BLISS & NYITRAY, INC.
STRUCTURAL
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Historical Preservation Board Report

for

947 Lincoln Road

Miami Beach, Florida

January 31, 2017

Prepared For:

Zyscovich Architects

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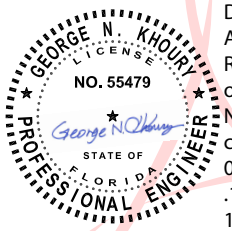
BNI Project No. 17M02



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1 PURPOSE

The purpose of this report is to describe the existing building and its condition, describe the proposed building, and to describe the appropriate structural solutions that maximizes the amount of historic fabric of the current building that is to remain.

2 METHODOLOGY AND LIMITATIONS

This condition investigation was conducted by visual observations and by limited removal of finishes to evaluate the structure. Since portions of the building are occupied, the structural members and/or their connections within most areas could not be directly observed.

Where structural members could not be directly observed, a sampling of members was observed, or observations were directed at secondary signs of structural distress such as cracks, bulging, staining and deflections. Therefore, it must be expected that during future renovations and at other times, deteriorated or distressed structural components that were not directly observed or specifically reported during this investigation, may be found.

This building was designed, permitted and constructed more than 80 years ago. The building codes, standards, methods, products and practices of the time this building and possible subsequent modifications were built vary considerably from those of today. Structural engineering practices for older historical buildings was at a far lower standard than that of today. Resistance to design gravity loads and to high wind forces in older buildings is almost always deficient relative to current codes and standards. While this building may have survived hurricane force winds, it has probably never been subjected to extremely high winds, such as were experienced within the north eye wall of Hurricane Andrew further south in Miami-Dade County in 1992.

In the absence of observations to the contrary, we have assumed that the existing structural systems were properly designed, permitted, constructed and approved in accordance with the building code and general practices in effect at the time of construction.

3 CURRENT BUILDING

This project is located at 947 Lincoln Road. It is bounded by Lincoln Road to the south, Michigan Avenue to the west, Lincoln Lane North (a service drive) to the north, and on the east by 939 Lincoln Road, a 2-story building.

947 Lincoln Road is currently a one-story building with a small, 2nd floor at the corner of Michigan Avenue and Lincoln Lane North. The ground floor has retail, although most of it is currently vacant, and the 2nd floor serves three efficiency apartments.

South Elevation

North Elevation

West Elevation

The building was constructed in the 1920's. There are no available drawings of the current building, but we visited the site to determine the framing and historic features. The exterior walls are load-bearing terracotta (clay tile) for the ground floor. The partial second story to the north is framed with 2x load bearing wood studs. The main roof, interior stud bearing

wall, high roof framing and the 2nd story are also framed with wood members. The ground floor is a floating slab-on-grade.

4 CURRENT CONDITION

4.1 Exterior Terracotta Walls

Given their age, the terracotta walls are in fair condition, although cracking and bulging is evident. However, they have little structural capacity to resist design loads of gravity, wind out-of-plane bending or wind in-plane shear.

Cracking and Bulging at Exterior Walls

Some of the walls have been infilled with wood that has since rotted, including some historical features such as the arches.

In-filled Arches would be removed

4.2 Exterior Wood Framed Walls

All exposed wood framing (2nd floor, roof and 2nd story walls) shows evidence of significant rot. We removed wall and ceiling finishes in several locations and all showed evidence of significant rot. All wood walls would have to be replaced or strengthened to bring it up to acceptable material capable of resisting design loads.

Severe Rotting in Exterior Wood Framed Walls

4.3 Roof

The roofs tremor and shake under the weight of a 200-pound man attempting small jumps. The roof structure and connectors also have very little resistance to wind uplift. Also, weeds/plants have begun to grow on some areas of the roof where water ponds after rain.

