

**re: Geotechnical Review - Park Structures**  
**Proposed Park Block 125, 126, 136 - Conservancy Lands East**  
**Borrisokane Road - Ottawa**

**to:** Caivan Communities - **Mr. Hugo Lalonde** - [hugo.lalonde@caivan.com](mailto:hugo.lalonde@caivan.com)

**date:** July 15, 2021

**file:** PG5036-MEMO.03 Revision 3

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Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide geotechnical design and construction recommendations for the aforementioned proposed park blocks. The following memorandum should be read in conjunction with Paterson Report PG5036-1 Revision 3 dated July 15, 2021.

## **1.0 Background Information**

Paterson reviewed the following plan prepared by J.D. Barnes Limited for the aforementioned residential development:

- Draft Plan of Subdivision - Reference No. 16-10-127-00-DP Revision 2 dated June 25, 2021

Based on our review, it is understood that park blocks are proposed for Blocks 125, 126 and 136. Generally, the subsurface profile consists of a silty clay fill placed and compacted directly over a native, topsoil layer and/or an undisturbed, very stiff silty clay layer. Based on the colour, moisture levels, and consistency of the recovered soil samples, the long-term groundwater level is expected between 2 to 3 m below ground surface.

It is understood that the future parks are to be located across the identified blocks within the proposed Conservancy East residential development. It is anticipated the proposed park layouts will include the following structures:

- asphalt pathways and parking areas
- shade, play structures and splash pads

Based on city review comments, it is understood that design considerations for community buildings, large sports fields/courts and pools may also be considered for the park blocks. The following sections provide design recommendations.

## 2.0 Geotechnical Recommendations

The subject blocks are considered suitable for the anticipated structures and pavement structures expected as the parks are developed. It is recommended that proposed structures, such as the shade structures, community buildings, pools, be supported on shallow foundations, such as conventional spread footings or thickened edge slabs. Recommendations for permanent structures are provided below.

Further details are provided in the following subsections:

### Site Grading and Preparation

It is anticipated that the existing fill, free of deleterious materials and topsoil can be left in place below the proposed park and pavement structures. However, it is recommended that the existing fill layer be thoroughly proof-rolled under dry conditions and in above freezing temperatures, using several passes of a vibratory drum roller and approved by the geotechnical consultant at the time of construction. Any poor performing areas noted during the proof-rolling operation should be removed and replaced with approved fill material, such as OPSS Granular B, Type II.

### Fill Placement

Fill placed for grading beneath the structures should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. This material should be tested and approved prior to delivery to the site. The fill should be placed in maximum 300 mm thick lifts and compacted to 98% of the material's standard Proctor maximum dry density (SPMDD) for granular pads below settlement sensitive structures.

### Bearing Resistance Values

Thickened edge concrete slabs or footings supported on the proof-rolled and approved existing fill can be designed using a bearing resistance value at serviceability limit states (SLS) for **100 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **180 kPa**, provided that the bearing surface is inspected and approved by the geotechnical consultant at the time of construction. The total and differential settlements for the proposed structures are 25 and 20 mm, respectively.

Where the existing fill material is encountered at the foundation subgrade, the existing fill shall be proof-rolled under dry conditions and above freezing temperatures, using a vibratory drum roller making several passes and approved by the geotechnical consultant at the time of construction. Any poor performing areas noted during the proof-rolling operation should be removed and replaced with approved fill material, such as OPSS Granular B, Type II.

The bearing medium under thickened edge concrete slab supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to silty clay and engineered fill above the groundwater table when a plane extending horizontally and vertically from the underside of the foundation at a minimum of 1.5H:1V passing through in situ soil of the same or higher bearing capacity as the bearing medium soil.

### **Slab-on-Grade Recommendations**

With the removal of fill, containing significant amounts of deleterious or organic materials, the existing fill or native soil subgrade approved by the geotechnical consultant at the time of excavation will be considered an acceptable subgrade surface on which to commence backfilling for slab-on-grade construction. Where the subgrade consists of existing fill, a vibratory drum roller should complete several passes over the subgrade surface as a proof-rolling program. Any poor performing areas should be removed and reinstated with an engineered fill such as OPSS Granular B Type II.

It is recommended the the upper 400 mm of sub-floor fill consist of OPSS Granular A crushed stone. All backfill material required to raise grade within the footprint of settlement sensitive structures should be placed in maximum 300 mm thick loose layers and compacted to at least 98% of its SPMDD.

### **Frost Protection Recommendations**

Frost protection is required for all structures within the park blocks. It is recommended that Paterson review the proposed frost protection for each structure at the time of detailed design.

### **Pavement Structure**

The following flexible pavement structures presented below are recommended for the design of the pathways (Type A), and access pathways and parking areas (Type B). It is anticipated that repeated heavy vehicle traffic during construction will heavily rut the fill subgrade surface. Cow-pathing granular layers, use of smaller excavation equipment and placement of a woven geotextile liner over the subgrade surface may be required where significant rutting is occurring during pathway construction. Site specific recommendations will be provided during our site inspections based on site conditions encountered at that time.

<b>Table 2 - Recommended Pavement Structure - Pathway (Type A)</b>	
<b>Thickness (mm)</b>	<b>Material Description</b>
50	<b>Wear Course</b> - HL-3 Fine Asphaltic Concrete
300	<b>BASE</b> - OPSS Granular A Crushed Stone
<b>SUBGRADE</b> - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill	

<b>Table 3 - Recommended Pavement Structure - Parking Areas and Access Pathway (Type B)</b>	
<b>Thickness (mm)</b>	<b>Material Description</b>
50	<b>Wear Course</b> - HL-3 Fine Asphaltic Concrete
150	<b>BASE</b> - OPSS Granular A Crushed Stone
300	<b>SUBBASE</b> - OPSS Granular B Type II
<b>SUBGRADE</b> - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type I or II material. Weak subgrade conditions may be experienced as a result of the existing fill material encountered at subgrade level. This may require the use of a geotextile, thicker subbase or other measures that can be recommended at the time of construction as part of the field observation program.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 98% of the material's SPMDD using suitable vibratory equipment.

