



Our File: 100654

November 13, 2022

Mr. Sukhi Atwal

Email: realtorsukhiatwal@gmail.com

Dear Sir,

**Re: Preliminary Geotechnical Report Revision 1 - Proposed Residential Development
2690 Queensway, Prince George, BC**

1.0 Introduction

Evertek Engineering Ltd. (Evertek) was retained by Mr. Sukhi Atwal (Client) to conduct a preliminary geotechnical evaluation for the proposed residential development on a property located at 2690 Queensway in Prince George, BC (herein referred to as, "the property"). The purposes of this geotechnical evaluation were:

- To conduct a field review of the current site surface and subsurface conditions.
- To provide geotechnical comments on prefeasibility for the proposed residential development.

Preparation of this report is generally in accordance with the City of Prince George Bylaws and British Columbia Building Code 2018. Evertek has reviewed the environmental report titled "The Riparian Assessment for 2690 Queensway, Prince George (Version 2, November 2022)", prepared by LTN Environmental Consulting LP.

This report has been revised based on the City of Prince George's comments on November 7, 2022.

2.0 Site Location & Proposed Development

The legal description of the property is Block 28, District Lot 933, Plan 727, PID: 014-141-582. The size of the property is approximately 1.51 acres (6113.3 m²). The Property is currently zoned as C7: Transitional Commercial. Fraser River is located east, adjacent to the property. The property is generally flat except for the 15-20 m eastern section of the property that benches down to the Fraser River bank. There is a section 219 Covenant (PG9697) registered to the legal title of the property requiring a minimum 30 m building setback from the natural boundary of the Fraser River and a flood construction level (FCL) of at least 569.5 m. The site location plan is attached for reference (Figure 1).

Based on the preliminary site plan prepared by Bakerview Building Design and verbal communication with the client, it is Evertek's understanding that the proposed residential development includes two-storey apartment buildings with an internal road and parking areas. The preliminary site development plan is attached for reference (Figure 2).



3.0 Field Geotechnical Assessment

A field geotechnical investigation was conducted on August 24, 2022. An excavator was used to excavate six (6) test pits (TP22-01 to TP22-06) on the property to depths ranging from 1.5 m to 2.7 m below the existing grade. Approximate test pit locations are depicted on Figure 2, attached. Soil encountered in the test pits consisted of 0.15 m to 0.3 m thick surficial topsoil layer over loose to compact, moist, brown sand with trace to some silt. The sand layer thickness ranged from approximately 0.9 m to 1.8 m. Underlying the sand was compact to dense, moist, greyish brown sand and gravel with some cobbles. TP22-01 and TP22-02 were terminated in the sand layer at a depth of 1.5 m below existing grade while test pits TP22-03 to TP22-06 were terminated in the sand and gravel layer at a depth of 2.7 m below existing grade. No groundwater was observed upon completion of the test pit excavation. The detailed subsurface soil logs are attached for reference. It should be noted that the test pits indicate subsurface conditions encountered at the respective test pit locations only. The subsurface conditions may vary outside the test pit locations and below the depths explored.

Laboratory testing was completed by Metro Testing for selected soil samples in order to identify the moisture content and grain size distribution of the soil. The moisture content of the soil sample for the sand with some silt ranges from 5.1% to 19.0% while the sand and gravel have a moisture content ranging from 2.1% to 3.8%. The grain size distribution for soil samples were taken at test pits TP22-02 and TP22-04 at a depth of 1.5 m below the existing grade. The grain size distribution for test pit TP22-02 was 62.5% sand and 37.5% silt. The grain size distribution for test pit TP22-04 was 90.2% sand and 9.8% silt. The laboratory testing results are attached for reference.

4.0 Recommendations for the Proposed Development

Based on the desktop review and preliminary subsurface investigation, Evertek considered that the proposed residential development is feasible from a geotechnical perspective. Recommendation for the proposed development will be discussed in the following sections.

4.1 Site Preparation

In the proposed building and roadway areas the site must be cleared of any vegetation, fill, construction debris or any soft and wet soil to expose native competent sand subsoil. Evertek must review the sub-grade once the stripping is complete, in order to verify the conditions of soil found during the investigation and to provide additional recommendations, if required.

