



DEVELOPMENT PERMIT

NO. DP- 2018-12

TO: [REDACTED]

ADDRESS: [REDACTED]
(Permittee)

- 1) This Development Permit is issued subject to compliance with all of the Bylaws of the Town of Gibsons applicable thereto, except those specifically varied or supplemented by this Permit.
- 2) The Development Permit applies to those "lands" within the Town of Gibsons described below:
Parcel Identifier: 010-917-128
Legal Description: Lot 7, Block 4 of Blocks B and C, District Lot 685, Plan 6318
Civic Address: 623 Gower Point Road/ 311 Beachcomber Lane
- 3) These lands are within Development Permit Area('s) of the Town of Gibsons Official Community Plan (Bylaw 985, 2005). This permit applies to the following Development Permit Area:
 - Development Permit Area No. 1 (Geotechnical Hazard Area) for the purpose of protection of development from hazardous conditions.
- 4) The "land" described herein shall be developed strictly in accordance with the terms and conditions and provisions of this Permit, and any plans and specifications attached to this Permit which shall form a part thereof; specifically:
 - Geotechnical Assessment, dated February 21, 2017, stamped by Benjamin Smale. PEng BEng, Western Geotechnical Consultants Ltd.
- 5) All requirements of the plan(s) are to be followed.
- 6) Minor changes to the aforesaid drawings that do not affect the intent of this Development Permit are permitted only with the approval of the Town of Gibsons and Geotechnical Engineer.
- 7) If the Permittee does not commence the development permitted by this Permit within twenty four months of the date of this Permit, this Permit shall lapse.
- 8) This Permit is NOT a Building Permit.

ISSUED THIS 31ST DAY OF JULY, 2018.

A handwritten signature in blue ink, appearing to be 'L. Staats', written over a horizontal line.

Lesley-Ann Staats, RPP
Director of Planning

Copy of permit to the Geotechnical Engineer

February 21, 2017

Project No.: WG2-0598

[REDACTED]
[REDACTED]
Gibsons, British Columbia
[REDACTED]

GEOTECHNICAL ASSESSMENT

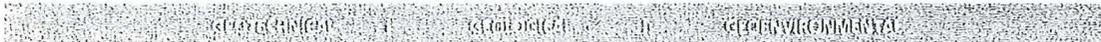
623 Gower Point Road, Gibsons, British Columbia

Submitted By: Richard Creagan BSc

Western Geotechnical Consultants Ltd.
#1877 Field Road (PO Box 624)
Sechelt, BC V0N 3A0
T. 604.866.9438
F. 604.740.0923
E. rcreagan@westerngeo.ca

British Columbia Locations:
Abbotsford, Burnaby, Sechelt,
Surrey (Head Office), and Squamish.

Alberta Locations:
Calgary





EXECUTIVE SUMMARY

Based on the findings of this assessment and provided that all of the recommendations presented herein are implemented, there are no reasonably conceivable geotechnical issues that would impede successful development on the subject site. The development is expected to be a two level garage with a carriage house on the second level. The proposed development falls within Development Permit Areas (DPA) 1 and 9 which are outlined within the Town of Gibson's Official Community Plan (OCP). DPA 1 represents a watercourse hazard with respect to Charman Creek, while DPA 9 applies to development within the Gibsons Aquifer. *The subject site may be considered safe for new development considering the information in this report is followed as provided.*

In consideration of DPA 1, the subject site was analyzed for susceptibility to debris floods, debris flow, and avulsion with respect to Charman Creek. It was found during the assessment that the creeks gradients aren't steep enough to transport a debris flow. The topography surrounding the site is predominately descending from the west towards the east, and in conjunction with the distance at which it lies with respect to Charman Creek (155 m) makes it unlikely that a flood would affect the subject site. The creek is incised within dense over consolidated glacial till and it is unlikely that the stream would avulse, rather than erode, towards the subject site. The subject site can be considered safe from hazard with respect to the 1 in 500 year debris flood, the 1 in 500 year debris flood, and the 1 in 200 year avulsion.

