December 14, 2014

Mr. Howie S. Ferguson  
University of Florida  
Planning, Design & Construction  
232 Stadium, PO Box 115050  
Gainesville, FL 32611-5050

Dear Mr. Ferguson:

As requested VTE Solution has reviewed all of the pertinent information that was available to us concerning the simplex electric traction elevator located in the Newell Hall Building at the University of Florida in Gainesville, Florida.

The elevator that will be the subject of this review is identified as follows:

Newell Hall Building:  
Florida State SN# 01904  
Controller: Otis Elevator Company: Type 11 UC, Sales # 222140  
Power Supply: 220 VAC 3 Phase 60 Hz  
Traction Machine with 1:1 Roping (Four ½ inch ropes)  
Capacity: 2000 Lb. - Speed: 100 FPM  
Door Operator: Otis Elevator Company  
Interlocks& Door Hangers: Otis Elevator Company  
Governor: Otis Elevator Company Type A  
Openings: 5 Front - 34" Single Speed Slide

Assessment of Existing Elevator: The following is an assessment of the condition of the existing elevator equipment located in the Newell Hall Building located at the University of Florida.

This assessment was commissioned to survey the existing elevator equipment condition at the Newell Hall Building and to make a recommendation with respect to elevator modernization or replacement, compliance with applicable elevator codes, building codes, and conformance to requirements of the Accessibility provisions of the Florida Building Code.
Passenger elevator equipment condition in the Newell Hall Building and its suitability for reuse is discussed in the following paragraphs. Most of the equipment, if not all of the equipment will be need to be replaced to provide reliability, operation, performance and safety features consistent with modern elevators.

On Monday November 24, 2014 a site survey of the existing passenger elevator equipment was conducted to determine its present condition and suitability for continued use with some level of possible modernization.

Generally speaking, there has not been any level of maintenance and the equipment has deteriorated due to the environmental conditions, including the lack of any humidity control in this building. The last record of an annual inspection was listed as 4/17/12 on a tag in the machine room. This equipment has seen approximately 50 to 55 years of service. We were not able to access the car top to verify the installation date so this information is based on the State Serial Number with an approximate age of this equipment.

The life span of elevator equipment is not an exact science as the real life depends on many things from usage to environment. Environmentally speaking, the elevator appears to have been protected reasonably well from the elements but this elevator is in extreme need of total refurbishment if the intention would be to retain this elevator and associated equipment.

As with any elevator review, the primary concern is the determination if this elevator equipment is safe to use for the building. Even though the elevator was not able to operate due to building hazardous material remediation, a visual inspection of the general condition of the equipment would not suggest that there are immediate concerns for the safe use of this elevator, but there is concern of the reliability of the system to be used without major work prior to being available for use of the public. This will continue to worsen as the aging process continues.

Most of the existing elevator equipment has, in my judgment, reached the end of its useful service life and should be extensively replaced, as indicated in this assessment document.

The existing elevator control equipment is obsolete and is not capable of providing reliable operation or performance comparable to modern installations. Additionally, the existing controls are not provided with the latest operational capabilities of automatic two-way leveling, selective collective operation, or the Firefighters' Operation features required by current codes.

This is illustrated with the variance (VW 2011-193) that is posted in the machine room of this elevator. This variance was approved on June 27, 2011 and will expire on June 1, 2016. While this variance addresses Firemen’s Service, there are a number of other items that would need a variance to be able to even operate this elevator today for any use of the public.

The existing car, frame, guide rails and buffers are in acceptable condition for reuse during any modernization. Most of the other hoistway components including the car platform and car enclosure are in questionable condition for reuse during any modernization and would probably have to be completely replaced due to their age and condition. All traveling cables, hoistway wiring and machine room wiring would have to be replaced during any modernization that would be necessary for this elevator.

The existing passenger elevator car door operator is obsolete and would have to be replaced completely as with all of the door equipment. The existing car door, door track, door sill and associated switches and controls must be replaced during any modernization due to the excessive wear on this equipment.
The existing traction machine will either have to be completely replaced with a new traction drive machine or it will need to be completely rebuilt with all new components and retain only the existing drive machine housing. The motor will need to be replaced with a new AC motor that would provide reliable and safe operation that would consistently allow the elevator to level into all landings within the standards of ± ¼ inch to ensure safe access and egress for the elevator cab. The cost to completely rebuild this drive machine would end up being more than it would cost to replace the entire drive machine due to the intensive labor that would be required to rebuild the existing unit.

