

re: Geotechnical Recommendations - Raft Slab Foundation for One Basement Level
Proposed Multi-Storey Building
112 Nelson Street - Ottawa

to: Smart Living Properties - **Mr. Jeremy Silburt** - jeremy@smartlivingproperties.ca

date: June 30, 2021

file: PG5716-MEMO.01

Further to your request, Paterson Group (Paterson) has prepared a memorandum to provide geotechnical recommendations for a raft slab foundation with one basement level for the proposed building located at the aforementioned site. This memo should be read in conjunction with Paterson Group Report PG5716-1 dated March 10, 2021. The foundation design information provided below supercedes the previous foundation design recommendations provided in Report PG5716-1 dated March 10, 2021.

Background Information

Based on recent discussion with the client, it is understood that the building will now consist of one basement level constructed over a raft slab foundation. Based on subsurface soil information obtained from the geotechnical investigation, the raft foundation with one basement level will be founded within a silty clay deposit. The raft slab foundation geotechnical recommendations provided in the above mentioned geotechnical report were given for a two to three level basement, therefore the design parameters provided herein should be considered for one basement level.

Geotechnical Recommendations for Raft Slab with One Basement Level

The design of the raft foundation is required to consider the relative stiffness of the reinforced concrete slab and the supporting bearing medium. A common method of modeling the soil structure interaction is to consider the bearing medium to be elastic and to assign a subgrade modulus. However, silty clay is not elastic and limits have to be placed on the stress ranges of a particular modulus. The proposed building can be designed using the following parameters and will be subject to a potential total and differential settlement of 25 and 20 mm, respectively.

For design purposes, it was assumed that the base of the raft foundation for the proposed multi-storey building will be located at an approximate geodetic elevation of 56 to 55 m depth with one underground level.

The amount of settlement of the raft slab will be dependent on the sustained raft contact pressure. The bearing resistance value at SLS (contact pressure) of **200 kPa** will be considered acceptable. The loading conditions for the contact pressure are based on sustained loads, that are generally taken to be 100% Dead Load and 50% Live Load. The contact pressure provided considers the stress relief associated with the soil removal required for the proposed building. The factored bearing resistance (contact pressure) at ULS can be taken as **300 kPa**. A geotechnical resistance factor of 0.5 was applied to the bearing resistance value at ULS.

The modulus of subgrade reaction was calculated to be **7.5 MPa/m** for a contact pressure of **200 kPa**.

The raft slab must be founded upon an undisturbed soil bearing surface. An undisturbed soil bearing surface consists of a surface from which all topsoil and deleterious materials, such as loose, frozen or disturbed soil, whether in situ or not, have been removed, in the dry, prior to the placement of concrete.

Where a raft foundation is utilized, it is recommended that a minimum 50 to 75 mm thick lean concrete mud slab be placed on the subgrade shortly after the completion of the excavation. The main purpose of the mud slab is to reduce the risk of disturbance of the subgrade under the traffic of workers and equipment.

The final excavation to the raft bearing surface level and the placing of the mud slab should be done in smaller sections to avoid exposing large areas of the silty clay to potential disturbance due to drying.

We trust that this information satisfies your requirements.

Best Regards,

Paterson Group Inc.



Nicole R.L. Patey, B.Eng.



David J. Gilbert, P.Eng.

Paterson Group Inc.

Head Office
154 Colonnade Road South
Ottawa - Ontario - K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

Northern Office and Laboratory
63 Gibson Street
North Bay - Ontario - P1B 8Z4
Tel: (705) 472-5331 Fax: (705) 472-2334

Ottawa Laboratory
28 Concourse Gate - Unit 6
Ottawa - Ontario - K2E 7T7
Tel: (613) 226-7381