The subject site falls within DPA 9 and as such the proposed development was analyzed for its potential effect on the Gibsons Aquifer. A subsurface investigation was completed within the area of proposed development to a maximum depth of 1.5 m below ground surface. The Gibsons aquifer was not encountered during the excavation of two exploratory test pits. The aquitard for the aquifer was also not encountered during the investigation. It is not expected that the development will affect the aquifer, and the aquifer will not affect the development.

A layer of podzol was encountered at an approximate depth of 1.0 m below ground surface. The layer of podzol is approximately 0.3 m thick extending to 1.3 m below ground surface. This organic horizon should be removed from the building envelope. Once removed, the excavation should be backfilled with engineered fill, or clean recycled native material free of organics, cobbles, and boulders after approval by the geotechnical engineer.

The recommended foundation type is 450 mm wide concrete strip footings. Strip footings should be placed 450 mm below ground surface for frost protection and placed on engineered fill or recycled native material approved by the geotechnical engineer. The soils on the subject site have an allowable bearing capacity of 75 kPa.



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1.0 INTRODUCTION

Western Geotechnical Consultants Ltd. (WGC) has conducted a geotechnical assessment of 623 Gower Point Road, Gibsons, British Columbia. The purpose of this assessment was to identify the geotechnical parameters of the subject site as required to guide the proposed construction of a two level garage with second level carriage house. This report was prepared in accordance with current geotechnical engineering practices and principles in British Columbia. This report was also prepared in accordance with the Town of Gibsons building bylaws and development permit standards. All work performed for this project conforms to WGC's Organizational Quality Management Plan currently registered with the Association of Professional Engineers and Geoscientists of British Columbia.

2.0 SCOPE

The scope of work performed for this assessment included the following tasks:

1. A geotechnical site investigation to observe the current conditions at the site, including observations of site topography, surface water, and drainage conditions and including a subsurface investigation to evaluate subsurface conditions in the area of proposed development;
2. A desktop review of relevant available background information including published geologic maps and related subsurface information;
3. Evaluation and geotechnical engineering analysis of the collected data; and,
4. Preparation of this summary geotechnical report to present the findings, recommendations, design parameters, and conclusions for the geotechnical aspects of the project.

The scope of this geotechnical assessment did not include any items pertaining to any other engineering disciplines for this project. This investigation did not include any assessment of environmental hazards or contamination that may be present on or near the site. In addition, no testing or evaluation for the presence of sulphates and/or other corrosive materials was completed as part of this investigation.

3.0 METHODOLOGY

WGC conducted a geotechnical assessment on December 6, 2016. The site investigation included a visual observation of topography, surficial soils, vegetation, and surface water. The investigation also included the excavation of two exploratory test pits to determine the subsurface conditions in the area of proposed development.

A desktop study of relevant available information was conducted following the site investigation. This study included the review of resources such as geologic maps, topographic maps, and satellite imagery. The desktop study was completed to assist in determining site specific geotechnical conditions as well as to provide background information on the sites susceptibility to geohazard. Following the study, a detailed analysis was conducted to provide suitable recommendations and construction criteria to guide geohazard risk mitigation, site preparation, building location, foundation design, and site drainage.



This report was prepared to summarize the results of the site investigation, desktop study, and geotechnical analysis. The intent of this report is to provide the key stakeholders with the information regarding the conditions of the subject site from a geotechnical perspective.

4.0 SITE DESCRIPTION

4.1 Site Layout

Access to the site is via Gower Point Road to the west or Beachcomber Lane to the east. The subject site is bordered by developed residential parcels to the north and south, by Gower Point Road to the west, and by Beachcomber Lane to the east. The subject site is roughly rectangular, with an approximate length of 61 m and width of 15 m, and encompasses an approximate total area of 0.09 ha.

4.2 Existing Structures and Proposed Development

There is currently a single family residence located on the western extents of the subject site. The client intends to develop a multi-level carriage house approximately 22 m east of the existing structure. Associated landscaping improvements around the development are also anticipated as part of the proposed works.

