

CHAPTER V

TECHNICAL DESIGN & PERFORMANCE STANDARDS

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DIVISION 14 – CONVEYING

14200 Elevators

Complete and Integrated System Required:

All incidental elevator work related to this project that is required to provide a complete and fully working system, including alterations necessary to comply with required testing requirements, shall be performed by the elevator contractor and shall be included in the scope of work.

The major elevator components shall be the products of one manufacturer of established reputation, except they may be the products, either wholly or in part, of another manufacturer of establishment. Also, the major components to be furnished shall be of a make or makes that have performed satisfactorily together under conditions of normal use in not less than twenty-five other elevator installations of equal or greater capacity and speed for a minimum of one and one-half years within the United States, and a minimum of three installations in North Carolina. Upon request the names and addresses of the buildings and the names of the owners or managers thereof, in which the proposed combination of major components has so performed, shall be furnished.

The term "major elevator components" as mentioned above shall mean such items as a hydraulic cylinder and plunger unit, power unit and motor, controllers, selector, door operator, and control equipment.

The power unit, tank, and associated control equipment shall be mounted in the elevator machine room. Equipment shall be so arranged that parts can be removed for repairs or replacement by conventional means, without dismantling or removing other equipment components in the machine room. Adequate work space for maintenance and repair operations shall be provided around the elevator equipment in the machine room with clear passage to any access or trap doors.

Non-Proprietary Equipment Required:

It is the intention of the University to obtain competitive bids for all maintenance and repair parts and services for the elevator(s) provided by this specification. Accordingly, the use of Proprietary Elevator Equipment and Information that has the effect of restricting competition in the procurement of maintenance services is not acceptable.

Definitions:

"Elevator Equipment and Information" means all equipment, parts, tools, software, or technical data that are required to perform any operation, adjustment, maintenance, or repair function over the life of the elevator(s) provided as part of construction projects. It includes all tools or instruments needed to troubleshoot, diagnose, maintain or adjust the operation of the elevator equipment. Elevator Equipment and Information also includes all items such as:

- replacement parts,
- printed circuit boards,
- maintenance manuals,
- diagnostic tools (whether handheld or built into the control system),
- all written operating and instruction manuals needed to use the diagnostic tools,
- electrical schematic wiring diagrams,
- access codes and passwords, and
- instructions for troubleshooting the microprocessor system.

“Non-Proprietary Elevator Equipment and Information” means Elevator Equipment and Information that can be obtained from a minimum of three suppliers within a 75 mile radius of the campus. There shall be no additional cost beyond the contract price, and there shall be no requirement to return any piece or component to the Manufacturer for renewal, recharging or reprogramming. The Owner and/or his authorized representative shall not be required to sign licensing agreements in order to use such Elevator Equipment and Information on the elevator(s) provided.

Non-Proprietary Elevator Equipment and Information Must Be Provided: All of the Elevator Equipment and Information for elevators that will become the maintenance responsibility of the University of North Carolina at Chapel shall be Non-Proprietary. It shall be provided to the Owner on or before the Date of Substantial Completion and shall become the Owner’s property.

Certification Must Be Provided:: Elevator specifications shall require the elevator contractor to provide to the Owner, on or before the Date of Substantial Completion, a written certification that only Non-Proprietary Elevator Equipment and Information is required for the operation, adjustment, maintenance, or repair of the elevator(s) that have been supplied by the contractor.

Bidder’s and Contractor’s Qualifications:

In the interest of unified responsibility, the elevator contractor shall be one regularly engaged in the business of installing and servicing elevators of the type and character required by these specifications. The elevator contractor shall have technical qualifications of at least three years experience, trained supervisory and installation personnel, and facilities to install specified items. Any manufacturer's product submitted shall have been in satisfactory and efficient operation on not less than twenty-five installations similar to this project and for not less than one and one-half years. Contractor shall submit a list of installations, including names and addresses to the Designer for approval, as per the North Carolina Construction Manual, General Conditions of the Contract, Article 16.

Bidder shall provide the name and address of a permanent service organization maintained or trained by contractor which will render satisfactory service to this installation within two hours of receipt of notification that service is needed. Submit name and address of service organization.

