G. M. SELBY, Inc.

April 7, 2019

Andria Wingett
Assistant Director
Development Services
2600 Hollywood Blvd., Room 422
Hollywood, FL 33022

RE: Summary of Report Review – Feasibility Study Report CIRC Hotel

Dear Ms. Wingett:

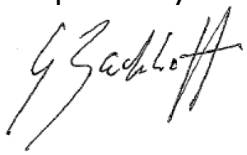
Please see our initial findings and opinion regarding the installation of radio frequency equipment at the CIRC hotel located at 1740 Polk Street, Hollywood in Broward County, Florida.

A more detailed report which should include calculations and schematic design sketches, which includes the structure and the RF signal coverage, should follow to back up and present our findings in their final and true insitu condition.

The following pages represent my opinion, based on engineering knowledge and experience regarding the current intentions of the installation and suitability of the CIRC building to provide a communication site for Broward County's Emergency Communication System.

The underlying intent is to design the system with the optimal requirements as they would be with a tower and communication site specifically designed for the Emergency Communication System. G. M. Selby, Inc recommends a few variations in the original ideas as presented by KCI et al.
Please reach out if you have any questions.

Respectfully submitted by:



Gerald Zadikoff, PE, F-ASCE

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G. M. SELBY, Inc.

EVALUATION OF THE

FEASIBILITY STUDY REPORT
CIRC HOTEL
1740 POLK STREET, HOLLYWOOD
BROWARD COUNTY, FLORIDA
Prepared for:
BROWARD COUNTY COMMISSIONERS
March 29, 2019

Prepared By
Gerald Zadikoff, PE

April 2019

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Introduction

G. M. Selby entered into an agreement with the City of Hollywood (Florida) to evaluate the feasibility report prepared by others in order to assess the CIRC Hotel building as a site for the installation of communications equipment. We specifically evaluated the Motorola Solutions, Broward County Staff, Mission Critical Partners and KCI Technologies, Inc. feasibility study of the CIRC Hotel as tasked by the Broward County Commissioners. The report as prepared highlighted the underlying systems and components in order to determine the suitability of the building to provide a communication site for Broward County's Emergency Communication System. Their underlying intent was to design the system with the optimal requirements as if they used a tower and communication site specifically designed for the Communication System.

G. M. Selby reviewed the report and has established our recommendations based on the building's criteria and RF requirements.

CIRC Building Evaluation

Antenna Placement / Design Considerations

The backhaul, i.e. microwave signal needs to be transmitted with a direct line of sight to the receiver. Due to the size of the microwave dish, 8' (eight ft.) and the desired azimuths to the receive antennas, the microwave will need to be elevated above the parapet wall to be able to rotate it. This is going to be very difficult to achieve with the high wind speed design criteria (FBC 2017) and limited area to attach to on the parapet wall. The recommendation was to use multiple standoffs attached back to the parapet wall as well as the roof surface to achieve.
Apart from the visibility of the large dish, this should not pose a problem at all from a logistical and structural point of view. The penetrations in the roof membrane should be kept to a minimum. This can be achieved by spreading the load of the standoffs and support system over a larger roof top area. This should only require a minimal number of penetrations into the roof which can be achieved by special dowels with small diameters attached to a larger surface bracket mounted on the dowel mechanism to attach to the

frame support. NDT (Non-Destructive Testing) must be employed to locate any steel in the roof to avoid conflict and maintain its full structural integrity. This is achievable as there is a large tolerance in the positioning and location of the spread mounting structure.

This system will allow for the direct line between the 8' (eight ft.) diameter RFS antenna and the receiving 5" (five inch) Sinclair SC412 antennas without loss of any signal.

The KCI report recommendation for the omni antennas installation; are to be elevated on a 10' (ten ft.) pipe mast in order to limit the shadowing. The omni antennas are fiberglass and have been known to crack or break with excessive movement. This excessive movement will not result in cracking from the slight swaying of the building but rather during high wind events. The 4" (four inch) pipe used for the 10' (ten ft.) high mount is not affected by high winds and has the capability to hold the omni antennas in place, however should be attached back to the wall in multiple locations to resist all of the loads as well as the overturning moment, thus minimizing the point load pull-out that may occur in a high wind event.