4.3 Topography

The subject site descends in elevation from the west towards the east. A gentle slope extends at a 7(H):1(V) (Horizontal: Vertical) slope ratio from the western property line towards the east for approximately 43 m horizontally. The site then transitions into a moderate 3H:1V slope for approximately 3 m horizontally with some inclinations as steep as 2H:1V on the southern half of the parcel. The site then tapers off to relatively flat gradients which extend for 12 m horizontally towards the eastern property line.

4.4 Vegetation

The subject site lies in the CWHxm1 biogeoclimatic zone (Coastal Western Hemlock Eastern Very Dry Maritime Variant) in the Georgia Lowlands Ecoregion of mapped ecology (Environment Canada, 1999). The subject site has a mature growth canopy consisting of second growth western red-cedar, and various deciduous trees. Below the canopy is predominately anthropogenic vegetation which included bushes, plants, and grasses.

4.1 Surface Water and Runoff

No surface water was observed at the time of the site investigation. Due to the gently to moderately sloping gradients located within the area of proposed development, the subject site should have sufficient gradient to transport surficial water in gentle sheet flow and it does not appear to be susceptible to ponding or erosion. Drainage recommendations are provided within Section 7.4 of this document.



4.2 Seismicity

In consideration of the soil stratigraphy observed during the subsurface investigation, *Site Class 'D' – Stiff Soil* is the most appropriate site classification in accordance with the 2012 BC Building Code. As with most sites in the area, the primary seismic hazard at the site is strong to severe ground shaking expected during a major earthquake event on one or more of the active faults in the region. As interpolated from the 2010 National Building Code Seismic Hazard Calculation, the following criteria apply for this location (Latitude 49.3945° N, Longitude - 123.5122° W):

Peak Ground Acceleration: $PGA = 0.440g$

Spectral Acceleration Response Values: $S_A(0.2)=0.902g$, $S_A(0.5)=0.630g$, $S_A(1.0)=0.331g$, $S_A(2.0)=0.172g$

Site Coefficients: $F_a = 1.1$, $F_v = 1.2$

It should be noted that the seismic design tool provided by the 2010 National Building Code of Canada considers only a *Site Class 'C' – Very Dense Soil and Soft Rock*, in determination of mapped acceleration parameters. Less competent materials were encountered in the geotechnical investigation of the subject site, and consequently, the spectral acceleration response values provided for this area are unconservative.

5.0 SUBSURFACE INVESTIGATION

The subsurface conditions on the subject site were investigated with two exploratory test pits. A location map of the test pits can be found within Appendix A of this document. This test pits were advanced with an excavator and extended to a maximum depth of 1.5 m below existing ground surface. Further suggestions of subsurface conditions and variations across the lot were obtained through hand probing and surficial observations conducted on the subject site. Detailed results of the subsurface investigation are presented on the attached Test Pit Log in Appendix B and a summary of the conditions encountered are provided in the following paragraphs.

5.1 Soil Stratigraphy

At the time of the investigation, two exploratory test pits were advanced within the area of proposed development.

Test Pit (TP)-01 was advanced approximately 17 m east of the northeast corner of the existing residence. The soils encountered during the excavation of TP-01 consisted of well graded granular fill which had particles sizes ranging from sand to cobble. TP-01 was advanced to a final depth of 1.5 m below ground surface. The fill material had increased moisture content with depth indicating that groundwater may be present beyond the final excavation depth. Although granular soils can wick moisture through capillary action, the client should be aware that saturated ground conditions could be a possibility while developing the lot.

TP-02 was advanced approximately 27 m east of the northeast corner of the existing residence. The subsurface conditions encountered while excavating TP-02 exposed similar granular fill as TP-01



extending to a depth of 1.0 m below ground surface which then transitioned into a layer of podzol. The layer of podzol was approximately 0.3 m thick which extended to 1.3 m below ground surface. The podzol was underlain by a coarse grained sand and gravel deposit. The sand and gravel had some residual organics. Groundwater was encountered at a depth of 1.5 m below ground surface. The final depth of excavation was 1.5 m below ground surface.