Roof

Plant near drainage spot at roof

4.4 Slab on Grade

The slab-on-grade is covered by wood flooring in some areas. Where the slab-on-grade is exposed, it appears to be in fair condition. However, the elevation is below design flood level and must stay that way to meet the adjacent sidewalks, so a structural slab designed to resist hydrostatic load will be required.

4.5 Summary of Condition

In summary, between how the structure was constructed and its current condition, there is no structural element with reasonable load-carrying capacity to resist today's required superimposed loads.

5 ENVIRONMENTAL SITE CONDITIONS

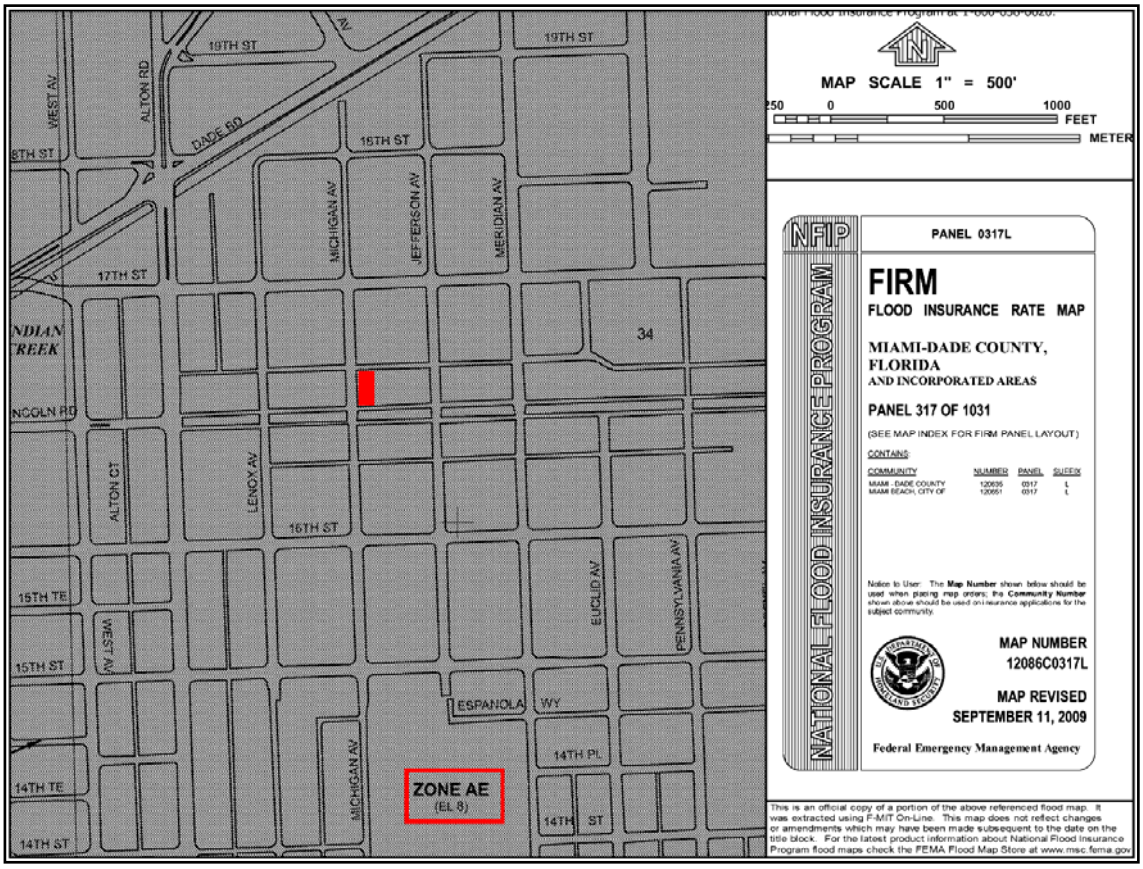
5.1 Hurricanes

All of South Florida is vulnerable to hurricanes, and most older buildings in South Florida, including this building, have been subject to hurricane-force winds, probably on a number of occasions. However, past performance cannot be considered a reliable predictor of future performance. Of course, deterioration is progressive, and structural systems may weaken over time. Wind direction is also a significant factor. Also of importance is the unlikelihood that, despite their age, older buildings, including this building, have ever experienced winds associated with an upper-level category storm, such as categories 4 and 5 on the Saffir-Simpson Scale.