The existing hoistway entrance assemblies and door panels could be reused with additional work required for reuse of these components. Even if these entrance assemblies could be reused the door opening is only 34 inches which is below the entrance requirements for Accessibility Standards. The interior car platform area is below what is required for accessibility provisions based on the 2012 Florida Accessibility Code for Building Construction which is based on The 2010 ADA Standards for Accessible Design. Even if you were to retain this elevator with the current hoistway entrance openings this elevator would not meet the minimum 36 inch clear opening standard for an elevator.

As requested I am identifying the various items that will be required to be provided not only for current code compliance, but for providing the University of Florida with an elevator that will provide many years of dependable service for the University. Since the controller will need to be replaced during any modernization, it drives the requirement to replace other components to insure operational compatibility for your elevator. Typically the HVAC requirement would not kick in until you replace your control system, but since you will need to replace the controller, you need to provide acceptable HVAC for the machine room since the controller is a microprocessor type of controller. That is the type of cascading requirements that will need to be addressed during any modernization of your elevator.

Modernization Requirements for Existing Elevator: In my opinion the following are the components that will need to be changed out when the University executes a modernization of this elevator and is explained in more detail in the body of this document:

- Traction Drive Machine
- Drive Motor
- Control System
- Landing System
- Hoistway Switches
- Complete Car Enclosure
- Car Top Inspection Station
- Traveling Cables and Hoistway Wiring
- Emergency Communications System
- Car Station Fixtures
- Electrical Upgrades
- Machine Room HVAC Upgrades
- Fire Alarm Panel/System Requirements
• Car Door Equipment, including car door, door operator, tracks, hangers and clutch assembly and associated door hardware
• Hoistway Door Equipment, including all hoistway door interlocks and door hanger equipment at all the landings
• Pit Ladder (none currently installed)
• Hall Station Fixtures

**Estimate of Modernization Option:** The entire machine room will have to have a fire resistive enclosure installed in conformance with current building requirements. Installing microprocessor controls for this elevator will require that HVAC be provided in conformance with current code requirements. All of the electrical supply for this elevator will have to be replaced including the feeders due to the age of these conductors. New circuits will have to be installed for the car lighting circuit and the machine room HVAC. Fire Alarm Initiating Devices will have to be provided and installed in conformance with both the A17.1 Safety Code for elevators and Escalators and in conformance with the NFPA 72 National fire Alarm code.

If the intention would be to retain and reutilize this elevator I would estimate that the cost would be between $120,000.00 and $150,000.00 for only the elevator equipment.

These costs do not even address the hoistway entrances that only have 34 inches clear opening. If these would be replaced to achieve the minimum 36 inch clear opening width you will increase the elevator cost by an additional $15,000.00 to $20,000.00.

Even though it is outside my area of expertise I would think that all of the associated requirements for a complete modernization of this elevator and compliance with current code requirements would add at least another $25,000.00 to as much as $50,000.00.

**Options to Modernization of Existing Elevator:** As per our conversation I have reviewed the possibility of having a new elevator installed in the annex building that is to be constructed adjacent to the Newell Hall Building. Based on the costs which would be encountered with a complete modernization of the existing elevator and the extensive amount of peripheral work that would be required I believe it would be a better decision to include the installation of a new elevator in the construction project of the annex building.

The current elevator would not meet the requirements of the accessibility guidelines that are in the 2012 Florida Accessibility Code for Building Construction which is based on the 2010 ADA Standards for Accessible Design. This minimum size requirement would be for an absolute minimum of a 2100 lb. elevator with a 36 inch clear door width.

Currently for a new elevator installation there is a minimum requirement for a stretcher capable elevator. This requirement is in Florida Statute Chapter 399.035 Elevator accessibility requirements for the physically handicapped. —

(2) Any building that is more than three stories high or in which the vertical distance between the bottom terminal landing and the top terminal landing exceeds 25 feet must be constructed to contain at least one passenger elevator that is operational and will accommodate an ambulance stretcher 76 inches long and 24 inches wide in the horizontal position.
The current elevator could not meet this requirement even with a total modernization. While this is not a retroactive requirement it needs to be a consideration in the planning process of this project.

There are two types of elevators that can be considered for this installation and I will provide some information on both of these types of elevators. One would be a hydraulic type of elevator and the other would be an electric traction type of elevator.

**Hydraulic Passenger Elevator Installation:** A 2500 lb. hydraulic passenger elevator can be installed in the new construction of the annex building. At 2500 lb. capacity this elevator platform size will meet the accessibility requirements and with a single speed side opening door it will meet the minimum requirement for a stretcher capable elevator.

This elevator would be installed with 42 inch wide doors for full access. The platform inside dimension would be 80 inches wide and 51 inches deep. These dimensions meet or exceed both the minimum stretcher capable size elevator in the State of Florida and the minimum requirements for accessibility.