As the design of the structure was in its preliminary stages during the assessment, it was unknown whether the test pits were advanced within the building envelope. Should the test pit fall within the building envelope, the material should be re-excavated and backfilled utilizing vibratory equipment and tested in 0.3 m lift sequences. A Test Pit Location Map can be found within Appendix A. Detailed Test Pit Logs can be found within Appendix C.

WGC should be retained to review the subsurface conditions once excavation begins as outlined within Section 7.6 of this report.

5.2 Bedrock

The subject site lies within the Coastal Belt Tectonic Region of the Coastal Mountain Range in the Lower Mainland of British Columbia. This region is characterized by its steeply faulted sedimentary and metamorphic groups with intrusive and extrusive regions of igneous groups. The region has a multitude of accretionary complexes which are a result of plate progression and regression (Mathews & Monger, 2005). No bedrock was encountered at the time of the investigation. No bedrock was observed in the vicinity of the subject site. The subject site lies within an area of soils deposited within the Quaternary period (Clauge, 1989) (Massey, 2005).

5.3 Groundwater

During the subsurface investigation saturated soil conditions were exposed at a depth of approximately 1.5 m below ground surface within TP-02. Placing footings in saturated soil conditions can lower the allowable bearing capacity of the soils, and as such it is not recommended to seat footings at this depth. As groundwater conditions can change during seasonal fluctuations in weather patterns, any groundwater encountered during the time of construction should be reported to the geotechnical engineer without delay. Site drainage recommendations can be found within Section 7.3 of this report.

6.0 GEOHAZARD ASSESSMENT

In assessing hazards associated with the subject site, this report has used the 1993 paper *Hazard Acceptability Thresholds for Development Approvals by Local Government* by Dr. Peter W. Cave (Cave, 1993), acknowledged throughout British Columbia as a defining document in hazard assessment. The Cave Report details eight different geotechnical hazards that may pose a risk to a site. The eight hazards have been summarized in Table 1. A site is rarely exposed to all eight hazards. However, depending on location, it may be at risk from a combination of them.

As per the Cave Report, and the proposed new construction of a two level garage, the site was analyzed based on the criteria for *New Building*.



Table 1: Eight geotechnical hazards outlined in Cave Report.

Hazard	Definition
Inundation by Flood Waters (Oceanic Flooding)	Characterized by an unusually large volume of water flowing in a channel, a portion of which may flow overbank. Floods are associated with other hazards such as channel erosion and avulsion.
Mountain Stream Erosion and Avulsion	Characterized by the lateral migration of a stream channel (erosion) and/or the abandonment of the channel course to occupy a different position on the alluvial fan (avulsion). This type of hazard may be associated with large flow events.
Debris Flows and Debris Torrents	A rapid, channelized, fluid transport of water saturated debris. A debris flow path can be divided into an initiation zone, a transport and erosion zone, and a deposition zone. Transport often initiates within steep gullies and is conveyed downslope at high velocity which can damage forests and human development.
Debris Floods	A large flood event associated with an unusually high amount of sediment movement consisting of coarse bed load material and organic material such as trees and logs.
Landslides, Small-Scale, Localized	The sudden and rapid or gradual and incremental downslope movement of soil, rock, and other weathered materials.
Snow Avalanche	The sudden and rapid downslope movement of snow and ice. Avalanches develop large amounts of kinetic energy, damaging anything in its path
Rock Fall	The detachment of individual rock fragments from a steep slope and their gravitational downslope transport.
Landslides, Massive, Catastrophic	The sudden and rapid movement of unusually large amounts of soil, rock and other weathered materials.

6.1 Risk Analysis

The Cave Report describes the appropriate regulatory responses to development application for sites that are subject to geohazards. The regulatory response for a specific site is based on the applicable geohazards, the expected return period, and the scope of the proposed development. The Approval Responses range from 1 (approval should be granted without conditions relating to the hazards) to 5 (the site is not approvable); a summary of the Approval Responses is provided in Table 3.

Estimates of the annual return frequencies for the hazards are listed in Table 2. It is important to note that defining annual return frequencies and probabilities of occurrence in terms of quantitative values is complex. In accordance with standard geotechnical principles and practices, the estimation of these values is based on the observed site conditions, engineering judgment, and all the information available to WGC at the time the report was written. The estimated probabilities of occurrences are based on the estimated annual return frequencies described in the Cave Report.



