

to:	Monarch Homes - Mr. Mike Weiler - mikew@monarchgroup.net
to:	Monarch Homes - Mr. Rob Pierce - robp@monarchgroup.net
re:	Geotechnical Design Summary and Grading Plan Review Proposed Blackstone Residential Development - Block 296
date:	September 11, 2013
file:	PG2233-MEMO.33
from:	Joe Forsyth

Further to your request and authorization, Paterson Group (Paterson) prepared the current memo report to provide a geotechnical design summary and a grading plan review for Block 296 to be constructed at Blackstone residential development. The following memorandum should be read in conjunction with Paterson Report PG2233-2 dated June 17, 2011.

Bearing Resistance Values

Footings, up to 3 m wide, placed over an undisturbed, compact silty sand or a firm silty clay bearing surface can be designed with a bearing resistance value at SLS of **60 kPa** and a factored bearing resistance value at ULS of **125 kPa**.

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 for footings.

The proposed buildings to be located within Block 296 of the residential development should be designed as per Part 4 of the Ontario Building Code. The bearing resistance values provided for footings placed over an undisturbed, silty sand or silty clay bearing surface assume a 0.5 m long term groundwater lowering. The footings designed with the above bearing resistance value at SLS should experience up to 25 mm of total settlement and 20 mm of differential settlement.

Grading Plan Review

Paterson reviewed the following grading plan prepared by Stantec for Block 296 of the aforementioned residential development:

- Grading Plan - Drawing No. GP-1 - Project 160401009 - Revision 0 dated August 30, 2013

Based on the grading plan provided, the majority of the grading for the proposed blocks does not exceed our permissible grade raise recommendations. However, grading along the back of several of the blocks was noted to exceed our permissible grade raise recommendations and require lightweight fill to compensate for the exceedance. Table 1 attached provides a grading summary and lightweight fill (LWF) requirements for the subject buildings.

Design for Earthquakes

As indicated on Drawing PG2233-9 - Seismic Site Classification presented in Report PG2233-2 dated June 17, 2011, a seismic site **Class E** is applicable for foundation design for the subject lots. The soils underlying the subject lots are not susceptible to liquefaction.

Applicable City of Ottawa Sensitive Silty Clay Protocols

Frost Protection

The proposed finished grade and proposed footing depth are considered to provide an adequate depth for frost protection for the proposed buildings.

Groundwater Table

Based on field observations during the geotechnical investigation and proposed grading for the current phase of development, it is expected that an adequate separation distance is available between the groundwater table and the proposed footing depth. Therefore, under-floor drains are not required for the proposed buildings.

Geotechnical Considerations

Swimming Pools

The in-situ soils are considered to be acceptable for swimming pools. Above ground swimming pools must be placed a minimum of 4 m away from the residence foundation and neighbouring foundations. Otherwise, pool construction is considered routine, and can be constructed in accordance with the manufacturer's requirements.

Aboveground Hot Tubs

If consideration is given to construction of an aboveground hot tub, a geotechnical consultant should be retained by the homeowner to review the site conditions. Additional grading around the hot tub should not exceed permissible grade raises. Otherwise, hot tub construction is considered routine, and can be constructed in accordance with the manufacturer's specifications.

Installation of Decks or Additions

If consideration is given to construction of a deck or addition, a geotechnical consultant should be retained by the homeowner to review the site conditions. Additional grading around proposed deck or addition should not exceed permissible grade raises. Otherwise, standard construction practices are considered acceptable.

Tree Planting Restrictions

Block 296 of the proposed residential development is located in a moderate sensitivity area with respect to planting trees over a silty clay deposit. Trees placed within 5 m of the foundation wall should consist of low water demanding trees with shallow roots systems that extend less than 1.5 m below ground surface. Trees placed greater than 5 m from the foundation wall could consist of typical trees, which are moderate to high water demand species with roots extending to a maximum depth of 2 m below ground surface.

It is well documented in the literature, and is our experience, that fast-growing trees located near buildings founded on cohesive soils that shrink on drying could result in long-term differential settlements of the structures. Tree varieties that have the most pronounced effect on foundations are seen to consist of poplars, willows, and some maples (i.e. Manitoba Maples) and, as such, should not be considered in the landscaping design.

We trust that this information satisfies your immediate requirements.

Best Regards,

Paterson Group Inc.



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Table 1 - Summary of Design Details
Block 296 - Blackstone Residential Development

	Original GS Front (m)	Proposed GS Front (m)	Original GS Rear (m)	Proposed GS Rear (m)	Permissible Grade Raise (m)	Above Permissible Grade Raise Front (m)	Above Permissible Grade Raise Rear (m)	Minimum Thickness LWF In Garage and Front Porch (m)	Minimum Thickness LWF extending 2.4 m Beyond the building face (m)
Block 1 - Unit 1 to 6	97.53	99.10	97.60	99.80	1.80	n/a	0.40	n/a	0.4 m - Rear of Block
Block 2 - Unit 7 to 10	97.37	98.95	97.70	99.80	1.80	n/a	0.30	n/a	0.3 m - Rear of Block
Block 3 - Unit 11 to 13	97.62	98.95	97.72	99.70	1.80	n/a	0.18	n/a	n/a
Block 4 - Unit 14 to 16	97.61	98.95	97.72	99.80	1.80	n/a	0.28	n/a	0.3 m - Rear of Block
Block 5 - Unit 17 to 19	97.55	98.90	97.55	99.25	1.80	n/a	n/a	n/a	n/a
Block 6 - Unit 20 to 23	97.41	98.90	97.30	99.10	1.80	n/a	n/a	n/a	n/a
Block 7 - Unit 24 to 27	97.24	98.90	97.55	99.05	1.80	n/a	n/a	n/a	n/a
Block 8 - Unit 28 to 30	97.47	98.80	97.28	99.05	1.80	n/a	n/a	n/a	n/a
Block 9 - Unit 31 to 33	97.40	98.95	97.07	99.00	1.80	n/a	0.13	n/a	n/a
Block 10 - Unit 34 to 37	97.15	99.10	96.96	98.90	1.80	0.15	0.14	n/a	n/a
Block 11 - Unit 38 to 42	96.88	98.65	97.00	99.00	1.80	n/a	0.20	n/a	n/a

Notes:

- Proposed grade raise information was based on the following grading plan prepared by Stantec:
- Project Number 16040109 - Block 296 Grading Plan - Drawing GP-1 - Revision 0, dated August 30, 2013.