patersongroup

consulting engineers

memorandum

re: **Proposed Test Fill Pile Settlement Monitoring Program**
Proposed Residential Development
3252 Navan Road - Ottawa

to: Claridge Homes - **Mr. Vincent Denomme** - vincent.denomme@claridgehomes.com

date: November 30, 2020

file: PG5224-MEMO.02

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide geotechnical recommendations for the proposed test fill pile settlement monitoring program for the proposed residential development at the aforementioned site. The following memorandum should be read in conjunction with Paterson Report PG5224-1 Revision 2, dated October 9, 2020.

Background Information

Based on our review of the proposed macro-grading plan prepared by IBI Group for the subject site, it is understood that the northern portion of the subject site would exceed the existing permissible grade raise restrictions provided in the aforementioned geotechnical report. As discussed in the aforementioned geotechnical report, due to the presence of the existing fill layer, it is recommended that a settlement monitoring program be completed to confirm the permissible grade raise restrictions and if further adjustment is appropriate. This program will permit the monitoring of settlement associated with the previously established fill, proposed grades, long-term lowering of the groundwater table and additional loading conditions prior to construction of the proposed development.

Geotechnical Recommendations

It is recommended that three (3) test piles be considered to be installed at strategic locations across the subject site. It is expected that the test fill pile program will extend over a 6 to 9 month period. The approximate proposed test fill pile locations are depicted as per Drawing PG5224-2 appended to this memorandum.

The recommended top of the test fill piles are presented on the attached plan. It is recommended that Paterson review further revisions to the existing preliminary site grading plans, if available, to ensure the proposed pile heights are sufficient for future grade raise considerations anticipated for the subject site. The proposed test file pile heights are subject to change based on our understanding of the proposed site grading.

Test Fill Pile Construction

It is recommended that where the existing topsoil is present at the existing ground surface that **the native topsoil remain in place below the test fill piles**. However, the topsoil layer must be removed below the future building footprint at the time of construction.

It is recommended that the test fill pile be placed up to the elevations noted on the attached drawing. It is recommended that high-quality select subgrade materials (SSM) be used for this program. The proposed SSM is anticipated to consist of a mix of relatively dry, brown silty clay, silty sand and/or glacial till and/or other fill that may be considered for pre-grade fill throughout the subject site. It is not recommended to construct the test fill piles using primarily gravelly fill such as engineered or blast-rock fill materials.

The pregrade material should be placed in maximum lifts of 300 mm and compacted using tracks of the levelling equipment (5-6 passes per lift). The pre-grade material should be compacted using an adequately sized sheep foot compactor making several passes over each lift if the fill will consist primarily of silty clay. It is recommended that periodic compaction testing be completed by the geotechnical consultant to ensure adequate compaction is met. The test fill pile surface should graded to minimize ponding of water across its footprint. Furthermore, the pile side-slopes are recommended to shaped at a minimum grade of 2H:1V, or flatter.

Where installed, fill and grade raise activities should not be considered within 30 m of the test fill pile footprints and associated temporary benchmarks. Should fill material be placed within this zone, settlement results may be influenced by the proximity of nearby works and negatively affect the results of the program. Details regarding the test fill pile construction are presented on Figure 2 attached.

It should be noted that the existing ground surface should be lowered and reshaped where it is currently above the proposed top of fill pile elevations. Where this is noted, the existing fill should be reshaped such that a minimum 30 m by 30 m area be taken to the proposed test fill pile height. Beyond the footprint of the test fill pile, the area should be lowered to a minimum of 1 m below the height of the test fill pile footprint.

Settlement Monitoring Program

To accurately monitor the settlement contributed to the test fill pile settlement program, it is recommended that two (2) settlement plates (SP) be placed within each pile. The recommended locations of the settlement plates are presented in the attached drawing. It is also recommended that a local benchmark be installed approximately 20 to 30 m from the surcharge pile in a location where no excessive material has been stored, and determined in the field by Paterson personnel at the time of construction. Materials and installation of settlement plates will be undertaken by Paterson personnel and will work in conjunction with the site earthworks contractor to install the settlement plates.

Settlement Plate Installation

- ❏ Each settlement plate consist of a 300 mm x 300 mm x 10 mm thick steel plate with a 19 mm diameter x 910 mm long steel rod vertically welded to the steel plate. Additional 910 mm long rod sections are threaded onto the plate to extend the rods to the top of the surcharge pile to aid in the settlement survey procedure.

