



re: **Geotechnical Assessment – Grading Plan Review**
Proposed Multi-Storey Building Complex
1009 Trim Road, Ottawa

to: Starwood – **Mr. Martin Chénier** - chenierm@live.ca
date: May 30, 2025
file: PG5336-MEMO.06

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to complete a grading plan review for the proposed multi-storey buildings at the aforementioned site.

Paterson reviewed the following documents in support of the proposed assessment:

- Paterson Group Report PG5336-1 Revision 4, dated May 29, 2025
- Drawing C200 – Site Grading Plan, Revision 2, dated March 25, 2024, prepared by EXP.

Background Information

Paterson has completed a review of the above-noted grading plan. Subsurface conditions at the site generally consist of approximately 3 to 6 metres of loose to compact fill, underlain by a hard to very stiff brown silty clay crust. The silty clay transitions to a grey coloration at an approximate depth of 8 metres below existing grade, maintaining a stiff consistency. Practical refusal to Dynamic Cone Penetration Testing (DCPT) was encountered at depths ranging between 34.0 and 41.8 m below existing grade, indicating the presence of a very dense or hard stratum, possibly bedrock or a highly compacted soil layer.

Due to the presence of a silty clay deposit, a permissible grade raise restriction was recommended for the site. Based on available information and the measured shear strength, consistency and Paterson's experience in the area, the permissible grade raise restriction can be taken at **2.0 m above the native ground surface**.

It is understood that the proposed development will consist of multiple residential towers connected at the podium level. The substructure is expected to be supported on a pile foundation system bearing on bedrock. In addition, the development will include landscaped areas and the construction of several retaining walls, including armored wall systems, as part of the site design.

The following section presents a summary of our review of the proposed grading plan, assessed in conjunction with the identified grade raise limitations based on subsurface conditions. This section also provides geotechnical recommendations to address the anticipated constraints related to settlement, foundation performance, and overall site stability associated with the proposed grade changes.



Proposed Grading Plan Review

Based on our review of the above-noted grading plan, the proposed finished grades across portions of the site exceed the recommended maximum permissible grade raise of 2.0 m, particularly within the northern section of the property in the vicinity of the proposed retaining walls, and along the western portion of the site near the vehicular access ramp to the underground parking structure. The proposed grade raises in these areas range from approximately 1.0 m to more than 8.0 m above the existing ground surface.

Additionally, the substantial fill heights, particularly adjacent to the proposed retaining walls, will impose significant lateral and vertical loads, which must be carefully considered in the retaining wall design to mitigate long-term settlement, global stability concerns, and potential impacts.

However, since it is expected that the building will be installed on a pile foundation system, the proposed grade raise is not expected to impact the structure.

Recommendations

Based on the review of the proposed grading plan and the subsurface conditions encountered within the subject area—as outlined in Paterson Group Report PG5336-1, Revision 4, dated May 30, 2025—a maximum permissible grade raise of 2.0 m above the native ground surface is recommended. Considering this constraint, two potential solutions can be evaluated for the proposed development.

Option 1 - Lightweight Fill

To mitigate settlement associated with the consolidation of underlying clay soils, lightweight fill (LWF) may be considered as backfill material behind selected retaining walls.

The use of LWF will help reduce vertical stress imposed on the subgrade, thereby minimizing long-term differential settlement and improving overall performance of the retaining wall structures.

The LWF should consist of EPS 12 blocks, with the final thickness profile to be determined following the completion of the retaining wall design. As a general guideline, the thickness of the LWF is expected to range from 1 to 5 m, depending on the area-specific grade raise and geotechnical conditions.

The EPS blocks should be covered with a polyethylene sheet and fully encapsulated in a non-woven geotextile, such as Terrafix 270R, to prevent soil intrusion and protect against degradation.

Paterson should be retained to review and monitor the placement of the lightweight fill during construction to ensure conformity with design specifications and to verify field conditions.



Mr. Martin Chenier

Page 3

PG5336-MEMO.06

Although the use of LWF significantly reduces the risk of settlement, minor long-term settlement may still occur, particularly in the landscape zones and in front of the proposed retaining walls, where compressible soils are present. However, this settlement is expected to be localized and will not impact the building structures, and only the landscaping areas along the north.

In addition, the use of lightweight fill will contribute to enhancing the global stability of the retaining wall systems by reducing the driving forces acting on the walls. The global stability of the retaining walls and adjacent slopes should be further evaluated through limit equilibrium analyses, considering the reduced unit weight of the LWF and the anticipated external loads, to confirm adequate factors of safety are achieved under both short-term and long-term conditions.

Option 2 – Preloading with Surcharge and Vertical Drain

As an alternative to lightweight fill (LWF), consideration may be given to the implementation of a preloading and surcharging program to manage grade raise-induced settlement.

This ground improvement technique involves the placement of engineered granular fill exceeding the final design grade elevation to act as a surcharge load, thereby inducing accelerated consolidation of the underlying compressible soils.

The surcharge is maintained for a predetermined duration—based on settlement monitoring and consolidation modeling—until a target percentage of primary settlement (e.g., 90–95%) is achieved. Once the preload objectives are met, the excess surcharge fill is removed, and site grading can proceed.

We trust that the current submission meets your immediate requirements.

Best Regards,

Paterson Group Inc.

Fabrice Venadiambu, P.Eng., ing.



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