A hydraulic passenger elevator would require a machine room ideally situated adjacent to the elevator hoistway at one of the lower floor levels. The size of the footprint of the machine room to contain the hydraulic drive machine, controller and associated electrical equipment would be approximately 60 sf. The hoistway dimension for the 2500 lb. elevator with a conventional borehole jack assembly would be 8'-4" wide x 5'-9" deep. This type of hydraulic elevator would also require a shorter vertical dimension of the hoistway since this elevator would require a minimum overhead dimension of 12'-3". The speed for this elevator can be specified to be between 100 fpm and 150 fpm with my recommendation to be a 125 fpm to 150 fpm speed.

The average monthly maintenance cost in the years following the installation maintenance and warranty period would be between $150.00 and $200.00 per month for a full maintenance service contract for this type for elevator.

The budget estimate for a 2500 lb. hydraulic passenger elevator with a conventional jack for a five front landings would be approximately $90,000.00. With all building costs for a new hoistway included for the machine room and hoistway including all associated building infrastructure requirements would add approximately $40,000.00 to $60,000.00 to this cost.

**Electric Traction Passenger Elevator Installation:** A 2500 lb. electric traction passenger elevator can be installed in the new construction of the annex building. At 2500 lb. capacity this elevator platform size will meet the accessibility requirements and with a single speed side opening door it will meet the minimum requirement for a stretcher capable elevator.

This elevator would be installed with 42 inch wide doors for full access. The platform inside dimension would be 80 inches wide and 51 inches deep. These dimensions meet or exceed both the minimum stretcher capable size elevator in the State of Florida and the minimum requirements for accessibility.

An electric traction elevator could be provided in a Machine Room Less (MRL) design. This application would be best suited for a building supported configuration of this MRL electric traction elevator. This configuration requires structural support by the building. This type of application is ideal for steel, concrete or other construction methods capable of carrying the loads of an elevator system.
With this type of elevator (Machine Room Less) a full size machine room comparable with the footprint of the hydraulic elevator machine room is not required. This type of elevator would require a Control Room instead of the machine room. The footprint of this Control room would be approximately 15 sf. Additionally the Control Room would need all of the building infrastructure support as the traditional machine room. The Control Room would still require HVAC, lighting, main line disconnect switch, cab lighting disconnect switch, convenience receptacles and Fire Alarm Initiating Device (FAID) installation.

The Control Room for this type of elevator could be located at any level in the building but should be sharing an adjacent wall surface with the hoistway.

The hoistway dimension for the 2500 lb. elevator with a MRL elevator would be 8'-4" wide x 6'-11" deep. This type of MRL elevator would also require a higher vertical dimension of the hoistway since this elevator would require a minimum overhead dimension of 14'-9". This would result in a hoistway height dimension approximately 2'-6" taller than the comparable hydraulic elevator. The speed for this elevator can be specified to be either a 200 fpm or a 350 fpm speed elevator. The maximum that I would recommend would be the 200 fpm elevator speed due to the height of the building and the floor to floor distances.

The average monthly maintenance cost in the years following the installation maintenance and warranty period would be between $325.00 and $400.00 per month for a full maintenance service contract for this type for elevator.

The budget estimate for a 2500 lb. electric traction passenger elevator with a MRL configuration for five front landings would be approximately $115,000.00. With all building costs for a new hoistway included for the machine room and hoistway including all associated building infrastructure requirements would add approximately $40,000.00 to $60,000.00 to this cost.

**Life Cycle Consideration:** The life cycle of the hydraulic elevator should be a minimum of 25 years. This type of elevator has been a mainstay in the low rise elevator installation and has a very strong reliability record and life cycle. In my opinion the life cycle of the MRL traction elevator will be something less than that length of time. The MRL elevator is a newer design without a track record that would support a statement that it would last a minimum of 25 years. A number of the MRL designs have not proven to have a life cycle that would match the hydraulic elevator in the low rise elevator installation use.

**Construction Cost Consideration:** Both the MRL electric traction elevator and the hydraulic elevator will end up having very comparable construction costs. While the machine room for the hydraulic elevator is larger, the footprint of the hoistway for the MRL traction elevator is larger and the overall construction height of the hoistway is higher. The construction cost does not show any real advantage for one type of elevator over the other.

**Maintenance Cost Consideration:** Additional consideration for maintenance costs should be a factor in the final decision for this elevator modernization or replacement project.

Installation of a hydraulic elevator will cost between $150.00 and $200.00 per month in maintenance costs.
Installation of a traction elevator will cost between $325.00 and $400.00 per month in maintenance costs.

The electric traction elevator would provide a slight advantage in electrical operating costs but in my opinion this difference must be evaluated on the additional monthly operating maintenance costs. The monthly maintenance costs will be approximately $175.00 to $200.00 per month more for the electric traction elevator which would probably more than offset any lower electrical operating costs.