Prior to beginning work on this project, the elevator contractor shall provide the Architect and Owner with the name of the contractor’s supervisory person responsible for supervising the execution of all project work required by the specification. The contractor’s supervisory person shall be the one responsible person with whom the Architect and Owner may communicate directly regarding the execution of the scope of work. The elevator contractor shall provide the name, business telephone, pager number and cellular telephone number (if applicable) of this supervisory person prior to the start of the interim maintenance portion of this project. The elevator contractor shall be permitted to replace the named supervisory person at his sole discretion, however the Architect and Owner shall be notified of any change, in writing, within 48 hours of the effective date of the change. The written notification of change shall contain all the above referenced information for the new contractor supervisory person.

Conformance with Codes and Standards:

All work shall be performed in accordance with the latest revised edition (as of the date bids are taken) of the American Society of Mechanical Engineers (ASME) A17.1 Safety Code for Elevators, and Escalators, the National Electrical Code, and N. C. State Building Code.

The Contractor shall comply with all rules and regulations contained in the current ANSI A17.1 - Safety Code for elevators, dumbwaiters, escalators, and moving walks (including supplements).

Shop Drawings:

The elevator contractor shall, after structural and architectural drawings are furnished, prepare drawings showing the general arrangement and loads of the elevator equipment. These drawings shall be approved by the Designer and the Owner before proceeding with fabrication and installation of the elevators. The elevator contractor shall be solely responsible for verifying all actual field dimensions.

Drawings approved by the North Carolina Department of Labor, Elevator Division, are required before installation of the equipment.

Shop Drawings shall show:

- Maximum dynamic and static loads imposed on the building structure at points of support for the elevator work.
- Overall plans elevations and sections for all floors served, travel distances and similar considerations of the work.
- Dimensions of plunger or casing, and a written description covering the entire system of power distribution, lighting, control, signals, communications, etc.
- Additionally, prior to purchasing any materials, the elevator contractor shall submit manufacturer's drawings and data sheets for ALL new materials and equipment. These drawings shall include but are not limited to hydraulic power units and valves, controllers, elevator car enclosures, car slings and platforms, hydraulic plunger and cylinder assemblies, entrance frames and door panels, door operators and operating equipment, traveling cables, landing systems, door reopening devices, signal fixtures and all related equipment. These drawings must be reviewed and approved by the Architect before proceeding with fabrication and installation of the elevator equipment.

Warranty and Maintenance Service:

Warranty: The elevator contractor shall guarantee the materials and workmanship against defect due to faulty materials or faulty workmanship or negligence for a period of twelve (12) months following the final acceptance of the work. This written guarantee is required to run concurrently with the 12 months maintenance period. This guarantee shall cover defective materials and workmanship including operational failures, performance below required minimum, evidence that the system will not be reasonably maintainable for the life of the building, abnormal wear, excessive noise or vibration, etc. Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The contractor shall replace such defective materials, equipment, or workmanship without cost to the owner within the stipulated guarantee period. This warranty is not intended to supplant normal maintenance service and shall not be construed to mean that the elevator contractor will provide free service for periodic examination, lubrication, or adjustment due to normal use, beyond that included in the specifications; nor will the elevator contractor correct, without charge, breakage maladjustments or other trouble arising from abuse, misuses, or improper use of the equipment which may develop with twelve (12) months from the date of acceptance.

Maintenance Service: The Contractor shall furnish full maintenance service by trained employees on the elevator(s) for a period of twelve (12) months from the date of the elevator's acceptance to run concurrent with the warranty. This service shall include systematic preventive maintenance including items such as adjustments, lubrication, routine cleaning of the elevator equipment in the machine room(s) and hoistway(s), and repair or replacement of electrical and mechanical components using genuine manufacturer's replacement parts. The Contractor shall provide preventive maintenance service at least once per month. When adjustments, parts, or repairs are made necessary by abuse or misuse by the Owner or occupants of the building, outline the repairs and provide a quote to the Facilities Services for authorization to repair and invoice for the work. Provide emergency minor adjustment call-back service 24 hours a day; however, all other work shall be performed during regular working hours and days of the elevator trade. Contractor shall respond to emergency calls within one (1) hour. Service personnel will notify Facilities Services office upon arrival for servicing, (or Campus Police if not during regular working hours). Prior to leaving campus, a Facilities Services representative will sign reports of monthly examinations and call back tickets.

Maintenance Service Log: During the warranty maintenance period the elevator contractor shall maintain a log for each elevator. The log shall be located in the elevator machine room and be used to indicate all call backs, repairs, replacement of parts fire service test and adjustments performed by the mechanic. Each entry in the log must be signed by the mechanic who performs the work and be kept up-to-date at all times.