In the phase two of this evaluation G. M. Selby will perform the RF calculations to evaluate if any shadowing effects are relevant, if so, we will recommend an extra down-tilt antenna to eliminate any such shadowing effects. If the antennas can achieve the full over ten feet (10+ft.) height with the proper beam width signal, minimal shadowing will take place.

The Radio Frequency design is the most important element within the design following the basic building capability to house/support the installation. North Perry Airport (HWO) governs high restrictions for installations within the FAA criteria, hence it is critical as the CIRC building is shown to be directly in line with the runway. The Report prepared by KCI et al. states that *"The potential impact of this may be to restrict the antenna to the height of the existing building and any attachments. As shown on the 2C letter, the height of the tallest appurtenance is at 310.9', which is one of the spires of the tower. Our requested height is 330-ft to the top of the antenna in order to minimize the shadowing effects of the roof."*

G. M. Selby suggests a variance be requested and filed with the FAA which based on our experience should be approved, as this does not affect the flight path in a meaningful way. Additionally, the FAA will take into consideration the need of the Emergency Communication System to be

deployed as an important factor in their decision making. Our experience shows that the FAA normally approves such variances.

The other issue with the antennas included the following; *"…is the possible requirement for stealth (concealing the antennas) or painting them to match the building. This has not become a concern yet, but in most installations is often desired by the building owners for aesthetic reasons. The lease agreements to date show this potential requirement in the update letter provided by the County attorney memo with the following statement:*
"Because final design and installation issues cannot be resolved prior to completion of the feasibility study, the lease is currently structured to require the County to obtain the landlord's post-lease approval for the specific installation and would allow the landlord to reject the proposed installation for reasons including aesthetic concerns."

Stealth antennas have been manufactured for over 18 years and the technology has improved tremendously. By tweaking the antenna criteria to achieve full signal, stealth can be readily used for this purpose.

The State Historical Preservation Office (SHPO), should not be a problem for this application and we do not expect any issues from the SHPO office. The NEPA evaluation in not expected to change RF criteria as well.

Equipment Room

The KCI et al. report suggests the following; "Based on this as in any potential flood area, we recommend that the floor be elevated eight (8) inches similar to the adjacent boilers in the room. The 8 inches will allow drainage pipes to be placed underneath the floor to the drain as well as protect the County equipment."
We agree that the floor requires to be elevated due to the potential of water intrusion. However, to minimize loads lightweight concrete with Fiber-reinforced polymer (FRP) reinforcement should be used.
The large bank of batteries adds a tremendous load to the existing slab. The KCI et al. report recommends reinforcing the slab. The KCI report states*;* *"The slab is a post tensioned concrete slab. The results of the analysis show that the floor is not capable of supporting the loads. This is a significant problem as the analysis utilized a light weight 5-inch insulation with 3-inch concrete cover slab design to generate the 8 inches of desired elevation."*

G. M. Selby agrees that the use of an existing building column is the best situation and location to install the heavy loads. If this is not possible, then a large frame to spread the load should be designed. The equipment & batteries may only use a portion of the frame but nonetheless load requirements may be achieved. GM Selby has used this type of frame in numerous situations whereby spreading the load over a large area reduces the total resistance required by the supporting beams. This system is not the most visually pleasing, if one is on the rooftop, but it does get the job done. This option will be evaluated within Phase II of this project. G. M. Selby needs to review the existing structural drawings in order to design minimizing the loads based the structural supports in place, while at the same time evaluating the available space required to achieve the installation of the spread footer/frame. Note this frame will already be elevated and achieve the drainage requirement for the equipment.

Post tensioned buildings require extreme care when attaching to their structural components, and thus any elimination of reinforcing the floors would be ideal, since opening the floor and impacting a PT cable may be catastrophic.
The spread footer/frame design we have employed in the past uses minimal connections to the deck slab.