The proposed development is relatively flat. Therefore site grading for the proposed development is expected to be minimal. Where grades need to be raised using structural fill material, the fill should comprise of granular material approved by the geotechnical engineer. The structural fill should be well graded, with a maximum particle size of 75 mm, and contain no more than 5% passing the No 200 sieve. The structural fill materials should be placed horizontally in maximum 300 mm (12 inch) thick lifts within 2 percent of its optimum moisture content. Each lift should be uniformly compacted to 100% of the Standard Proctor Maximum Dry Density (SPMDD) in accordance with ASTM D698 in the building area, and 95% Modified Proctor dry density in the roadway area. In-situ density testing must be carried out during the structural fill placement to verify that the specified compaction is achieved. Subject to field review during construction and approval by the geotechnical engineer onsite excavated sand and gravel may be suitable for reuse as structural soil.



4.2 Floods, Site Slopes, and Setbacks

Fraser River is located east, adjacent to the property. The property is generally flat except for the 15-20 m eastern section of the property that benches down to the Fraser River bank. There is a section 219 Covenant (PG9697) registered to the legal title of the property requiring a minimum 30 m building setback from the natural boundary of the Fraser River and a flood construction level (FCL) of at least 569.5 m.

LTN Environmental Consulting LP recently conducted an environmental study, and specified an environmental setback of 20 m between the proposed development and the river. Based on the architectural site plan by Bakerview Building Design, the setback for the proposed parking area is a minimum of 20 m while the setback of the proposed building is a minimum of 30 m.

The majority of the site is relatively flat. However, there is a slope near the Fraser River channel. The site slopes down towards Fraser River at the southeast side of the property which is approximately 12-15 m wide. The section slopes (3H:1V to 2.5H:1V) to a lower bench which then declines steeply (1.5H:1V to 1.3H:1V) down to the Fraser River channel. The lower bench transition to the steep slope is classified at the watercourse top of bank. Based on the site visit, there was no evidence of slope instability such as tension cracks, scarps, soil slumping and debris tracks. The slope is considered to be stable. Evertek concurs that the minimum of 20 m setback line from the watercourse top of bank as specified by LTN Environmental Consulting LP) is considered geotechnically adequate in terms of slope stability.

The topographic surveying plan prepared by McElhanney Associates Land Surveying Ltd. dated October 14, 2022 indicates that the current ground elevation in the proposed building area ranges from approximately 570 to 571 m, which is higher than the FCL (569.5 m) outlined in the existing land covenant (PG9697).

4.3 Site Drainage, Erosion Control, and Stormwater Management

A temporary onsite surface drainage system (ditches or swales) may be implemented during site grading and construction. The surface water collected and conveyed by the temporary surface drainage system should be discharged to the existing natural drainage system or the municipal stormwater system, if permitted. These recommendations should be incorporated into the civil design.

During and after construction, it is important that care be taken to prevent uncontrolled water runoff and saturation of any exposed natural soil surface. Site grading should be designed to prevent the ponding of surface water near foundation walls and paved areas. Sidewalks, pavement areas or landscaping within a zone of approximately 2 m of the exterior perimeter of the buildings should be graded to drain water away from the buildings at a minimum gradient of 2%.

Drainage established during design and construction should be maintained for the life of the development.

Should the municipal stormwater system be unavailable to the site, an onsite stormwater infiltration system for the roof water and foundation drainage may be considered. Based on the soil and groundwater conditions, onsite stormwater infiltration system is considered feasible from



the geotechnical perspective. Evertex can assist in the proposed storm-water management plan design upon request.

4.4 Bearing Capacity Estimation and Site Classification

Based on the existing soil conditions, a conventional shallow foundation system atop of compacted structural fill or the native soil may be considered suitable for the proposed buildings. Footings founded on the competent native sand soil or structural fill can be designed with a factored Ultimate Limit State (ULS) bearing pressure of 150 kPa (3,000 psf), for a resistance factor $\phi = 0.5$ in accordance with the Canadian Foundation Engineering Manual (CFEM). The Serviceability Limit State (SLS) pressure is 100 kPa (2,000 psf). For footings founded on the natural sand and gravel, soil bearing capacities of 225 kPa (ULS) and 150 kPa (SLS) may be used. The estimated total settlement of the building should not exceed 25 mm and the corresponding differential settlement should not exceed 20 mm over a 6 m span.

The minimum width of continuous footings should not be less than 0.45m (18 inches), and the minimum dimension of column pads should not be less than 0.9 m (36 inches). A minimum embedment depth of 1.2 m (48 inches) must be provided for frost protection.

