Addendum # 1

Contract Number: UMA17-18
Project Number: A001800
Speedtype: 158905
Title: Fine Arts Center, Room 125 Rand Theater Rigging System

The attention of the bidders submitting proposals for the above subject project is called to the following addendum to the specifications and drawings. The items set forth herein, whether of omission, addition, substitution, or clarifications, are all to be included in and form a part of the proposal submitted.

The number of this Addendum (1) must be entered in the appropriate space “B. This bid includes addenda numbered (list all addenda) _____” found on Page 51 – Form For General Bid, and/or Page 59 - Form for Sub-Bid “B. This sub-bid includes addenda numbered (list all addenda)_____.

Item 1: Clarification regarding the index light strip

Answer: In Specifications Section 116133, Part 3.02.B.2, revise spacing of index strip light lamps to 1’-0” c/c instead of 2’-0” c/c.

Item 2: Question – the gridiron will likely need to be accessed during construction by a man-lift. What is the structural capacity of the stage in regard to a lift?

Answer: A Structural Report for the existing stage floor and carrying members was conducted. The scope of this Study had a broader reason but the information regarding member capacities and limits may assist with the answer to this question. Structural Report is attached.

Item 3: Clarification regarding counterweights

Answer: In Section 116133, Part 3.03.E (Counterweight), DELETE Item 3. Provide counterweight in thicknesses as specified in Part 3.03.E.4.”

Item 4: Attached is the pre-bid sign-in sheet

End of Addendum #1

By: John O. Martin
Director of Procurement
<table>
<thead>
<tr>
<th>Company</th>
<th>Telephone</th>
<th>E-Mail</th>
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</thead>
<tbody>
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</tr>
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Meeting Subject: Pre-Bid Meeting

Meeting Date: March 28, 2017

Project: FAC, Room 125 - Rand Theater Rigging System

Design & Construction Management
November 18, 2016

Mr. Cleve Carrens
Capital Project Manager
Design and Construction Management
Facilities & Campus Services
University Of Massachusetts
360 Campus Center Way
Amherst, MA 01003-9248

RE: FAC RAND THEATER STAGE FLOOR STRUCTURAL STUDY

SUBJECT: STRUCTURAL CONDITION SURVEY AND STRUCTURAL ANALYSIS OF THE REMOVABLE STAGE FLOOR SYSTEM

Dear Mr. Carrens:

At the request of the University of Massachusetts, D M Berg Consultants, P.C. has performed a structural condition survey and structural analysis of the removable stage floor area at the above-referenced building. The structural condition survey was limited to the area of the stage floor with removable floor sections and the associated structural elements supporting the floor panels. This is a report of the results of our structural condition survey and structural analysis.

1.0 OBJECTIVES

The objectives of this report are as follows:

- To provide a structural analysis of the removable floor sections and the associated structural elements supporting the floor panels in order to provide a load rating to each component of the stage floor assembly.

- To provide an opinion of the present structural condition of the removable area of stage floor structural components and future expected repair costs to refurbish the components.

- To provide a recommended option to the University to completely replace the stage floor with a new floor system including replacement of the structural beams and columns supporting the removable stage floor area.
2.0 SCOPE

Our scope of work includes the following:

- Field observations of the structural components to determine the sizes and layout of the removable stage floor components (floor panels, beams, columns and connections).
- Evaluate and summarize the results of our field survey and structural analysis.
- Provide repair recommendations to restore/refurbish the existing structural integrity of the removable stage floor components.
- Perform a preliminary design of the recommended option for the replacement removable stage floor assembly.
- Provide an opinion of probable construction cost for the stage floor refurbishment option and for the new stage floor replacement option.

3.0 GENERAL DESCRIPTION OF THE EXISTING REMOVABLE STAGE FLOOR ASSEMBLY

The removable stage floor section is approximately 1,100 square feet in area and is located in the center portion of the stage. As we understand the floor panels are occasionally removed to during building and setting up of productions. The sectional floor panels are constructed of 1x3 glue-laminated boards oriented in the vertical direction. Each floor panel is 3 inches deep and 11 ½ inches wide. There is a steel angle at each end on the underside that connects four panels together. The panels are single-span and are supported by interior 6x10 timber beams. Along the perimeter the supported ends of the panels are supported by steel angles bolted to the cast-in-place concrete beams and walls. The timber beams are support by 4-inch nominal steel posts with U-shaped cap plates and square baseplates. The columns are supported directly on the concrete basement slab.