### 3.0 Geotechnical Field Review and Testing Recommendations

The following is recommended to be completed at the time of construction once final design and development drawings are completed:

- Observation of proof-rolling at the existing fill subgrade
- Observation of all bearing surfaces prior to the placement of concrete.
- Observation of all subgrades prior to backfilling.
- Field review during the placement of insulation, where required.
- Observation of all subdrains prior to backfilling.
- Field density tests to ensure that the specified level of compaction has been achieved.
- Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming the construction has been completed in general accordance with the recommendations could be issued upon request, following the completion of a satisfactory material testing and observation program by the geotechnical consultant.

We trust that this information satisfies your immediate request.

Best Regards,

**Paterson Group Inc.**



Owen Canton, E.I.T.



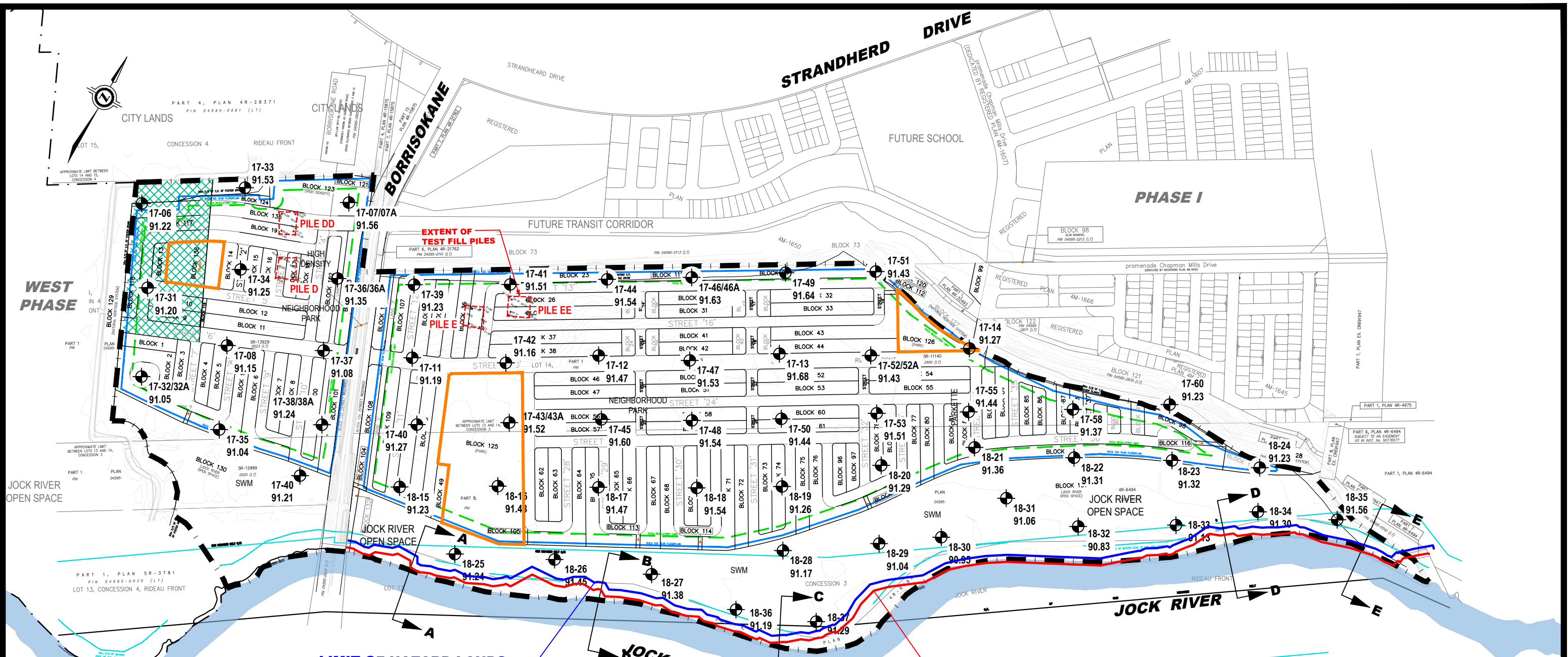
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- LEGEND:**
- APPROXIMATE BOREHOLE LOCATION (GOLDER ASSOCIATES, 04/2019)
  - 91.56 GROUND SURFACE ELEVATION (m)
  - SITE CLASS E (REMAINDER OF THE SITE IS CLASS D)
  - OUTLINE OF PROPOSED PARK BLOCKS
- BOREHOLE LOCATIONS WERE SURVEYED BY OTHERS AND ARE REFERENCED TO A GEODETIC DATUM.

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NO.	REVISIONS	DATE	INITIAL
1	REVISED TO LATEST CONCEPTUAL PLAN	14/07/2021	OC

**CAIVAN COMMUNITIES**  
**GEOTECHNICAL INVESTIGATION**  
**PROP. RESIDENTIAL DEVELOPMENT - CONSERVANCY LANDS EAST**  
OTTAWA, ONTARIO

**Title: PARK BLOCK LOCATION PLAN**

Scale:	1:6000	Date:	02/2021
Drawn by:	MPG	Report No.:	PG5036-1
Checked by:	SD	<b>PG5036-11</b>	Revision No.: 1
Approved by:	DJG		