In terms of seismic design, the Site Classification for this property is D – stiff soil (in accordance with the BC Building Code 2018, Table 4.1.8.4.A). The Peak Ground Acceleration (PGA) for this site is 0.049g for a probability of occurrence of 2% in 50 years (0.000404 per annum), which obtained from 2015 National Building Code Seismic Hazard from the web-site <http://www.earthquakescanada.nrcan.gc.ca> of National Resources Canada.

4.5 Floor Slab-On-Grade

Concrete floor slab-on-grade must be underlain by a 100 mm minimum layer of coarse, free draining granular material. A vapour barrier membrane consisting of minimum 0.15 mm thick polyethylene sheeting should be placed between the slab and the bedding layer. A thin layer of sand may be placed on top of the vapour barrier to protect the polyethylene sheeting from tearing during construction of footing forms and concrete pouring.

5.0 Further Work and Construction Inspections

Evertex should review the final design to ensure that our recommendations have been incorporated into the design. We recommend that Evertex be retained in the detailed design and construction phases of the project for the following purposes:

- Review of final proposed layout and grading plan;
- Review of structural design for proposed buildings;
- Subgrade field review during the building, underground utility and road construction;
- Monitoring of excavation side slope stability and review of the temporary shoring installation if required; and
- Monitoring of field densities of structural fill during placement and compaction.



6.0 Closure

This report is based on the findings at six test pit locations. Should different subsoil and groundwater conditions be encountered during construction, this office should be notified and recommendations submitted herein will be reviewed and revised as required. This report should be applied only to the presently proposed development.

This report has been prepared for the exclusive use of the client for the specified application to the project described in this report. The City of Prince George may also rely on the findings of this report. It has been prepared in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

We trust that the information provided in this letter meets your requirements. Should you have any questions please do not hesitate to contact this office.

Yours truly,

Evertek Engineering Limited

(EGBC Permit to Practice No. 1000729)

Reviewed by:

Derek Emslie, EIT, M.A.Sc.
Junior Geotechnical Engineer

Larry Deng, M.Sc, P.Eng.
Senior Geotechnical Engineer, Principal

Attachments: Preliminary Site Plan by Bakerview Building Design
Figure 1 – Site Location Plan
Figure 2 – Test Pit Location Plan
Soil Logs
Metro Testing Laboratory Results

Total : 49 Parking Stalls needed - 49 Parking Stalls provided

124

85





SUKHI ATWAL
EMAIL: realtorsukhiatwal@gmail.com



EVERTEK ENGINEERING
202-2692 CLEARBROOK ROAD,
ABBOTSFORD, B.C. V2T 2Y8
TELEPHONE (604) 776-0222

[illegible]

PROJECT NO:	100654
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DATE: 2022-08-24

DWN BY:	DE
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DESIGN:	LD
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SCALE HORZ: NTS

SCALE VERT:	NTS
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FIGURE NO:	1
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1

City of Prince George

SITE LOCATION PLAN
2690 QUEENSWAY, PRINCE GEORGE



— APPROXIMATE TEST PIT LOCATION

TEST PIT LOCATION PLAN
2690 QUEENSWAY, PRINCE GEORGE



SOIL LOG TP22-01

PROJECT NUMBER: 100654

CLIENT NAME: Sukhi Atwal

PROJECT: Proposed Residential Development

SITE ADDRESS: 2690 Queensway, Prince
George, BC

DATE: August 24, 2022

EQUIPMENT: Mini Excavator

SURFACE ELEVATION:

DEPTH OF TEST PIT: 1.5 m

DEPTH OF GROUNDWATER:

COMMENTS

LOGGED BY DE

Depth (m)	Graphic Log	Soils Description	Moisture (%)	DCPT Values	Depth (ft)
0.2		TOPSOIL, roots.			1
0.4		SAND, some silt, fine to medium grained sand, moist, brown, loose to compact.			2
0.6					3
0.8					4
1					5
1.2					6
1.4					7
1.6		Termination of test pit at 1.5 m below existing grade. No groundwater observed upon completion of test pit excavation.			8
1.8					9
2					10
2.2					11
2.4					12
2.6					13
2.8					14
3					15
3.2					16
3.4					17
3.6					18
3.8					19

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SOIL LOG TP22-02

PROJECT NUMBER: 100654

CLIENT NAME: Sukhi Atwal

PROJECT: Proposed Residential Development

SITE ADDRESS: 2690 Queensway, Prince
George, BC

DATE: August 24, 2022

EQUIPMENT: Mini Excavator

SURFACE ELEVATION:

DEPTH OF TEST PIT: 1.5 m

DEPTH OF GROUNDWATER:

COMMENTS

LOGGED BY DE

Depth (m)	Graphic Log	Soils Description	Moisture (%)	DCPT Values	Depth (ft)
0.2		TOPSOIL, roots.			1
0.4		SAND, some silt, fine to medium grained sand, moist, brown, loose to compact.			2
0.6					3
0.8					4
1					5
1.2					6
1.4					7
1.6		Termination of test pit at 1.5 m below existing grade. No groundwater observed upon completion of test pit excavation.			8
1.8					9
2					10
2.2					11
2.4					12
2.6					13
2.8					14
3					15
3.2					16
3.4					17
3.6					18
3.8					19

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SOIL LOG TP22-03

PROJECT NUMBER: 100654 CLIENT NAME: Sukhi Atwal PROJECT: Proposed Residential Development SITE ADDRESS: 2690 Queensway, Prince George, BC	DATE: August 24, 2022 EQUIPMENT: Mini Excavator SURFACE ELEVATION: DEPTH OF TEST PIT: 2.7 m DEPTH OF GROUNDWATER:
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COMMENTS	LOGGED BY DE
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Depth (m)	Graphic Log	Soils Description	Moisture (%)	DCPT Values	Depth (ft)
0.2		TOPSOIL, roots.			1
0.4		SAND, trace silt, trace gravel, fine to medium grained sand, moist, brown, compact.			2
0.6					3
0.8					4
1					5
1.2					6
1.4					7
1.6					8
1.8					9
2		SAND and GRAVEL, some cobbles, coarse grained sand, sub-rounded to rounded gravel, moist, greyish brown, compact to dense.			10
2.2					11
2.4					12
2.6					13
2.8		Termination of test pit at 2.7 m below existing grade. No groundwater observed upon completion of test pit excavation.			
3					
3.2					
3.4					
3.6					
3.8					



SOIL LOG TP22-04

PROJECT NUMBER: 100654

CLIENT NAME: Sukhi Atwal

PROJECT: Proposed Residential Development

SITE ADDRESS: 2690 Queensway, Prince George, BC

DATE: August 24, 2022

EQUIPMENT: Mini Excavator

SURFACE ELEVATION:

DEPTH OF TEST PIT: 2.7 m

DEPTH OF GROUNDWATER:

COMMENTS

LOGGED BY DE

Depth (m)	Graphic Log	Soils Description	Moisture (%)	DCPT Values	Depth (ft)
0.2		TOPSOIL, roots.			
0.4		SAND, trace silt, fine to medium grained sand, moist, brown, compact.			1
0.6					2
0.8					3
1					4
1.2					5
1.4					6
1.6					7
1.8					8
2					9
2.2		SAND and GRAVEL, some cobbles, coarse grained sand, sub-rounded to rounded gravel, moist, greyish brown, compact to dense.			10
2.4					11
2.6					12
2.8		Termination of test pit at 2.7 m below existing grade. No groundwater observed upon completion of test pit excavation.			13
3					
3.2					
3.4					
3.6					
3.8					

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produced by ESlog.ESdat.net on 31 Aug 2022



SOIL LOG TP22-05

PROJECT NUMBER: 100654 CLIENT NAME: Sukhi Atwal PROJECT: Proposed Residential Development SITE ADDRESS: 2690 Queensway, Prince George, BC	DATE: August 24, 2022 EQUIPMENT: Mini Excavator SURFACE ELEVATION: DEPTH OF TEST PIT: 2.7 m DEPTH OF GROUNDWATER:
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COMMENTS	LOGGED BY DE
-----------------	---------------------

Depth (m)	Graphic Log	Soils Description	Moisture (%)	DCPT Values	Depth (ft)
0.2		TOPSOIL, roots.			1
0.4		SAND, trace silt, trace gravel, fine to medium grained sand, moist, brown, compact.			2
0.6					3
0.8		SAND and GRAVEL, some cobbles, coarse grained sand, sub-rounded to rounded gravel, moist, greyish brown, compact to dense.			4
1					5
1.2					6
1.4					7
1.6					8
1.8					9
2					10
2.2					11
2.4					12
2.6					13
2.8		Termination of test pit at 2.7 m below existing grade. No groundwater observed upon completion of test pit excavation.			
3					
3.2					
3.4					
3.6					
3.8					