5.2 Flooding

Per FEMA Flood Insurance Rate Map (FIRM), as shown below, the building is situated in Zone AE with a Base Flood Elevation (BFE) of +8.00' NGVD.

The Florida Building Code dictates that buildings with Risk Category II should have a Design Flood Elevation of BFE + 1'. Therefore, the entire ground floor should be designed for hydrostatic pressure based on water elevation of +9.00'.



FEMA – Flood Insurance Rate Map

Per the State of Florida's Department of Environmental Protection, the building is located outside of the Coastal Construction Control Line (CCCL). Therefore, the building will not be subjected to High-Velocity Wave Action.

FEMA – CCCL Map

6 PROPOSED BUILDING

The proposed building is a two-story for retail. Design will retain as many of the historical features as possible. The exterior of the building will be cleaned, repaired and waterproofed, but otherwise will remain as it is, with the exception of one 6-foot-wide section of terracotta wall being removed and replaced by curtainwall at the northeast corner of the building. The exterior windows and doors which will be replaced with impact resistant windows that match the profile of the original windows.

7 STRUCTURAL DESIGN CRITERIA

7.1 Building Code - Renovations

The proposed new renovations of the existing building involve a work area more than 50% of the aggregate area of the building, and so will be classified as 'Alteration-Level 3', as defined in the 2014 Florida Building Code – Existing Building. This requires Bliss & Nyitray to perform an engineering evaluation and analysis to establish the structural adequacy of the altered structure. Since more than 30% of the total floor and roof areas of the building are proposed to be involved in a structural alteration, the evaluation and analysis shall demonstrate that the altered structure complies with the current FBC, including wind loading. Meaning, all remaining existing elements shall be confirmed and/or strengthened to resist loads of the current code rather than the applicable code at the time when the existing building was originally constructed. The final structure must meet current code.

7.2 Building Code – New Construction

The governing Code for this Project is the **Florida Building Code, 5th Edition (2014)**. This Code prescribes which edition of each referenced standard applies to this Project.

7.3 Design Superimposed Loads:

OCCUPANCY	LIVE LOAD
Ground	100 psf
2nd Floor (Currently - Residential)	40 psf
2nd Floor (Proposed - Retail)	75 psf
Public Areas	100 psf
Stairs	100 psf
Roof/Rain	30 psf

7.4 Design Wind Loads

The governing code for the design of wind forces is American Society of Civil Engineers (ASCE) 7-10. Wind pressures will be based on a 3-second gust speed at 33 feet above ground.

Governing Code	ASCE 7-10
Building Risk Category	II
Ultimate Wind Speed	V_{ult} = 175 mph
Allowable Stress Design Wind Speed	V_{asd} = 136 mph
Mean Roof Height	38 feet
Directionality Factor	Kd = 0.85
Gust-Effect Factor	G = 0.85
Exposure	C
Internal Pressure Coefficient	GCpi = 0.18

8 STRUCTURAL FRAMING SYSTEMS

The structural system can consist of a concrete flat slab or steel framing. The floor framing system will be determined in the future after careful evaluation of the site, proposed new layout, and should be capable of working well with the existing walls that are remaining.