- ❏ The settlement plates should be installed upon the placement of approximately 1.5 and 2 m depth of fill is in place. Several plates can be installed in one operation, for a particular area, provided the fill within the area is all at the appropriate level. To correctly monitor any potential settlement due to the fill material, it is critical that the settlement plates be installed and the initial survey be completed prior to the placement of the upper fill materials.

- ❏ A small pit can be excavated at each plate location, sloping back the sides for safety during the installation event. Each plate should be installed level on an undisturbed soil subgrade. Some granular bedding can be used to level the surface if necessary.

- ❏ Once the plate and necessary sections of rods, and the protective sleeve have been installed, the sleeve can be backfilled with the material excavated, compacted or tamped. Backfill evenly around the sleeve to prevent it moving or tilting

- ❏ Upon completion of the installation, Paterson will conduct a baseline levelling survey to reference the tops of the settlement plate rods, to the level applicable at the time of installation.

- ❏ The placing/lowering of fill is to be coordinated with Paterson to ensure that the settlement plate extension rods and sleeves are placed (and measured or surveyed) as the fill level rises and no damage occurs to the instrumentation.

- ❏ Because of the thick clay nature of the soils at the site throughout the proposed location of the test fill piles, some cooperation with site contractors may be required during surveying to temporarily halt work while readings are taken to reduce vibration effects. This can be coordinated at the time, based on what equipment is operating and in what proximity it is to the survey crew.

It is recommended that periodic inspections be completed by the geotechnical consultant to review the placement of the fill material within the pre-grade and surcharge portion of the settlement monitoring program. Coordination may be required between the earth moving contractor and Paterson during the installation of settlement plates, as well as the extension of the rods and sleeves, if required. Details regarding the settlement plate construction is presented in Figure 1 attached.

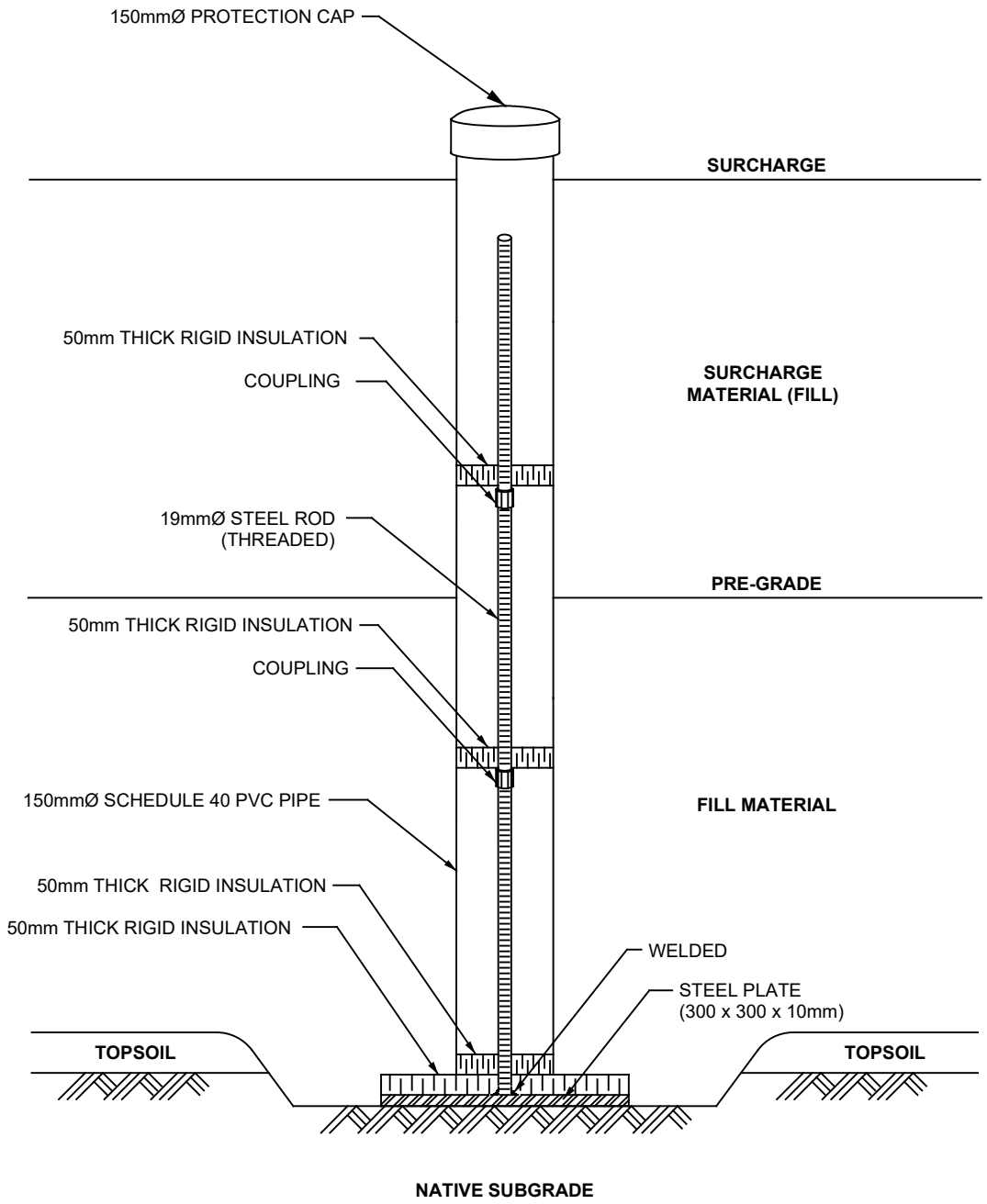
We trust that the current submission meets your immediate requirements.

