. 36” Center Opening - Open 1.5, Close 2.1
4. 42” Single Slide - Open 2.7, Close 3.8

5. 42” Two Speed - Open 2.4, Close 3.7
6. 42” Center Opening - Open 1.7, Close 2.4
7. 48” Two Speed - Open 2.7, Close 4.5
8. 48” Center Opening - Open 1.9, Close 2.9
9. 54 “ Two Speed - Open 3.3, Close 5.0
10. 54” Center Opening - Open 2.3, Close 3.2
11. 60” Two Speed - Open 3.9, Close 5.5
12. 60” Center Opening - Open 2.5, Close 3.5
13. 60” Two Speed Center Opening - Open 2.5, Close 3.0

3.3. DOOR HOLD

A. The Door Hold button in the elevator shall be easily adjustable from 20 - 60 seconds.

3.4. MOTION TIME

A. Motion Time of 9.6 sec. is the elapsed time measured in seconds from start of car movement until car is stopped within a predetermined stopping zone. Measured at a typical adjacent landing.
B. Performance Time of 15.0 sec. is the elapsed time measured in seconds from the start of door closing to doors open 32" (813 mm) at an adjacent floor, with a car in a specified stopping zone. Measured using a typical floor height.
C. Door opening time is the elapsed time measured in seconds from the time of start of car door opening motion, with door full closed, until car door opening motion stops. Measured at a typical landing.
D. Door closing time is the elapsed time measured in seconds from the time of start of car door closing motion, from door full open, until car door motion stops. Measured at a typical landing.
E. Door closing force is the force necessary to prevent closing of the hoistway and the car door from rest shall be not more than 30 lbf. (133N). This force shall be measured on the leading edge of the door with the door at any point between 1/3 and 2/3 of its travel. Door closing force shall not exceed the requirements of Rule 112.4 ASME A17.1.

3.5. NOISE AND VIBRATION CONTROL:

A. Elevator equipment shall be installed and adjusted to meet the performance specified herein within the following parameters with tests performed in accordance with Vibration Measurements as defined in NEII Vertical Transportation Standards, Latest Edition.

1. Horizontal acceleration within cars during all riding and door operating conditions shall not exceed 25-mg peak to peak in the 1 to 10Hz range.
2. Acceleration and deceleration shall be constant and not exceed 5 feet/second/second with an initial ramp between 0.5 and 0.75 seconds.
3. Sustained jerk shall not exceed 8 feet/second/second squared.

4. Measured noise levels in a moving car outside the leveling zone shall not exceed 55 dBa under any condition including car exhaust blower/fan on highest speed.
5. Measured noise levels in the car within the leveling zone or when the car is stopped shall not exceed 60 dBa.
6. There shall be no discernible sound in the elevator car from the machine, ropes, sheaves, drive units, car or counterweight guides, pump unit, plunger and cylinder.
7. In accomplishing the above requirements, Contractor shall maintain a comfortable elevator ride with smooth acceleration, retardation and soft stop. Door operation shall be quiet and positive with smooth checking at the extremes of travel.

3.6. SITE INSPECTION

A. Prior to beginning work, the Contractor shall examine the hoistway and machine room areas and verify that no discrepancies or irregularities exist which would adversely effect the execution of the work.
B. Report any discrepancies or irregularities to the owner.

3.7. MATERIAL HANDLING

A. Protect equipment and finishes during transportation, storage and erection against any damage.

3.8. INSTALLATION

A. Install components of elevator system in accordance with approved shop drawings, manufacturer's directions, project documents, and referenced codes.

3.9. ADJUSTMENTS

A. Align guide rails within 1/16" vertically in 100 feet.
B. Adjust roller guides on cars with guide rails to provide smooth movement with no perceptible lateral movement or vibration.
C. Balance cars to equalize pressure of roller guides on the rails.
D. Adjust motors, power control devices, brakes, controllers, leveling, limit and stopping switches, door operators, interlocks, and safety devices to achieve specified performance levels.
E. Lubricate all operating parts of system, including ropes, as recommended by manufacturer.