9 DISCUSSION AND RECOMMENDATIONS

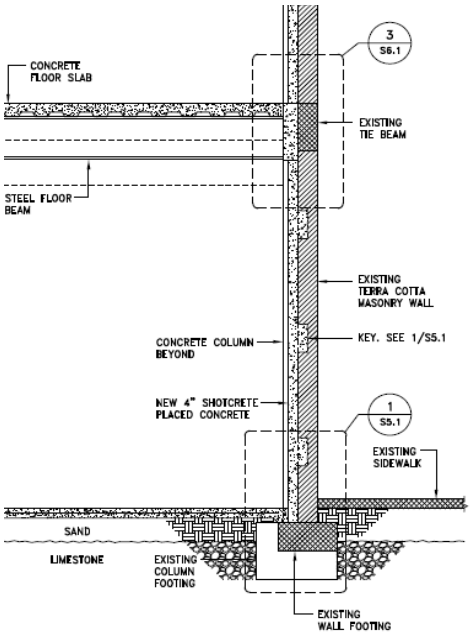
As described above, the exterior walls don't have the capacity to resist today's gravity or wind loading as required by Florida Building Code. So, all walls will require reinforcing.

The wood roofs are not capable of resisting hurricane uplift forces. All roofs will be removed and replaced with concrete slabs capable of resisting code loads.

9.1 Exterior Historic Walls

With the exception of the 6-foot-wide section of terracotta wall being removed and replaced by curtainwall at the northwest corner, all of the terracotta walls will remain. To resist all design gravity and wind out-of-plane and in-plane shear loads, we will call for shot-crete to create a 4"-thick concrete wall and attach the terracotta to act as a veneer. All historical features will be maintained and/or restored to the original.

We are sensitive to maintaining the historic façade not just on the drawings but in reality during construction. Design drawings will call for placing the shotcrete inside of the terracotta walls and prior to removal of the existing roof. We will require bracing of the terracotta wall during and following shotcreting and until the 2nd floor diaphragm can permanently brace the top of the shotcrete.



Preserving the Exterior Walls During Construction / Sample Wall Retrofit Section

After reinforcing the exterior walls with a 4" thick concrete wall, all new doors, windows, louvers, and curtain walls will have an approved NOA (Notice of Acceptance) for the required wind design pressure. Pressures will be provided on the Structural Drawings at future phases.

Note that cladding for the bottom 30 feet of the building height must resist the large missile impact test required by the High Velocity Hurricane Zone of the Florida Building Code. The remaining cladding above 30 feet must resist the small missile impact test.

9.2 Second Floor

The 2nd floor efficiencies are not historic. Further, they are wood framed, rotten and unsafe. Therefore, the 2nd story will be demolished. The new 2nd floor will be framed with concrete slabs capable of resisting the new retail live load, supported by the 4" thick shotcrete wall extending up from the 1st story.

9.3 Ground Floor

The existing slab on grade is not capable of resisting the hydrostatic pressure generated from the ground water. The entire ground floor slab would be removed and replaced with structural slab, supported by piles, designed to resist gravity and uplift hydrostatic forces.

9.4 Foundations

The existing footings must remain in place to support the terracotta walls. These wall footings would have to be strengthened by installing helical piles to support the new higher floor loads as well as the added 4" concrete wall.

The new foundations for the new columns shall be designed based on the geotechnical engineering report that will be prepared for this site.

We expect the foundations to consist of deep foundations to transfer the loads from the building foundations into the limestone formation. Locally, augercast piles (pressure-grouted) are considered the most appropriate type of deep foundation system for the support of the building being considered for this project. As an added advantage, this system can be constructed with the least amount of noise/vibration while still providing resistance to compression, lateral and uplift forces. The capacity of augercast piles is essentially

developed in side shear (skin friction) between the periphery of the grouted pile and the layers of limestone or/and sand through which the piles penetrate.

10 MATERIAL PROPERTIES

Concrete Strength

f'c = 5,000 psi Foundations, Beams and Elevated Slabs

Steel Strength

Fy = 50 ksi Wide Flange sections

Fy = 36 ksi Angles, Channels, Plates

Building materials and systems should be durable, offer easy maintenance, and be suitable for South Florida applications.