Thirty days before expiration of the twelve (12) month maintenance service, the elevator contractor shall schedule an inspection of the elevator equipment with the elevator consultant at the North Carolina Department of Labor. This inspection is to assure that the elevator equipment is in safe first-quality, operating condition and the equipment is operating in line with its original design. An authorized representative of the elevator contractor shall accompany the elevator consultant from the North Carolina Department of Labor.

Elevator Machine Room:

All equipment shall be so arranged that parts can be removed for repairs or replacement by conventional means, without dismantling or removing other equipment components in the machine room. Adequate work space for maintenance and repair operations shall be provided around the elevator equipment in the machine room with clear passage to any access or trap doors.

Painting:

All exposed metal work furnished by the elevator contractor shall be properly painted after installation in order to present a new appearance, as otherwise specified. Minimum requirements are one coat of metal primer, and one coat of semi-gloss industrial grade enamel. All surfaces painted must be clean and free from rust, oil, grease, etc., before painting. Machine room floors and pit floors shall be cleaned and painted with two coats of semi-gloss industrial grade enamel. All car tops shall be thoroughly cleaned and shall be free from rust, grease, etc. and painted with one coat of field applied bright white semi-gloss industrial grade enamel.

Hydraulic Power Unit (when provided):

The oil pumping and control mechanism shall be compactly and neatly designed with all of the components listed combined in a self-contained unit: Structural steel outer base with tank supports; floating inner base for mounting motor-pump assembly; overhead oil reservoir with tank cover and controller compartment with cover; metal drip pan; oil-hydraulic pump; electric motor; and an oil control unit with the following components built into a single housing -- a high pressure relief valve, a check valve, an automatic unloading up-start valve, and a lowering and leveling valve.

The pump shall be specially designed and manufactured for oil-hydraulic elevator service. It shall be of the positive displacement type, designed for steady discharge with minimum pulsations to give smooth and quiet operation. Output of pump shall not vary more than 10% between no load and full load on the elevator car.

The motor shall be specially designed for oil-hydraulic elevator service, of standard manufacture, and of duty rating to comply with herein specified speeds and loads.

The oil control unit shall consist of the following components, all built into a single housing. Welded manifolds with separate valves to accomplish each function will not be acceptable. All means of adjustments shall be accessible and shall be made without removing the assembly from the oil line.

Relief valve shall be externally adjustable, and shall be capable of by passing the total oil flow without increasing back pressure more than 20% above that required to barely open the valve;

Hydraulic valve shall be externally adjustable, and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually divert oil to or from the Jack Unit, insuring smooth up-starts and up-stops;

Check valve shall be designed to close quietly without permitting any perceptible reverse flow;

Lowering valve and leveling valve shall be externally adjustable for drop-away speed, lowering speed, leveling speed, and stopping speed to insure smooth starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling when slowdown is initiated;

A "nose" fitting (1/4" in size) shall be provided in the oil line at the power unit. The fitting shall be designed to receive a "quick-disconnect" type body, allowing pressure readings to be taken using the proper gauge; The hydraulic lines between the pump and the pit should run exposed.

Gate Valve: Provide a service gate valve in the supply line in the pit near the cylinder.

The elevator controller shall contain a solid-state soft start electronic motor starter with integrated circuitry as required by ASME A17.1. Thermal overload relays shall be provided to protect the motor. All component switches shall be mounted in a steel cabinet, fully enclosed. The controller shall be mounted on or adjacent to the power unit. The cabinet shall be ventilated and provided with a mechanical latching device for ease of maintenance;

All wiring on the panels shall be neatly formed and securely fastened in place. All equipment on the panels shall be readily accessible and easily replaceable. All controller relays shall be magnetically operated. Solid-state components shall be electrically sized, physically spaced, and ventilated so their heat can be adequately dissipated during operation; and

Each device on the controller panels shall be properly identified by name, letter, or standard symbol which shall be neatly stenciled (or otherwise marked) in an approved indelible and legible manner, on the device or panel. The identification markings shall be coordinated with identical markings used on the wiring diagrams.

Sound isolating couplings, a minimum of two, shall be installed in the oil line in the machine room between pump and jack. The isolators shall also provide electrical isolation.

Sound isolation: All rotating and vibrating elevator equipment and components shall be on vibration-absorption mounts, designed to effectively prevent transmission of vibrations to structure, and thereby eliminate sources of structure-borne noise from the elevator system. Where the equipment is subject to loud or sudden vibrations, provide sound deadening material to isolate sounds and vibrations from the supporting floor or wall.

