PATERSON GROUP

memorandum

**re:** **Geotechnical Review: Site Grading, Servicing Plan and Frost Review**
**Proposed Warehouse Building**
**96 Bill Leathem Drive, Ottawa**

**to:** Prestige Design and Construction - Enzo DiChiara - enzo@prestigeottawa.com

**date:** March 7, 2024

**file:** PG6668-MEMO.02

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Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide geotechnical grading plan summary for the aforementioned project. The following memorandum should be read in conjunction with the current Geotechnical Investigation Report (Paterson Group Report PG6668-1, dated June 1, 2023).

# 1.0 Grading Plan Review

Paterson reviewed the following grading plan prepared by T.L. Mak Engineering Consultants Ltd. for the aforementioned development:

- Site Grading and Servicing Plan – 96 Bill Leathem Drive – Project No. 822-125 – Drawing No. G-1 – Revision 8– Dated February 29, 2024.

## 1.1 Site Grading

Based on the aforementioned Geotechnical Investigation Report, a maximum grade raise restriction of 2 m was proposed for the subject site due to the presence of a silty clay deposit. Based on our review of the above noted drawing in consideration with the proposed maximum grade raise restriction, the grading is considered acceptable from a geotechnical perspective. No additional measures such as lightweight fill or settlement monitoring programs will be required to accommodate the proposed finished grades as noted on the aforementioned grading plan.

## 1.2 Bearing Resistance Value

Based on our review of the abovementioned grading plan, it was noted that the proposed underside of footing elevations of the building will be at geodetic elevations of 88.46 m within the north, east and western portions of the building and 88.70 m within the southern portion of the building. Based on the proposed USF elevation it is anticipated that the footings will be placed over a hard to very stiff brown silty clay bearing medium surface.

Conventional strip and pad footings placed over an undisturbed hard to very stiff brown silty clay or on engineered fill placed directly over the undisturbed hard to very silty brown clay can be designed using a bearing resistance value at Serviceability Limit States (SLS) of **150 kPa** and a factored bearing resistance value at Ultimate Limit States (ULS) of **250 kPa**, incorporating a geotechnical factor of 0.5 at ULS.

All bearing medium surfaces should be reviewed by Paterson at the time of construction, prior to the placement of concrete.

## 1.3 Site Servicing

Based on the abovementioned site plans, it was noted that the proposed invert elevations of the storm and sanitary services in and around the proposed building, will be located below the USF elevation of the footings. Care should be taken to not advance any excavation activities within the lateral support zone of the building footings. Furthermore, it was noted that the invert elevation of the storm (87.70 m) and sanitary (87.65 m) at the point of entry/connection into the building, was observed to be lower than the USF elevation of the footings at these locations. Thus, one of the following options can be followed at these locations:

**Option 1 – Extend Footing and Foundation Wall**

The depth of the footing and the foundation wall can be stepped down to extend below the invert elevation of the service lines (geodetic elevation of 87.70 m) along the northeast corner of the building, such that, the service line inlets pass through the building foundation wall. This will require no additional protection around the service pipes entering the building.

**Option 2: Lean Concrete Infilled Trenches**

As an alternative, the depth of the footings can be increased to extend approximately 150 mm below the invert elevation of the service pipes (or thickness of the pipe bedding if different) through lean concrete infilled (minimum 15 MPa), near vertical trenches. The service pipes can then be extended under the footings through the lean concrete. Where the service pipes pass through the lean concrete, they should be surrounded by minimum 150 mm of geospan fill or sleeved through a larger high grade PVC pipe.

## 1.4 Frost Protection

Based on our review of the proposed underside of footing (USF) elevations, all the footings have a minimum of 1.8 m of soil cover above the proposed USF elevations of the footings.

Furthermore, based on our review of the abovementioned grading plan, it was noted that some portions of the proposed storm service lines will have less than 2 m of soil cover above the invert elevation of the pipes. Where insufficient soil cover (i.e.- less than 2.0 m) is available, the following frost protection criteria outlined in Table 1 below.

| Soil Cover Provided D (mm) | Insulation Dimensions (mm) | |
|---|---|---|
| | Thickness (mm) | Length (mm) |
| 1,100 to 1,400 | 75 | Extend 900 mm horizontally beyond the edge face of the pipe |
| 1,400 to 1,700 | 50 | Extend 600 mm horizontally beyond the edge face of the pipe |
| 1,700 to 2,000 | 50 | Extend 300 mm horizontally beyond the edge face of the pipe |

The rigid insulation should be placed 150 mm above the pipe on top of a compacted Granular A backfill and should have a minimum of 150 mm of Granular A backfill above the rigid insulation. Rigid insulation placed underneath roadways less than 1.2 m from the surface should consist of high density extruded polystyrene HI-60 or better. At larger depth HI-40 or better can be used.

Any portion of the storm service pipe installed at a depth of 2.0 m below finished grade or deeper is considered acceptable from a geotechnical perspective.

## 1.5 Conforming

Upon following of the abovementioned recommendations, the abovementioned grading and site servicing plan is considered acceptable from a geotechnical perspective.

We trust that this information satisfies your requirements.

**Paterson Group Inc.**


Pratheep Thirumoolan, M.Eng. Joey R. Villeneuve, M.A.Sc., P.Eng., ing.