SOIL LOG TP22-06

PROJECT NUMBER: 100654 CLIENT NAME: Sukhi Atwal PROJECT: Proposed Residential Development SITE ADDRESS: 2690 Queensway, Prince George, BC	DATE: August 24, 2022 EQUIPMENT: Mini Excavator SURFACE ELEVATION: DEPTH OF TEST PIT: 2.7 m DEPTH OF GROUNDWATER:
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COMMENTS	LOGGED BY DE
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Depth (m)	Graphic Log	Soils Description	Moisture (%)	DCPT Values	Depth (ft)
			0 100	0 100	
0.2		TOPSOIL, roots.			
0.4		SAND, trace silt, trace gravel, fine to medium grained sand, moist, brown, compact.			1
0.6					2
0.8					3
1					4
1.2					5
1.4					6
1.6					7
1.8		SAND and GRAVEL, some cobbles, coarse grained sand, sub-rounded to rounded gravel, moist, greyish brown, compact to dense.			8
2					9
2.2					10
2.4					11
2.6					12
2.8		Termination of test pit at 2.7 m below existing grade. No groundwater observed upon completion of test pit excavation.			13
3					
3.2					
3.4					
3.6					
3.8					

TO: **EVERTEK ENGINEERING LTD.**
 202-2692 Clearbrook Road.
 Abbotsford, B.C., V2T 2Y8

REPORT DATE: 31-Aug-22
 PROJECT NO: VE41747

ATTN: **DEREK EMSLIE**


PROJECT: 2690 QUEENSWAY, PRINCE GEORGE
SCOPE: Moisture & Sieve Test

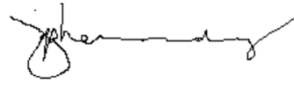
ASTM D2974
 STANDARD TEST METHOD FOR MOISTURE, AND ORGANIC MATTER OF PEAT AND OTHER
 ORGANIC SOILS

SAMPLE DATA

SUPPLIER	Evertex Eng'ng Ltd	DATE SAMPLED:	24-Aug-22
SOURCE:	2690 Queensway, Prince George	DATE RECEIVED:	26-Aug-22
SAMPLE TYPE:	Various	DATE TESTED:	29-Aug-22
		TESTED BY:	JR

BH #	DEPTH	Moisture Content, %	Remarks
TP22-01	5 FT	11.3	
TP22-02	5 FT	19.0	see sieve report
TP22-03	5 FT	6.3	
TP22-03	8 FT	3.8	
TP22-04	5 FT	5.1	see sieve report
TP22-04	9 FT	2.7	
TP22-05	9 FT	2.8	
TP22-06	9 FT	2.1	

Per: 
Jaime Rivero
 Laboratory Supervisor

Reviewed By: 
Jim Hernandez
 Laboratory Manager

TO

EVERTEK ENGINEERING LTD
202-2692 CLEARBROOK RD
ABBOTSFORD, BC
V2T 2Y8

PROJECT NO. VE41747

CLIENT EVERTEK ENGINEERING LTD
C.C.