Oil-hydraulic silencer (muffler device) shall be installed in the oil line near power unit. It shall contain pulsation absorbing material inserted in a blowout-proof housing. Flexible hose of the type which is required to be marked with a replacement date will not be accepted.

Jack Unit (when provided):

Telescoping type jack unit is prohibited.

Jack Unit Protection: Provide the casing and any underground piping with an approved coating designed to protect it from electrolytic and chemical corrosion. Protect any underground piping in a similar fashion. Provide an alternate using Union Guard 160 or similar protection. The Designer shall inspect the casing prior to backfilling.

Care should be taken in the installation of hydraulic elevators to prevent damage to the hydraulic piston. Scratches, gouges, dents, etc. may not be removed by hand or mechanical honing or any other similar manner. Replace damaged pistons.

Failure Protection:

The electrical control circuit shall be designed so that if a malfunction should occur due to motor starter failure, oil becoming low in the system or the car failing to reach a landing in the up directly within a predetermined time, the elevator car will automatically descend to the lowest terminal landing. If power-operated doors are used, the doors will automatically open when the car reaches that landing to allow passengers to depart. The doors will then automatically close and all control buttons, except the "door open" button in the car station shall be made inoperative.

Automatic Terminal Limits:

Electric limit switches shall be placed in the hoistway near the terminal landings and be designed to cut off the electric current and stop the car should it run beyond either terminal landing.

Automatic Self Leveling:

The elevator shall be provided with a self-leveling feature that will automatically bring the car to the floor landings. The self-leveling shall, within its zone, be entirely automatic and independent of the operating device and shall correct for over travel or under travel. The car shall also be maintained within the specified leveling tolerance with the landing regardless of the load.

Buffers:

Substantial buffers under car shall be furnished and installed in the elevator pit. Buffers shall comply with ASME A17.1 Code requirements.

Drains and Sumps:

Drains and sumps in elevator pits shall have a sump pump equipped with an oil sensing shut off prior to being piped to the sanitary sewer. Drains and sumps in elevator pits shall not be connected to the storm sewer system.

Car Top Inspection Station:

Each car shall have a cartop exit which opens from, and swings to, the outside of the car to a full open position. Fasten exit door from the outside with standard slotted screws.

A car top inspection station shall be located on each car top. Each inspection station shall be provided with the following: An emergency "Stop" switch; A toggle switch or push-pull button to activate the station; Constant pressure "Up-Down" direction buttons with "Safety" button, and A top of car work light, light switch, and GFCI receptacle.

The activation of the "car top inspection station" shall make the normal operating devices inoperative and give the inspector complete control of the elevator.

All switches and buttons shall be clearly and legibly identified as to their function.

Proper lighting shall be provided adjacent to the car top inspection station.

Interlocks:

Each hoistway entrance shall be equipped with an approved type interlock tested as required by ASME A17.1 Code. The interlock shall be designed to prevent operation of the car away from the landing until the doors are locked in the closed position, and shall prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing. Interlocks shall bear Underwriter's Laboratories or CSA label of approval.

Passenger Cars:

Equip each passenger car with an exhaust fan, an emergency lighting supply, handrails on wall, and telephone cabinet.

Furnish each car with removable wall pads and hooks.

All fasteners shall be "tamperproof" type.

Mount a tamper proof certificate frame in the elevator car.

Operation:

The car station shall contain key switch(es) to operate the fan, lights and independent service operation. A "door open" button shall be provided for stopping the closing motion of the doors, causing them to return automatically to their open position. Interior control panel shall have a "door open" button. The buttons in the car and hall stations shall be of the light-up type which will illuminate when the button is pressed, indicating that a call has been registered for that landing. Buttons shall remain illuminated until the floor is reached.

Each floor button shall illuminate when pushed until the floor selected has been reached.

Wire the stop switch to the alarm bell.

Each car control panel shall have a "keyed switch" to take the elevator out of service, keyed to the University Keying System.

Provide a protective device to prevent elevator doors from closing on an obstruction. Contact with an obstruction shall automatically reopen the doors. The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door movement is obstructed for a predetermined time, the electronic door reversal device shall be inhibited and the doors shall close at a reduced speed and torque, in accordance with ASME A17.1 code requirements. Closing shall be initiated one-half second after the passenger or object has moved from the opening.

After a stop is made, the doors shall remain open for an adjustable time interval. Closing may be initiated instantaneously by registration of a car call.