3.10. CLEANUP

A. Keep work areas orderly and free of debris.
B. Remove filings and loose materials resulting from this work from hoistways.
C. Clean all dirt, oil and grease from machine room and pit equipment and floors.
D. Clean car, car enclosures, entrances, hoistways, operating and signal fixtures and trim of dirt, dust, oil, grease and finger marks.

E. Remove all old equipment from site including but not limit to: controller, hoistway door panels, cab, platform, sling and counterweights.

3.11. PAINTING

A. A high quality paint shall be applied on all unprotected surfaces.
B. The machine room floor, hoist machine, and controller shall all be painted.
C. The car top shall be painted.
D. The pit area shall be painted.

3.12. ACCEPTANCE DEMONSTRATION

A. Demonstrate to Owner, or Owner's designated representative, the operation of the elevator system. Demonstration shall include:
B. Installation compliance with specifications.
C. Contract speed, capacity, and floor-to-floor performance compliance with specifications.
D. Stopping accuracy and car ride compliance with specifications.
E. Operation of signal fixtures and operation of supervisory or dispatching system.
F. Operation of Independent Service operation.

3.13. PRE-TEST AND TESTS

A. All safety and fire service tests shall be performed by the local enforcing authority.
B. Contractor shall furnish as required, all test instruments and materials on-site and at the designated time of inspections and tests.
C. The Owner, may at its discretion, require the Contract to perform all the following tests in the presence of an Elevator Consultant:
    1. Rated load: The elevator shall be tested for a period of one (1) hour continuous runs with full contract load in the car. During the test run, the car shall be stopped at all floors in both directions of travel for a standing period of not less than 5 sec. nor more than 10 sec. per floor.
    2. Speed: The actual speed of the elevator shall be determined in both directions of travel with rated and no load in the car. Speed shall be determined by applying a tachometer to the car guide rails. The actual measured speed of the elevator with all loads in either direction shall be within 2% percent of specified rated speed.
    3. Microprocessor: A diagnostic testing device for all troubleshooting procedures related to the specific type microprocessor control installed on this project shall be tested. The diagnostic testing device shall demonstrate a series of not less than 10 simulated malfunctions, diagnosed properly by the device.
    4. Car Leveling: Elevator car leveling devices shall be tested for accuracy of leveling at all floors with no load and with rated load in car in both directions of travel. Accuracy of floor leveling, shall be within $\pm$ 1/8” level with any landing floor for which the

stop has been initiated regardless of load in car or direction of travel. The car leveling device shall automatically correct over travel as well as under travel and shall maintain the car floor within ± 1/8" level with the landing floor regardless of change in load.

5. Insulation/Resistance: The elevator's complete wiring system shall be free from short circuits and grounds and the insulation resistance of the system shall be determined by use of a Megger.
6. Overload Devices: All overload current protection devices shall be tested within their designed circuitry.
7. Safety Devices: All safety devices shall be tested as required by Section 1006 ASME A17.1
8. Limit Stops: The position of the car when stopped by each of the normal limit stops with no load and with rated load in the car shall be accurately measured. Final position of the elevator relative to the terminal landings shall be determined when the elevator has been stopped by the final limits. The lower limit stop shall be made with rated load in the elevator. Elevator shall be operated at rated speed for both tests. Normal limit stopping devices shall be inoperative for the tests.
9. Car Door Contacts: The position of the car door at which the elevator may be started shall be measured. The distance from full closure shall not exceed that required by the Code. The test shall be made with hoistway doors closed or the hoistway door contact inoperative.
10. Interlocks: The position of the hoistway door at which the elevator may be started shall be measured and shall not exceed the Code requirements.
11. Operating and Signal System: The elevator shall be operated by the operating devices and the operation signals and automatic floor leveling shall function in accordance with requirements specified. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration of deceleration. Stopping shall be without bumps and jars.
12. Firefighters' Service: A complete operational test of Phase I and Phase II.

3.14. FINAL SUBMITTALS

A. Provide the following information prior to receiving final payment:

1. Legible schematic wiring diagrams including all changes made during installation (four sets, three in manuals and one laminated set in the machine room).
2. Description of operation of elevator system installed.
3. Complete replacement parts catalog appropriate for equipment installed.