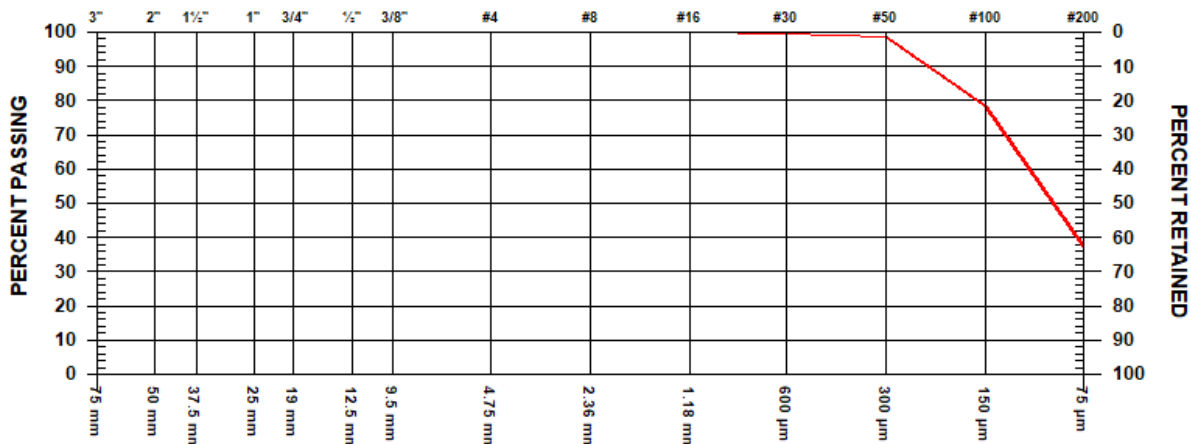
ATTN: DEREK EMSLIE

PROJECT 2690 QUEENSWAY, PRINCE GEORGE
MATERIALS TESTING
CONTRACTOR EVERTEK ENGINEERING

2690 QUEENSWAY PRINCE GEORGE
PRINCE GEORGE

SIEVE TEST NO. 1 DATE RECEIVED 2022.Aug.26 DATE TESTED 2022.Aug.30 DATE SAMPLED 2022.Aug.24


SUPPLIER EVERTEK
SOURCE 2690 QUENSWAY, PRINCE GEORGE
SPECIFICATION
MATERIAL TYPE TP22-02, 5FT

SAMPLED BY CLIENT
TESTED BY JR
TEST METHOD ASTM C-136


GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
3"	75 mm		
2"	50 mm		
1 1/2"	37.5 mm		
1"	25 mm		
3/4"	19 mm		
1/2"	12.5 mm		
3/8"	9.5 mm		

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
No. 4	4.75 mm		
No. 8	2.36 mm	100.0	
No. 16	1.18 mm	100.0	
No. 30	600 µm	99.6	
No. 50	300 µm	98.5	
No. 100	150 µm	78.2	
No. 200	75 µm	37.5	

COMMENTS



TO

EVERTEK ENGINEERING LTD
202-2692 CLEARBROOK RD
ABBOTSFORD, BC
V2T 2Y8

PROJECT NO. VE41747

CLIENT EVERTEK ENGINEERING LTD
C.C.

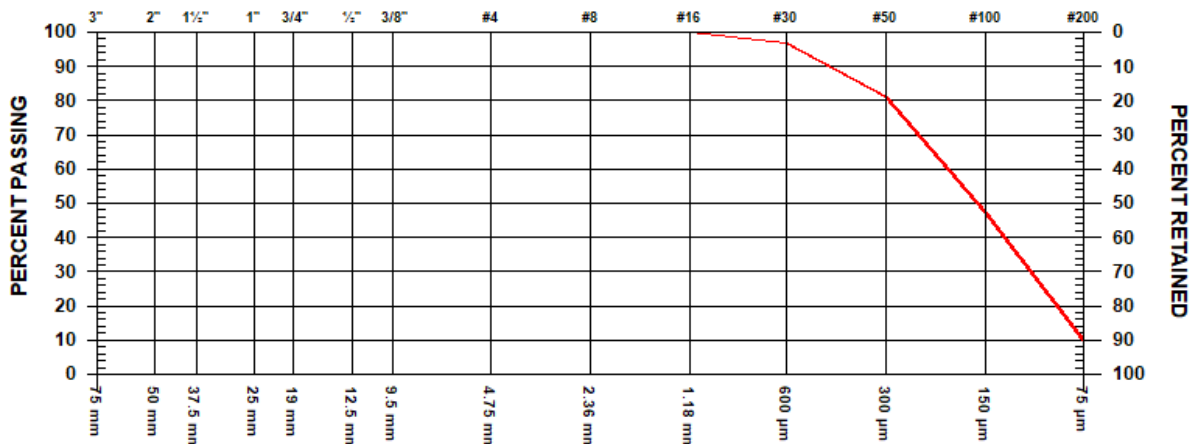
ATTN: DEREK EMSLIE

PROJECT 2690 QUEENSWAY, PRINCE GEORGE
MATERIALS TESTING
CONTRACTOR EVERTEK ENGINEERING

2690 QUEENSWAY PRINCE GEORGE
PRINCE GEORGE

SIEVE TEST NO. 2 DATE RECEIVED 2022.Aug.26 DATE TESTED 2022.Aug.30 DATE SAMPLED 2022.Aug.24

SUPPLIER EVERTEK ENG. LTD
SOURCE 2690 QUEENSWAY, PRINCE GEORGE
SPECIFICATION
MATERIAL TYPE TP22-04, 5 FT

SAMPLED BY CL
TESTED BY JR
TEST METHOD ASTM C-136


GRAVEL SIZES			PERCENT PASSING	GRADATION LIMITS
3"	75	mm		
2"	50	mm		
1 1/2"	37.5	mm		
1"	25	mm		
3/4"	19	mm		
1/2"	12.5	mm		
3/8"	9.5	mm		

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
No. 4	4.75 mm		
No. 8	2.36 mm	100.0	
No. 16	1.18 mm	99.8	
No. 30	600 µm	96.8	
No. 50	300 µm	81.2	
No. 100	150 µm	47.5	
No. 200	75 µm	9.8	

COMMENTS