Push Button Stations and Car Stations:

All push button stations and car stations shall be vandal proof. Provide Braille number or character designations either routed into the button or on the button side plate.

Electrical Outlet for Housekeeping:

Provide an electrical receptacle for housekeeping purposes in elevator or in corridor on each floor adjacent to elevator landing.

Indicators, Lanterns and Gongs:

A digital type position indicator(s) shall be provided in the upper portion of the elevator cab. An audible signal shall sound prior to elevator arriving at or passing any landing. Soffit mounting is not acceptable.

Hall position indicators shall be provided at each landing over the elevator entrances. Provide indicator lights over the elevator door on the corridor, on all floors, to indicate at which floor the elevator is located.

The elevator shall be provided with a car riding lantern fixture mounted in the jamb. It shall notify waiting passengers by means of electrically illuminated direction arrows and audible gong as to which direction the elevator will be traveling. The gong shall sound once indicating an "up" traveling car and twice to indicate a "down" traveling car.

Hall lanterns with an audible signal shall be provided over or adjacent to all hoistway entrances with single lantern at terminal floors and "up and down" lanterns at intermediate floors. As soon as the car has reached a predetermined distance from a floor and is set to stop at that floor, the corresponding hall lantern shall be illuminated and the signal shall sound whether the hall button has been pressed or not, and the lantern shall remain illuminated until the car has left that landing.

Provide a light indicator at each entrance to indicate a call has been placed.

Passenger Sensing Device:

An electronic full entrance detector designed to operate as described below shall be provided at the entrance of the elevator car.

Controller:

Microprocessor Control System: Provide manufacturer's standard solid state microprocessor based control system for each elevator as required to provide selective collective group operation. Microprocessor based control system shall perform the functions of safe elevator motion, car operational and supervisory control and elevator door control. System shall allow for reprogramming of software to suit the individual requirements of each elevator, and changing operational requirements of the facility, based upon the parameters of the operational system(s) specified. The system shall include the hardware required to connect, transfer and interrupt power, and protect the motor against overloading; and perform car operation control. Each controller cabinet containing memory equipment shall be properly shielded. Controls shall accept reprogramming with minimum system down time, and shall not lose its memory from power failure.

Equipment Enclosures for the control system shall be NEMA I cabinets of steel with hinged doors or panels arranged for easy removal, of required gage and properly grounded as required by ASME A17.5 and/or the National Electric Code. Rack mount equipment to permit easy access to components. Provide doors with recessed ring-pulls or handles and ventilation grills at top and bottom. Ventilation fans shall be provided to permit sufficient movement of air through the panels to facilitate cooling of the internal components.

ENVIRONMENTAL CONSIDERATIONS: The new elevator controllers shall be capable of operating in an ambient temperature between 50 degrees F and 90 degrees F with a non-condensing humidity up to 90%.

DIAGNOSTICS: The new elevator control system shall provide a comprehensive means of accessing the computer memory for elevator diagnostic purposes. It shall have permanent indicators for important elevator statuses as an integral part of the controller.

INTENDED OPERATION OF CRITICAL COMPONENTS: The failure of any single magnetically operated switch, contactor, or relay, to release in the intended manner; the failure of any static control device, speed measuring circuit, or speed pattern generating circuit to operate as intended; the occurrence of a single accidental ground or short circuit; shall not permit the elevator to start or run if any hoistway door or gate interlock is unlocked or if any hoistway door or car door contact is not in the made position. Furthermore, while on car top inspection or hoistway access operation, the failure of any single magnetically operated switch, contactor or relay to release in the intended manner; the failure of any static control device to operate as intended; or the occurrence of a single accidental ground shall not permit the elevator car to move even with the hoistway door locks and car door contacts in the closed or made position.

STATUS INDICATORS: Dedicated permanent status indicators shall be provided on the controller to indicate when the safety string is open, when the door locks are open, when the elevator is operating at high speed, when the elevator is on independent service, when the elevator is on fire service, when the elevator out of service timer has elapsed, and when the elevator has failed to successfully complete its intended movement. In addition, a means shall be provided to display other special error conditions that are detected by the microprocessor.

OUT OF SERVICE TIMER: An out of service timer shall be provided to take the car out of service if the car is delayed in leaving the landing while there are calls existing in the system.

