Rone Engineering

SCAN
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- ENCLAVE SOILS REPORT -

- GEOTECHNICAL ENGINEERING
- CONSTRUCTION MATERIALS TESTING
- ENVIRONMENTAL CONSULTING
- FORENSIC ENGINEERING

December 23, 2005

Mr. Michael Beaty
Mooreland Development Company
4516 Lovers Lane
Suite 350
Dallas, Texas 75225

Re: ADDENDUM TO GEOTECHNICAL ENGINEERING REPORT
PROPOSED WHISPERING FARMS PHASE 2
PROSPER, TEXAS
RONE PROJECT NO. 05-10342

Dear Mr. Beaty:

We understand the residential structures for Block J of the referenced project will consist of upscale homes supported on drilled pier foundations. We have been asked to provide geotechnical recommendations for design of drilled pier foundations for Block J Lots 1 through 14. This letter presents our recommendations, and should be considered an addendum to our Geotechnical Engineering Report dated October 14, 2005. This letter should not be considered separately from the referenced geotechnical report. All other comments and recommendations contained in the referenced geotechnical report remain unchanged.

Drilled Pier Foundations

Straight-shaft drilled pier foundations extended into the gray limestone are recommended for support of the buildings. An allowable end bearing pressure of 40,000 psf may be utilized for shafts bearing in the gray limestone. An allowable skin friction resistance of 6,000 psf may also be utilized for the portion of the shaft below a minimum penetration of two feet into the gray limestone. Drilled pier foundations designed and constructed in accordance with the recommendations in this report should experience settlements of less than ½ inch.

The gray limestone was encountered at depths of about 5 to 18 feet below the existing ground surface at Borings B-35 and B-37 through B-48. Limestone was not encountered within the explored depth of the boring at Lot 8 (Boring B-36). A deeper supplemental soil boring will be required for Lot 8 to provide geotechnical recommendations for foundation design.

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The uplift force on the piers due to swelling of the active clays can be approximated by assuming a uniform uplift pressure of 2,000 psf acting over the perimeter of the shaft to a depth of 12 feet or to the top of tan limestone, whichever is less. The shafts should contain sufficient full length reinforcing steel to resist uplift forces. The uplift force can be resisted by the dead load on the shafts plus the allowable skin friction resistance in the portion of the shaft embedded in the gray limestone below the minimum penetration described above.

For bearing and uplift considerations, adjacent piers should have a minimum center-to-center spacing of 2.5 times the pier diameter, based on the diameter of the larger pier. Closer pier spacing may result in reduced pier capacity or (both uplift and downward). We should be contacted to review closer pier spacing on a case-by-case basis.

Construction Considerations for Drilled Piers

The construction of all piers should be observed as a means to verify compliance with design assumptions and to verify:

(1) the bearing stratum;
(2) the minimum penetration;
(3) the removal of all smear zones and cuttings;
(4) that groundwater seepage, when encountered, is correctly handled; and
(5) that the shafts are vertical (within the acceptable tolerance).

The depth to the gray limestone at any individual lots could vary from the depth indicated on the respective boring log, depending on the location of the structure on the property, the footprint area of the structure, and any grading (cuts or fills) performed prior to installation of the piers. Rone Engineering Services should monitor pier installation to verify conditions are as anticipated. Supplemental borings could be performed in the building pad area of an individual lot after the location of the structure is established to provide additional information regarding the depth to limestone. Rone would be pleased to provide these services if desired.

Groundwater seepage was encountered at Boring B-46, and was not encountered at the remaining borings performed in Block J. Even though groundwater was not encountered at most of the borings, our experience with the Austin Chalk formation indicates groundwater can be encountered within or above the limestone during drilled pier installation. Also, the risk of encountering groundwater seepage is increased during or after periods of precipitation. Concrete should be placed in the shafts as soon as possible to reduce the risk of groundwater seepage and deterioration of the foundation bearing surface. Temporary steel casing may be required in some cases where seepage is encountered. The casing should be seated in the clay or limestone below the seepage, and all water should be removed from the shaft excavation before beginning the design rock penetration. The portion of the shaft in limestone above the bottom of the casing should not be included in the design rock penetration.

Concrete should be placed immediately after the excavation has been completed. In no event should a pier excavation be allowed to remain open for more than 8 hours. Concrete should have a slump of 5 to 7 inches and should not be allowed to strike the shaft sidewall or reinforcement steel during concrete placement.

Floor Slabs and Grade Beams
As discussed in the referenced geotechnical report, potential ground movement at this site could be as much as 5 inches. A suspended floor is the most-positive method of floor support and should result in negligible floor movements.

Floor slabs and grade beams should be structurally connected into the top of the piers. For Lots 1 through 7, 13, and 14, a minimum void space of 6 inches should be provided beneath the floor and grade beams and the underlying soil between piers. For Lots 8 through 12, a minimum void space of 8 inches is recommended. This void space allows movement of the soils below the floor and grade beams without distressing the structure. The minimum void space recommended above should be provided between the subgrade and the lowest suspended fixture beneath the floor (such as plumbing lines, P-traps, etc). The ground surface beneath the suspended floor should be sloped and drained to prevent the ponding of water. Where the floor is suspended without the use of carton forms, the void space should be ventilated.

The excavation for the grade beam void space must remain dry. In addition, backfill material must not be allowed to enter the void area below grade beams, since this reduces the void space. Typically, a soil retainer in the form of a thin pre-cast panel or pieces of wood is placed along the outside edge of the grade beams to prevent the aforementioned soil intrusion. On-site soil then may be placed against the sides of the grade beams.

We appreciate the opportunity to be of service to you on this project. Please contact us if you have any questions or need any additional services.

Respectfully submitted,

Theodore A. Janish, P.E.
Senior Geotechnical Engineer

Chula B. Ellepola, P.E.
Senior Geotechnical Engineer