PATERSON GROUP

memorandum

re: **Grading and Site Servicing Plan Review and Geotechnical Recommendations**
Proposed Industrial Redevelopment
135 Cardevco Road – Carp, Ottawa, Ontario

to: Premier Bus Lines Inc. – **Mr. Eric Hochgeschurz**

to: Arbaum Architects – **Ms. Mariana Palos** – marianapalos@arbaum.com

date: November 24, 2023

file: PG6018-MEMO.04

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to document our grading plan and site servicing plan review for the proposed Industrial Redevelopment to be located at 135 Cardevco Road in the City of Ottawa, Ontario. The following memorandum should be read in conjunction with Paterson Group Report PG6018-1 Revision 4 dated November 24, 2023.

Grading and Site Servicing Plan Review

Paterson reviewed the following grading and site servicing plan prepared by D. B. Gray Engineering Inc. for the aforementioned development:

- ❑ Grading Plan and Site Servicing Plan – Proposed Building Addition – 135 Cardevco Road - Job No. 21081 - Drawing No. C-1 – Revision 4 - dated June 9, 2023.

Based on our review of the above-noted drawing and the subsurface conditions present at the subject site, the proposed grading is considered acceptable from a geotechnical perspective. A silty clay deposit was not encountered during the geotechnical investigation and therefore permissible grade raise restrictions are not applicable to the subject site. Tree planting setbacks, based on the City of Ottawa “Tree Planting in Sensitive Marine Clay Soils - 2017 Guideline”, are not required as well.

The proposed underside of footing elevations (USF) for the proposed building addition is expected to be at an elevation of 117.40 m which is lower than the existing warehouse. Based on our review of the above-noted drawing, sufficient frost cover will be provided for the proposed footings (minimum 1.5 m below finished grade for heated structures).

For unheated structures, such as stairs, servicing pipes, and retaining walls, a minimum frost cover of 2.1 m below the finished grade is required to provide sufficient frost protection. Based on our review of the grading and site servicing plan, proposed retaining walls, culverts, catch basin, manhole, and stormwater pipes were noted to be provided with a reduced soil cover to footings against frost action.

Protection of Footings Against Frost Action

It should be noted that to accommodate the absence of sufficient frost cover (minimum 2.1 m for heated footings) for the proposed footings, a different form of frost protection should be provided. This can be achieved by means of rigid insulation.

Any portion of proposed retaining walls, culverts, catch basin, manhole, and stormwater pipes installed at a depth of 2.1 m below finished grade or deeper is considered to have sufficient soil cover for frost protection. Where insufficient soil cover is present above the invert of stormwater pipe, manhole, catch basin, or USF elevation of culverts and retaining walls, the following frost protection criteria should be followed:

Table 1 – Frost Protection Recommendations for Reduced Soil Cover

Thermal Condition	Soil Cover Provided (mm)	Insulation Dimensions	
		Thickness (mm)	Extension (mm)
Unheated	900-1200	75	Extend 1200 mm horizontally beyond edge of footing or pipe face
	600-900	100	Extend 1800 mm horizontally beyond edge of footing or pipe face
	300-600	150	Extend 2100 mm horizontally beyond edge of footing or pipe face
	0-300	200	Extend 2100 mm horizontally beyond edge of footing or pipe face

Underpinning

Based on our review of the grading plans, and on information collected from our geotechnical investigation, it is understood that the USF for the proposed building addition and the eastern foundation wall are at approximate geodetic elevation of 117.40 and 118.40 m, respectively. Furthermore, there will be no horizontal setback between the proposed building addition and the eastern foundation wall of the existing warehouse. Therefore, the underpinning of the eastern foundation wall of the existing warehouse should be underpinned.

- ❑ The underpinning program should be completed in sections (panels) by excavating each panel individually in a piano key fashion to maintain adequate lateral support for the existing footings.

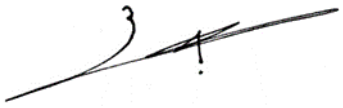
- ❑ A maximum 1.0 m horizontal spacing is required between each excavated panel.
- ❑ The maximum height of excavation per stage is .1.0m.
- ❑ Each panel should be excavated using suitable excavation equipment and infilled with a minimum 15 MPa (28-day compressive strength) concrete once the forms are secured in place. Concrete infilling will be done through the cored holes in the floor slab.
- ❑ For each excavated panel, place 0.75 to 1.0 m forms below the top of the existing footings down to the bottom of the excavation at each stage. The forms should be firmly secured in place prior to pouring concrete.
- ❑ Once the concrete in the first set of panels has set (12 to 24 hours), the second set of panels can be completed. The process is then repeated in consecutive order to maintain adequate lateral support during the duration of the underpinning program.
- ❑ In cold weather conditions the concrete should be sufficiently protected with insulated tarps, until the concrete attains its design strength.
- ❑ The subsequent courses of panels should be offset from the previous course.
- ❑ The underpinning program should extend down to the USF elevation of the proposed building addition.

Further details regarding the proposed underpinning program are provided in Figure 3 and 4 in appendix 2 of the above noted geotechnical report.

We trust that this memorandum satisfies your requirements.

Best Regards,

Paterson Group Inc.



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