DOOR OPERATION: Door protection timers shall be provided for both the opening and closing directions. The door open protection timer shall cease attempting to open the door after a predetermined time in the event that the doors are prevented from reaching the open position. In the event the door closing attempt fails to make up the door locks after a predetermined time, the door close protection timer shall reopen the doors for a short time. If after a predetermined number of attempts, the doors cannot be closed successfully, the doors shall be opened and the car removed from service. A minimum of four different door standing open times shall be provided. A car call value shall predominate when only a car call is canceled. A hall call time value shall predominate when a hall call is canceled. In the event of a door reopen caused by the car door detector screen, a separate short door time value shall predominate. A separate door standing open time shall be available for lobby return.

NUDGING: If the doors are prevented from closing for longer than a predetermined time, the door nudging operation shall cause the doors to move at slow speed in the closed direction. A buzzer shall sound during the nudging operation.

CAR AND HALL CALL REGISTRATION: Demands for service shall be by car calls placed in the car and hall calls placed at the landings. When a demand for a car or hall call is placed, the appropriate car or hall call acknowledgment lamp shall illuminate. The call acknowledgment lamp shall be extinguished after the call is canceled.

FIRE SERVICE OPERATION: Firefighters' Phase I emergency recall operation, alternate floor Phase I emergency recall operation, and Phase II emergency in-car operation shall be provided according to the applicable edition of ASME A17.1. The main fire return floor shall be the Floor 1 Level. The alternate fire return floor shall be the Floor 2 Level.

INDEPENDENT SERVICE: Independent service operation shall be provided in such a way that actuation of a key switch in the car operating panel will cancel any existing car calls, and hold the doors open at a landing. The car will then respond only to car calls. Car and hoistway doors will only close with constant pressure on a car call push-button or the door close push-button. While on independent service, the hall direction lanterns shall be inoperative.

LEVELING: Each elevator car shall be equipped with two-way leveling to automatically bring the car level at any landing within a tolerance of +/- 0.5 in under all load conditions in both directions of travel.

TEST SWITCH: Each controller shall be provided with a controller test switch. In the test position, this switch shall allow independent operation of the elevator with the door open function deactivated for the purposes of adjustment or testing of the elevator. The elevator shall not respond to hall calls when the test switch is in the on position.

RELAY PANEL INSPECTION: Relay panel inspection shall not be provided. This will eliminate the requirement for a means of communication between the machine room and the elevator car.

UNCANCELED CALL BYPASS: a timer shall be provided to limit the amount of time a car is held at a floor due to a defective car call or hall call, including stuck push-buttons. Call demand at another floor shall cause the car, after a predetermined time, to ignore the defective call and continue to service the building.

HOISTWAY ACCESS: Each individual car controller shall provide for key activated hoistway access at the top and bottom landings.

EMERGENCY POWER: (For future use only) When an emergency power situation is detected by an input, the elevators shall be returned to the first floor landing floor one elevator at a time, via a three-position, auto-1-2 emergency power selector key switch located integral with the Phase I Firefighters' operating station and remain there after cycling the doors or with the doors open. Selection of the car that will run under emergency power shall be done by placing the elevator emergency power selector key switch in the proper position. The elevators shall be so arranged that only one elevator will operate at a time.

PERIPHERALS: This shall include the capability to remotely monitor the elevator operation via modem and/or telephone line including any software required for the Owner or the Owners Authorized Representative to access the elevator from a remote on-site or off-site location.

LANDING SYSTEM: The manufacturer's standard landing system compatible with the new controllers and capable of providing all the required signals shall be provided. A pump limit timer function shall be provided which, in case of the pump motor being energized longer than a predetermined time, shall cause the car to descend to the lowest landing and park, open the doors automatically and then close them. Calls shall be canceled and the car taken out of service automatically. Normal operation may be restored by cycling the main line disconnecting means or by placing the car on access or inspection operation. Door reopening devices shall remain operative. A valve limit timer shall be provided which shall automatically shut off current to the down valve solenoids if they have been energized longer than a predetermined time. The calls shall then be canceled and the car automatically taken out of service. Normal operation may be restored by cycling the main line disconnecting means or by placing the car on access or inspection operation. Door reopening devices shall remain operative. All available options or parameters shall be field programmable without the need for any knowledge of any programming languages. Programmable options and parameters shall be stored in nonvolatile memory. As a minimum, there shall be a 32-character alphanumeric display used for programming and diagnostics.

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Final Testing:

Final testing shall be performed in the presence of authorized representatives from the North Carolina Department of Labor, Elevator Division. Upon compliance with the applicable rules and regulations, a certificate of operation shall be furnished by the North Carolina Department of Labor. The elevator contractor shall coordinate the final

inspection with the elevator consultant from the North Carolina Department of Labor, in order to inspect the workmanship and specification requirements.