Best Regards,

Paterson Group Inc.

Drew Petahtegoose, B.Eng.

David J. Gilbert, P.Eng.



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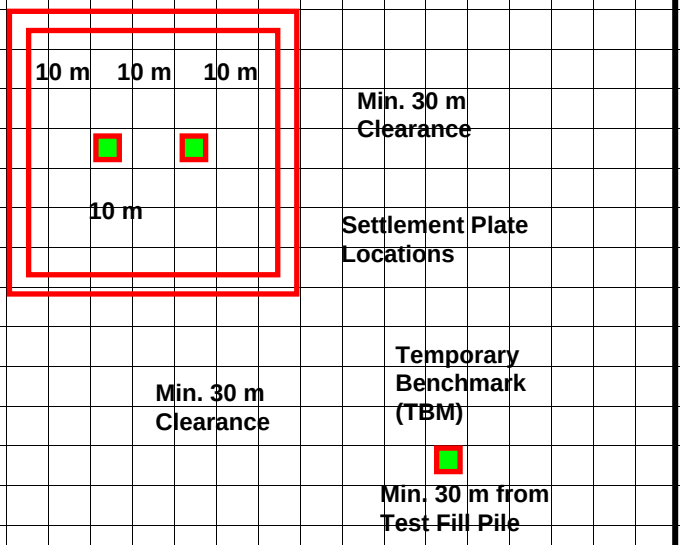
154 Colonade Road South, Ottawa, On. K2E 7J5

SETTLEMENT PLATE CONSTRUCTION

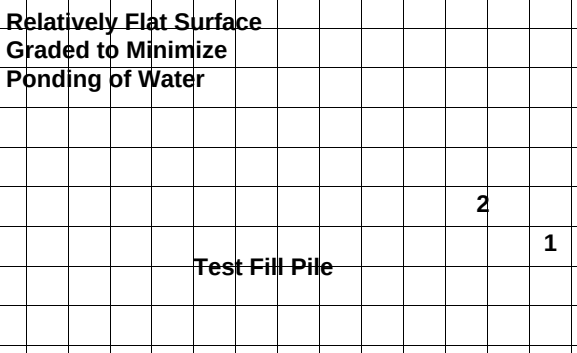
Drawing No.:	Scale:	
FIGURE 1	N.T.S.	
Date:	Drawn:	Approved:
03/2017	MPG	DG

patersongroup consulting engineers 154 Colonnade Road South, Ottawa, ON, K2E 7J5	Claridge Homes	Job No. PG5224
	3252 Navan Road - Ottawa	Date: 2020-11-06
	Proposed Test Fill Pile Settlement Program	Dwn: DP
	Figure 2 - Test Fill Pile Plan Detail	Page: NTS

Typical Test Fill Pile Layout - Plan View



Typical Test Fill Pile Layout - Section View



Notes and Details

1. Refer to attached plan for proposed test fill pile locations. This drawing is not to scale.

2. Prior to undertaking test fill pile construction, pile subgrade must consist of original ground surface and verified at the time of construction by Paterson personnel. Topsoil and weathered/vegetated surficial soils to be left in place below footprint of test fill pile. Area to be stripped of vegetation and topsoil once test fill pile has been decommissioned and prior to placing pre-grade fill for the proposed development.

