SUBSURFACE EXPLORATION REPORT

Tobie Wilson Recreational Building
7901 NW South River Dr.
Medley, Florida
October 13, 2010
FILE NO.: 10-2576

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Mr. Melvin Wolfe
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7777 NW 72nd Avenue
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RE: **SUBSURFACE EXPLORATION REPORT**
Tobie Wilson Recreational Building
7901 NW South River Dr.
Medley, Florida

As requested and authorized by you, we have completed a shallow subsurface soil exploration for the above mentioned project. The purposes of performing this exploration were to evaluate the general subsurface conditions within the building areas and to provide recommendations for fixing the existing unstable condition that could jeopardize the safety of the structure. This report documents our findings and presents our engineering recommendations.

SITE LOCATION AND SITE DESCRIPTION

The site for the facility is located on the north east side of NW S. River Dr close to the intersection with NW 74 Street. in Medley, Florida (Section 11, Township 53 S, Range 40E). The site is currently occupied by an existing building.

PROPOSED CONSTRUCTION AND GRADING

The one-story existing structure presents severe cracks along the North wall facing the canal. The existing building consist of load bearing masonry walls and interior columns with slab-on-grade floors.

FIELD EXPLORATION PROGRAM

SPT Borings

The field exploration program consisted of performing two (2) Standard Penetration Test (SPT) borings.

The SPT borings were performed at the approximate location shown in our boring location plan. The borings were advanced to a depth of 30 feet below the ground surface using the methodology outlined in ASTM D-1586. A summary of this field procedure is included in the Appendix. Split-spoon soil samples recovered during performance of the borings were visually classified in the field and representative portions of the samples were transported to our laboratory in sealed sample jars for further classification and laboratory testing.

The groundwater level at each of the boring locations was measured upon completion of drilling.

LABORATORY TESTING PROGRAM

Representative soil samples obtained during our field sampling operation were packaged and transferred to our laboratory for further visual examination and classification. The soil samples were visually classified. The resulting soil descriptions are shown on the soil boring profiles presented in the Appendix.

GENERAL SUBSURFACE CONDITIONS

General Soil Profile

The results of the field exploration and laboratory testing programs are graphically summarized on the soil boring profiles presented in the Appendix. The stratification of the boring profiles represents our interpretation of the field boring logs and the results of laboratory examinations of the recovered samples. The stratification lines represent the approximate boundary between soil types. The actual transitions may be more gradual than implied.

The results of our test borings indicate the following general soil profile:

Depth Below Ground Surface (feet)	Description
0-6	Fill, medium dense to dense
6-23	Limestone, poorly cemented
23-30	Sand medium dense

The above soil profile is outlined in general terms only. There is significant difference between the results of borings B-1 and B-2. Please refer to the boring logs for soil profile details.

Measured Groundwater Level

The groundwater level was measured in the boreholes on the day drilled after stabilization of the downhole water level. As shown on the boring logs, the measured groundwater levels were encountered at depths that ranged from 5.1 to 5.4 feet below the ground surface on the dates indicated. Fluctuations in groundwater levels should be anticipated throughout the year primarily due to seasonal variations in rainfall and other factors that may vary from the time the borings were conducted.

NORMAL SEASONAL HIGH GROUNDWATER LEVEL

The normal seasonal high groundwater level each year is the level in the August-September period at the end of the rainy season. The water table elevations associated with a 100-year flood level would be much higher than the normal seasonal high groundwater level. The normal high water levels would more approximate the normal seasonal high groundwater levels.

The seasonal high groundwater level is affected by a number of factors. The drainage characteristics of the soils, the land surface elevation, relief points such as drainage ditches, lakes, rivers, swamp areas, etc., and distance to relief points are some of the more important factors influencing the seasonal high groundwater level.

Based on our interpretation of the site conditions using our boring logs, we estimate the normal seasonal high groundwater level at the site to be approximately one foot above the groundwater levels measured at the time of our field exploration.

ENGINEERING EVALUATION AND RECOMMENDATIONS

The cracks observed on parts of the North wall of the Tobie Wilson Building appears to be consistent with a local slope stability failure along the southern of the Miami River canal. A local stability failure is normally associated with local variations in soil stratigraphy as is observable in the results of the two soil borings completed for this report. Notice the soil boring B-1 presents limestone between 7.5 feet and 23 feet below grade. However, in boring B-2 there is no limestone observable in the boring. The conditions found in boring B-2 are normally representative of vertical cones of uncemented sand within the limestone matrix. When these sandy areas are exposed on the slope of the canal, water level variations tend to trigger local slope stability failures.

A local canal slope failure is in our professional opinion the cause of the observed deformations of the part of the North wall of the Tobie Wilson building. The North side of the building is not accessible to drilling equipment due to the restricted space conditions. It is not known if some type of slope protection or rip-rap is present in the canal slope. To avoid further damage to the structure we recommend to provide underpinning to the foundations of the North wall.

Underpinning of the North wall should be performed using small diameter piles like pin piles of helical piles. The installation of these piles is normally performed with equipment the can access very limited working spaces. However, the presence of boulders, if present, may create difficulties for pile installation.

Minimum tip elevation of a small pile underpinning is governed by the depth of the Miami canal adjacent to the Tobie Wilson building. At this time we are not aware of this depth, however final tip elevation shall be at least 10 feet below canal bottom.

The underpinning solution shall be based on vertical and battered piles to provide lateral stability against potential future slope stability failures. Battered piles shall be inclined at least 6 vertical versus 1 horizontal (6:1). Battered and vertical piles may be alternated along the foundation alignment. Additional containment measures using retaining earth elements may be required within the failed area. A containment structure may be required to avoid continued erosion of soils under the building slab on grade. This possibility should be clarified at the time of pile installations.

Pin Piles

Pin pile foundations may be selected based on limited access to some of proposed addition areas. Based on the findings of our site exploration, our evaluation of subsurface conditions and judgement based on our experience with similar projects, we recommend four inch diameter pin piles driven until practical refusal is found. We require that tip of the pin pile should reach 10 feet below canal bottom. A minimum penetration of 18 feet below grade will be required to accept a completed pin pile. Pre drilling through the surficial fill will be required if practical refusal is found at a higher elevation. Hardened grout or boulders existing in the subsurface may hinder the advancement of small piles as designed. Pin piles driven to the recommended depth should be able to support loads up to 3 tons given the soil condition of this site. Pin pile capacities greater than our recommended capacity may be established by performing a load test. Pin pile installation shall be monitored by a foundation Engineer representative.

Helical Piles

Helical piles may be selected as a foundation alternative. Helical piles derive their allowable capacity from the development of ultimate capacity at individual helix areas. Multiple helix (1 to 3) may be used by the manufacturers of the systems. For this particular case we will consider only the capacity of the leading helix since penetration of the leading helix inside the limestone layer is not expected to be more than 5 feet.

Failure surface is expected to reach from 2 feet below the helix to about 6 to 8 feet about the helix. A helical pile installed to a practical refusal, will develop an allowable capacity in compression of 18 kips and 9 kips in tension. We require that the pile tip should be located at least 10 feet below the canal bottom. Lateral capacity of a small diameter shaft is very small when the pile is installed vertically. If lateral capacity is required it should be derived as the horizontal component of a battered pile installed at the same depth recommended above.