The Architect shall verify that the system performance is in conformance with the specification as part of the Owners acceptance inspection. The following system performance criteria shall be evaluated for conformance with the 7th Edition of the NEII Vertical Transportation Standards for new elevators: Acceleration; Deceleration; Maximum Jerk; Contract Speed Regulation; Vertical Vibration; Stopping Zone; Horizontal Vibration S/S; Horizontal Vibration F/B; Performance Time; Door Opening Time; Door Closing Time; Door Sound Opening; Door Sound Closing; Door Sound Reversal; Sound in Machine Room; Sound in Car at Rated Speed; Sound in Stopped Car, Door Closed, Fan On. Deviation from the specified value of contract speed shall not exceed +/- 2% in either direction with any load. Instrumentation for measuring system performance shall be provided by the Architect and/or his Authorized Independent Elevator Consultant. The Owner and/or Architect shall have the right to perform any test deemed necessary to verify compliance with the requirements of the specification and all applicable codes and standards. The elevator contractor shall be required to participate, as deemed necessary by the Architect, in performing any test needed to verify his compliance with the specification and all applicable codes and standards.

Post-Completion Submittals:

The elevator contractor shall give to Facilities Services personnel, or their designated representatives, thorough instructions regarding any solid state components, controls, operating sequence, etc.

The elevator contractor shall provide four complete sets of electrical and solid state wiring diagrams, and operating and maintenance manuals as more particularly described herein.

Drawings and Manuals: Prior to final completion of the project, and final acceptance of the project by the Owner and final payment, the elevator contractor shall provide to the Owner with three (3) complete sets of sequence of operation and control (including the functions of signals, door devices, any solid state circuit boards showing trouble shooting voltages), parts (including parts numbers), maintenance manuals, specific operating instructions, troubleshooting instructions for all equipment provided as part of this project and as-built wiring diagrams. These documents shall be bound in individual three-ring binders with the project name and number and State Elevator Numbers printed on the spine of each binder. These documents shall be formally transmitted, with five (5) complete sets of all signal fixture keys, to the Owner prior to the final acceptance inspection by the Department of Labor, Elevator Division Consultant.

In addition to the three sets of documents required by the previous paragraph, the elevator shall provide in each elevator equipment room one (1) additional complete set of the exact same documents plastic laminated to prevent damage. The as-built wiring diagrams shall also be plastic laminated, but are to be full sized and not placed in the three-ring binder. A wall mounted plan holder and plan racks shall be provided and installed in the machine room for storage of the as-built wiring diagrams. The remaining documents shall be bound in a three-ring binder as described above. These laminated documents shall be placed in the machine room.

The identification label for each diagram and manual shall include the subject, building name, and location, and contract number for which the diagrams and manuals apply.

All copies of all documents provided by the elevator contractor as required by the specification shall not be marked "Property of....." or inscribed with any written or verbal expression that would restrict the Owner from reproducing the drawings for use by the Owner. Under no circumstances shall any drawing, document or manual required by this specification be copyrighted in such a manner that restricts reproduction by the Owner in any manner the Owner chooses at his sole discretion.

Diagnostic Tools: The elevator contractor shall provide to the Owner as part of this specification any and all diagnostic tools and/or instruments, whether hand held or machine room terminal, and all written operating and instruction manuals needed to use the diagnostic tools required by the specification to allow for adjustment of any

and all computer parameters and/or troubleshooting the equipment provided. These diagnostic tools shall be provided at no additional cost to the Owner. The Owner shall not be required to execute any type of written agreement in order to obtain said tools.

The diagnostic tools and/or instruments shall permit the Owner and/or his authorized representative to access, diagnose and/or adjust all computers and/or software based variable features and/or parameters for the entire lifespan of the new equipment provided as required by the specification.

The diagnostic tools and/or instruments shall be permitted to be dedicated to only the new equipment provided on this project as required by the specification insofar as all other requirements regarding the ability to access the diagnostic features are in full compliance with the specification.

Any and all passwords required to use the diagnostic tools and/or instruments required to access the equipment control systems for the purposes outlined herein shall be formally transmitted to the Owner in writing and shall be included in the four (4) Owners Manuals described in Item B. Drawings and Manuals above.

The elevator contractor shall notify the North Carolina Department of Labor for scheduling of a final inspection per code and specifications. Approval must be given that all code requirements have been met and that installation complies with the specifications before final payment will be made.