4.0 STRUCTURAL CONDITION SURVEY OBSERVATIONS

During our structural assessment survey of the removable stage floor structure we made the following observations:

- We observed laminated wood removable stage floor panels were in good condition. There is a steel angle at each end on the underside that connects four of the 11 ½-inch wide panels together (Photo 1). A few of the panels were observed to have split open between the 1x3 laminations.
- We observed the laminated wood removable stage floor panels are supported at the perimeter on a steel 3x3 angle ledger bolted to the concrete floor edge beam. The bolts are spaced at 3 feet on center.
We observed the timber 5x10 beams to be generally in good condition (Photo 2). Some beams had horizontal splits due to drying of the wood over the years (Photo 3).

We observed that the timber 6x10 beams are seated in the U-shaped steel cap plate without bolts or lag screws (Photo 4).

We observed that the timber 6x10 beams are seated in a steel saddle bolted to the perimeter concrete edge beam. (Photo 5).

We observed a layer of wood subflooring installed on the topside of panels another layer was being installed with screws the day of our survey.

5.0 STRUCTURAL ANALYSIS RESULTS

We performed a structural analysis of all the structural components of the removable stage floor system. Table 1 below indicates the uniform total load carrying capacity and the allowable uniform live load capacity of the stage floor components. (Note: the current Massachusetts State Building Code requires stage floors to be designed for a minimum live load capacity of 125 pounds per square foot (psf)). Both bending and shear capacity was used in our determination of the limiting load capacities presented in the tables. Table 2 below indicates the concentrated total load carrying capacity and the allowable concentrated live load capacity of the stage floor components combined with a minimal uniform live load of 20 psf. We considered a concentrated load applied over 12-inch by 12-inch area.

Note: we performed calculations on the capacity of the steel U-Shaped column caps, steel beam support saddles and the steel angle ledger including the bolts. The load carrying capacities of these elements well exceeded the Code required live load and thus are not presented in the tables.

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<tr>
<th>Component</th>
<th>Total Uniform Load Capacity</th>
<th>Uniform Live Load Capacity</th>
<th>Limiting Factor</th>
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<td>296 psf</td>
<td>Bending</td>
</tr>
<tr>
<td>Stage Floor Panels</td>
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<td>371 psf</td>
<td>Shear</td>
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<td>6x10 Timber Beams</td>
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<td>138 psf</td>
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<td>Column</td>
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<tr>
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<th>Total Load Capacity</th>
<th>Live Load Capacity</th>
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6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on our results of structural analysis of the removable stage floor structural components presented in Tables 1 and 2, the 6x10 timber beams with a span of 7ft-8 ½ inches do not meet Code for shear strength. All other structural components exceed the Code required live load carrying capacity of 125 psf for stage floors. However, during our field measurements and inspection we did not observe evidence of overstressed beams, floor panels or columns such as cracking and crushing of the wood and bending of steel plates.

We also calculated the point loads applied on the various stage floor structural components from the Genie lift used at the theater. For these calculations we used a total weight of 1100 pounds for the lift with an operator, tools and some material. Spreading the load over the Genie lift footprint (not including the outriggers), the uniform load under the lift is calculated to be approximately 100 psf. This load is considered acceptable as the floor component's uniform load carrying capacities meet or exceed the 125 psf over the whole floor. The point loads capacities presented in in Table 2 also exceed the entire weight of the Genie lift on a 12-inch by 12-inch area. Based on these results we conclude that the Genie lift may be operated on the stage floor.

Listed below are the two options we would recommend to the University. The first, the refurbishment and strengthening option and the second the removal and replacement of the entire removable stage floor assembly.  Note: At the end of this report we have provide an opinion of probable construction costs for the two options listed below.

Refurbishment Option

1. To strengthen the timber beams to meet or exceed the Code required live load carrying capacity replace all the timber beams with 3 plies of 1 ¾ x 7 ¼ LVL glued and screwed together.

2. Resurface the top surface wood floor panels and apply a new subfloor layer to the top side.

Replacement Option

1. Demo and dispose of the existing removable stage floor components.
2. Install a new removable stage floor structure. The structural system will consist of new steel columns (similar spacing as the existing columns), new steel beams (all bolted connections) and a new removable floor panel system. The proposed floor panel system is a 4 foot wide, 6 1/2-inch thick structural insulated panel (SIP). The panel will be fire rate using a flame resistant polyurethane core with a 26 gage metal skin each side. On the top, a fire treated wood subfloor can be added to the panel. The panel edges will be linked together using a recessed cam locking system. The weight of this floor panel system is approximately 40 percent less than the current wood floor panels.

If you have any questions or need further assistance please call.

Sincerely,

DM BERG CONSULTANTS, P.C.

Thomas G. Heger, P.E.
President

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PHOTOGRAPH 1
PHOTOGRAPH 2
PHOTOGRAPH 3
PHOTOGRAPH 4