The statement made by KCI et al. regarding the structure;" Many *of these will be difficult to implement without significant impediment to the floor below. All of them are expensive and will add time to the overall construction timeline*" is partially true, due to the fact that costs will be higher to deploy a workable situation, however, if there is adequate space and we can show that with minimal modifications the spread footer/frame can be deployed, costs will be significant less that reinforcing the deck slab as proposed by KCI et al. The additional space requirement for the frame may increase the monthly lease – GM Selby is not privy to those conditions.

Conclusions

Construction issues are somewhat concerning, but achievable. KCI et al. *concludes "The construction cost of the CIRC facility is considerably higher than the cost of the similar tower site by over $1.5 million dollars, with the tower site construction budgetary estimate of $750,000. The lease cost, not included in this cost estimate, will be a significant burden over the life of the communication system.*

The primary benefit of the CIRC is the fact that it is an existing tall structure, so that the view shed will not be further negatively impacted nor any of the park will be off limits to the Broward County citizens. This is always a challenge to weigh emotional considerations against technical or cost ones."

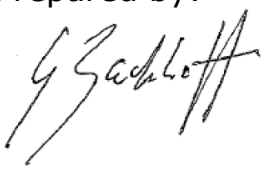
Lifting the equipment will be a challenge in terms of road closures etc. However one mechanism not evaluated in the report is the use of hoisting equipment such as the CM Powerstar Electric Chain Hoist or similar. The setback to the use of these types of machines is that an attachment to the area is required for the mechanism. The hotel must agree to allow the lifting of equipment along the outside of the building. This type of system is cheaper and less time consuming than either the Heli-loader or the fixed crane.

GM Selby believes the cost for the construction should be somewhat lower than the outlined costs within the KCI et al. report. This is mainly due to the use of different loading mechanisms to handle the equipment installation.

A typical tower to accommodate the needs for this emergency communications center will cost between $700,000 to $780,000.
The negative aspect for such a structure is the visual pollution associated with towers. The other limiting aspect is the difficulty obtaining zoning approval due to citizens' complaints, and the associated time. Both issues are difficult to overcome but not unsurmountable.

In urban areas, wireless companies like to use tall building wherever possible based on the difficulties overcoming "the NOT IN MY BACKYARD" syndrome and FAA limitations or NEPA and SHPO restrictions. The key is making the building work for the project within its limitations.

Prepared by:



Gerald Zadikoff, PE
FL 44206
April 5th, 2019

GM Selby's Building Co-location Experience

GM Selby has designed and been responsible to inspect and provide CIM services for numerous roof top communication installations.

Some of our clients included:

- Verizon – Installation on an historical building (Schlitz Brewery) in Milwaukee Wisconsin
- ATT – Installation of a roof top communication system in Orlando Florida
- Einstein Wireless – Installation of wireless equipment on Green Bay Packers Stadium – Lambeau Field
- Metro PCS – Roof top and In-building design and installation of telecommunication switch equipment – Ft Lauderdale, FL
- Nextel – Roof-top co-location installation in Ft Lauderdale FL (sample enclosed)

G. M. Selby, Inc.

Engineering the Future

Client
Sprint, AT&T, Vertzon, Metro PCS

Key Project Highlights
Projects were time sensitive

Structural Inspections, Analysis, Reinforcement of Telecom Towers & Roof Tops
USA & International

Major Project Outcomes

- Perform site inspections
- Design reinforcement to accommodate for additional loads
- Prepare CAD for Construction

G. M. Selby conducted over a thousand structural inspections of telecom towers and sites in order to design reinforcements to support additional carriers on the structures. These services were part of our overall involvement in the Telecom industry, where we provide all engineering disciplines necessary to create a Telecommunication network (RF, Environmental, Geotechnical, Civil, Structural, Mechanical, Electrical, Zoning & Permitting, and Construction Management).

EXAMPLE ROOF TOP CO-LOCATION PROJECT BY GM SELBY