Furnish a minimum of four (4) keys for any key-operated locks (such as call station, lighting, hoistway entry, fireman return key, etc.) for each elevator to the Facilities Services. Provide key blanks of an equal number to the Facilities Services.

14415 Vertical Wheelchair Lift

General

All installations shall comply with the North Carolina Vertical Wheelchair Lift Code.

Prior to the ordering of equipment or the construction of surrounding areas, provide complete product information including major components, lift dimensions, control diagrams, surrounding construction configuration, electrical connections, to the University for approval.

Upon completion of construction, the Contractor shall provide the University with certificate indicating that the lift, and all associated items provided by the manufacturer for this installation complies with the North Carolina Vertical Wheelchair Lift Code.

Product delivery, storage, and handling: The Contractor shall prevent damage to the lift or adjacent construction when delivering, storing, and handling the lift. The Contractor shall coordinate delivery with project's progress.

Products

Furnish a vertical wheelchair lift equal to the unit manufactured by the Cheney Company, American Stair Glide Corporation. The Designer shall select the finish from the manufacturer's standard colors.

The unit shall have a minimum 450 lbs. capacity and accommodate a lifting height as required for its location. Operation is by electric motor. Platform not to exceed 12 square feet.

Self-closing gates and associated items at top and bottom levels, with all "electro-magnetic" and mechanical hardware shall comply with the N. C. Vertical Wheelchair lift code.

Unit to have key controlled switches for attendant controlled operation.

Provide a one year warranty on vertical wheelchair lift for parts and labor. The Contractor is not responsible for damages unrelated to defective parts or for the labor to repair or replace this damage.

Provide full service maintenance by trained employees for a period of one year to run concurrent with the warranty.

Execution

Rated Speed: The rated speed of lift shall not exceed forty feet (40') per minute.

Platform and Ramps:

- The platform shall measure not less than thirty-six inches (36") wide and shall have an area of not more than twelve square feet (12 sq.ft.) on the inside of the platform.
- Construct the platform surface of material that is relatively smooth and skid proof.
- Provide a ramp, if required, for access to the platform.
- Design and construct ramp as required by Section IX (4.1) of the N. C. Vertical Wheelchair Lift Code.
- Design and construct the platform to prevent the wheelchair from prematurely leaving the platform.

Supports:

- Support and maintain the assembled lift in place to prevent any part from becoming loose or displaced.
- Provide adequate support to maintain the lift platform in a level position at all times.
- Securely anchor the framework in place to a foundation.

Factors of Safety: Construct the frame and platform of lift with metal capable of withstanding stresses of five (5) times the rated load of the device. A registered professional engineer will certify the safety factor of five (5) by affixing his or her signature and seal to the certificate.

Guarding:

- Protect the area around the top and bottom landings of a lift with a barrier at least forty-two inches (42") high and equip with an entrance door or gate.
- The barrier may be a solid panel or open railing and shall be of substantial strength. If a railing is provided, space the supports so that a ball two inches (2") in diameter may not pass through.
- The lift contractor will furnish the top and bottom landing gates, however, the General Contractor will furnish and install the enclosure for the lift and gates. General Contractor will provide support for the top and bottom gates and securely anchor the gates to the enclosure. Contractor will not construct entrance walls until the lift gates are in place.
- Entrance doors or gates shall be self-closing and self-locking and equipped with an electric contact to stop the lift if the gate is opened. Equip the underside of the platform with a "Safety Obstruction Sensor(s)" that will provide an automatic shut off of the equipment should an obstruction interfere with its downward travel.
- Provide entrance doors or gates at least forty-two inches (42") in height.
- Maximum pressure required to open the doors or gates shall not exceed eight pounds (8#).

Controls and Electrical Equipment

- Provide an upper and lower stopping switch to stop lift at the terminal landings.
- Provide a final limit switch to stop the lift should over-travel occur.
- The operating controls shall be key operated to prevent operation by unauthorized persons. Control switches shall be constant pressure type arranged to return to the off position when released.

Lift Contractor will obtain a permit from the N. C. Department of Labor, Elevator Division to install unit and pay all inspection fees.

It is the Contractor's responsibility to coordinate all aspects of the lift installation and any special needs due to the lift manufacturer's requirements.

Contractor shall provide the Owner with a minimum of six (6) keys that operate the controls of the lift.



THE UNIVERSITY
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DEPARTMENT OF FACILITIES PLANNING & CONSTRUCTION