3. Typical pile layout will consist of a minimum 30 m x 30 m fill pile with the above-noted dimensions. Piles should be shaped with side-slopes at a minimum of 2H:1V or shallower. Top of pile to be shaped to be relatively flat and promote sheet drainage of surface water to mitigate ponding of water in low areas.

4. Pile to be constructed of a mix of relatively dry, brown silty clay, silty sand and/or glacial till and/or other fill that may be considered for pre-grade fill throughout the subject site. It is not recommended to construct the test fill piles using primarily gravelly fill such as engineered or blast-rock fill materials. Fill sourcing, placement and compaction to be approved and periodically monitored by Paterson personnel at the time of construction.

5. The pre-grade material should be placed in maximum lifts of 300 mm and and compacted using tracks of the levelling equipment (5-6 passes per lift). The pre-grade material should be compacted using an adequately sized sheepsfoot compactor making several passes over each lift if the fill will consist of silty clay. It is recommended that periodic compaction testing be completed by a geotechnical consultant to ensure adequate compaction is met.

6. Once the program has been implemented, fill may not be placed within 30 m of the fill piles or TBM footprints. Placement of fill within this 30 m radius will negatively influence the settlement results and deter the programs progress.

Test Plate Pads A
- Top of Fill Pad Elev. = 85.6 m
- Anticipated Approx. Garage FG = 85.0 m
- Assumed Average Existing Grade = 85.5 m

Test Fill Pad B
- Top of Fill Pad Elev. = 86.6 m
- Anticipated Approx. Garage FG = 86.0 m
- Assumed Average Existing Grade = 86.0 m

Test Fill Pad C
- Top of Fill Pad Elev. = 84.7 m
- Anticipated Approx. Garage FG = 84.1 m
- Assumed Average Existing Grade = 83.5 m

General Test Fill Pile Notes
- Fill pad should consist of 30 m by 30 m pad of grade raise fill.
- 2 Settlement plates to be installed within pad.
- Temporary benchmark (TBM) will be required to be placed in proximity of test fill pads where disturbance during site activities is unlikely.
- Area within 30 m of test fill pile recommended to be remain below the proposed elevation of the test fill pile to reduce influence to measured settlement results.
- Paterson personnel will be responsible for supplying and installing settlement plates and TBM's and anticipated to work in conjunction with site earthworks contractor.
- Placement of fill recommended to be coordinated with Paterson to ensure settlement plates remain undamaged if installed prior to attaining final test fill pile height.

NAVAN ROAD

BH 11
BH 10 86.03
BH 1 85.28
BH 12 85.14
BH 3
BH 3-20 83.22
BH 2-20 83.59
BH 13
BH 16-1/16-11 86.29/86.24
BH 2 85.67
BH 1-20 85.59
BH 5 82.34
BH 4
BH 6
BH 6-20 81.73
BH 7
BH 8
BH 9 69.49
BH 16-4 82.07
BH 16-103 71.00
BH 4-20 70.66
BH 5-20 69.68
BH 05-11 82.13
BH 16-6 70.50
BH 05-3 69.86

SPACE
SCHOOL SITE
VACANT LAND
PRESCOTT - RUSSELL TRAIL LINE
100M BUFFER FROM SOUTH SIDE RAILWAY

PERMISSIBLE GRADE RAISE:
- 0.5 m
- 1.0 m
- 2.5 m

NOTE: PERMISSIBLE GRADE RAISE RECOMMENDATION TO BE TAKEN FROM ORIGINAL GROUND SURFACE

LEGEND:
- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION BY OTHERS (GOLDER ASSOCIATES LIMITED)
- 70.50 GROUND SURFACE ELEVATION (m)
- A—A SLOPE STABILITY CROSS SECTION

SCALE: 1:2500
0 25 50 75 100 125 150 175m

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NO.	REVISIONS	DATE	INITIAL
3	ADDED NEW SLOPE STABILITY CROSS SECTIONS	14/10/2020	DP
2	ADDED NEW BOREHOLES (BH 1-20 TO BH 6-20)	21/09/2020	JV
1	UPDATED TO NEW BASE PLAN	04/02/2020	JV

CLARIDGE HOMES (GLADSTONE) INC.

GEOTECHNICAL INVESTIGATION
3252 NAVAN ROAD
OTTAWA, ONTARIO

Title:
PERMISSIBLE GRADE RAISE PLAN

Scale: 1:2500	Date: 01/2020
Drawn by: NFRV	Report No.: PG5224-1
Checked by: JV	Dwg. No.: PG5224-2
Approved by: DJG	Revision No.: 3

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