**Decommission and Demolition of Existing Elevator:** The existing elevator can be decommissioned and demolished but it needs to be done properly. This is still a licensed elevator until after it is decommissioned and removed from the Bureau of Elevator Safety inventory listing of elevators. Technically this would require a procedure that is covered in ASME A17.1b-2009 Safety code for Elevators and Escalators which is the currently adopted safety code in the State of Florida.

This would be classified as placing the elevator installation out of service with the following code requirement before the elevator could be decommissioned and removed from the Bureau of Elevator Safety current elevator inventory.

A17.1b-2009 Requirement 8.11.1.4 Installation Placed Out of Service. Periodic inspections and tests shall not be required when an installation is placed “out of service”:

(a) as defined by the authority having jurisdiction; or

(b) when an installation whose power feed lines have been disconnected from the mainline disconnect switch; and

(1) an electric elevator, dumbwaiter, or material lift whose suspension ropes have been removed, whose car and counterweight rest at the bottom of the hoistway, and whose hoistway doors have been permanently barricaded or sealed in the closed position on the hoistway side;

The State of Florida has not defined any specific requirements to place the elevator out of service other than compliance with the A17.1 requirements.

I would advise that the University contract with a Registered Elevator Company (REC) to coordinate the removal of the power feed lines after the REC has placed the elevator and the counterweight in a secure position at the bottom of the hoistway.

Prior to placing the elevator and counterweight assembly at the bottom of the hoistway the REC should seal the hoistway doors in the closed position on the hoistway side of each landing. Once this is completed the REC can place the car and counterweight in position at the bottom of the hoistway. After the REC has placed the car and counterweight in this position the REC must remove the suspension ropes for this elevator.

Once this has occurred the elevator installation will be “placed out of service.” Once this has taken place the State can be notified to verify the elevator has been placed out of service and they will remove the elevator from the current elevator inventory. At this point the University can contract for the demolishment and removal of all of the existing elevator equipment with any company qualified to perform this type of equipment demolition. After the State removes the elevator from the inventory this can be a company that does demolition work and not necessarily an elevator company.
Extreme caution should be taken as with any construction and/or demolition site due to the obvious fall hazards that will be present until all of the existing hoistway entrances have been removed and the openings permanently covered. If the initial placing of the elevator out of service is not initiated by a REC with the detailed knowledge of the equipment that is being decommissioned this would be an extremely dangerous situation due to the potential of having the elevator car or counterweight falling and crashing into the bottom of the hoistway or this could cause the elevator car to engage the car safeties with the car crashing into the top of the hoistway.

**Recommendations:**

1. In my opinion I believe it would be in the best interest for the University of Florida to demolish the existing elevator in the Newell Hall Building.

2. In my opinion I believe that it would be in the best interest for the University of Florida to plan for the installation of a new 2500 lb. hydraulic passenger elevator in the planned construction project of the annex building for the Newell Hall Building.

Hopefully, this information will assist you to make decisions relative to the elevator equipment located in the Newell Hall Building at the University of Florida

Regards,

William Snyder
VTE Solution, LLC
Hoistway entrance assembly at lower landing has been disturbed in the past during some building work and would need to be replaced to ensure acceptable fire resistive construction.
Cab interior is extremely distressed and the overall size will not meet minimum accessibility requirements currently adopted. Cab enclosure would need to be completely replaced during any serious modernization project of this elevator.
Some hoistway wiring is original and additional cables have been installed over time. All wiring is in poor condition due to the general age of the conductors throughout the hoistway and machine room.

All door equipment would need to be completely replaced due to the condition of the door equipment and requirements for newer code requirements.
All fixtures for this elevator will have to be replaced and relocated within the height ranges stipulated in the Accessibility Standards.

During building remediation a wooden access panel to the hoistway was uncovered. This will be required to have a fire rated access panel installed with a means available to utilize the access panel which was not provided previously.
Machine room construction will need to be completely redone to provide fire resistive construction in conformance with current building code requirements. There are foreign piping and other building system components that will need to be removed and relocated out of the machine room if it is retained.
Access to the machine room level of this installation is inherently a hazard due to the vertical ladder that is used for access. New equipment including drive machine and controller will not even be able to be brought through the floor opening to access the machine room equipment level.

All electrical will have to be replaced with additional electrical requirements for HVAC, cab lights machine room lighting and convenience receptacles will need to be provided.
Existing drive machine is worn out. Inspection of the worm and gear indicate excessive wear which would require complete replacement of all drive machine components or complete replacement of entire drive machine with a new geared drive machine.