Table 2: Estimated annual return frequency for geotechnical hazards.

Hazard	Return Frequency (years)	Approval Response
Inundation by Flood Waters	n/a	1
Mountain Stream Erosion/Avulsion	1 in 200	1
Debris Flows and Debris Torrents	1 in 500	1
Debris Floods	1 in 500	1
Landslides, Small-Scale, Localized (Static)	n/a	1
Landslides, Small-Scale, Localized (Dynamic)	n/a	1
Snow Avalanche	n/a	1
Rock Fall	n/a	1
Landslides, Massive, Catastrophic	n/a	1

Table 3: Hazard-related responses to development approval applications.

Approval Rating	Approval Response
1	Approval without conditions relating to hazards.
2	Approval, without siting conditions or protective works conditions, but with a covenant including "save harmless" conditions.
3	Approval, but with siting requirements to avoid the hazard, or with requirements for protective works to mitigate the hazard.
4	Approval as (3) above, but with a covenant including "save harmless" conditions as well as siting conditions, protective works or both.
5	Not approvable.

6.2 Debris Flood/ Debris Flow

The subject site falls within Development Permit Area (DPA) 1 within the Town of Gibsons Official Community Plan (OCP) (Gibsons, 2015). As depicted within the OCP, the subject site is within an area considered a low geotechnical hazard with relation to Charman Creek.

The subject site was screened for potential Debris Flow, Debris Flood, and Avulsion of Charman Creek. For a debris flow event to take place, the creek channel topography typically has an initiation zone greater than 25° and a transportation zone greater than 10° (VanDine, 1984). As per the 2006 report provided by Golder and Associates, Charman Creek has low stream gradients (<15%) and there is a low potential for the initiation of a debris flow. Shallow sidewall slope failure within the glacio-lacustrine silty clay is possible upstream at the confluence of the adjoining tributaries and 500 m downstream of the confluence in areas where localized erosion is occurring. Shallow sidewall failure is possible within these areas where a stable slope angle has not yet been achieved. This area is over steepened locally with the majority of the sidewalls situated at a stable slope angle. As this area is approximately 500 m northwest of the subject site, and the stream gradients aren't greater than 25°, there is a low probability of the subject site being affected by a debris flow. It is not expected that a debris flood would accumulate sufficient water that would breach the valley which has approximately 30 m of topographic relief. Any flooding of Charman Creek would most likely be localized and due to



seasonal changes in weather patterns. The creek is situated approximately 150 m north of the subject site, and won't necessitate a flood construction level. Avulsion of the creek is not expected due to the presence of relatively dense glacial till along the banks of the creek. An approval response of '1' is deemed appropriate for the above related hazards, which provides approval without conditions relating to hazard.

An approval response of '1' is deemed suitable for the flooding hazard from Charman Creek. This provides approval without conditions relating to hazard.

6.3 Gibsons Aquifer

The subject site lies within an area defined by the Town of Gibsons OCP as being subject to DPA 9. DPA 9 represents an area within lower Gibsons which is underlain by the Gibsons aquifer. The purpose of this DPA is to protect the town's water supply from the adverse effects of development. The town of Gibsons requires an application for the permit should development require construction and or excavation past the initial 1.5 m from ground surface. The subsurface investigation was extended to a maximum depth of 1.5 m below ground surface and did not encounter the aquifer or aquitard. A substantial organic horizon was encountered between 1.0 m and 1.3 m below ground surface within TP-02. Should this organic layer be encountered a depth of 1.5 m below ground surface during excavation, the development may require permitting and approval from the Town of Gibsons. The town should consider that the ground encountered within the initial 1.0 m from ground surface was unnatural as it was comprised of granular fill material. The Gibson's aquifer is not expected to have an impact on the development of the two level garage, and the development is not expected to have an affect the aquifer.

7.0 DISCUSSION AND RECOMMENDATIONS

7.1 Site Preparation

The subsurface investigation exposed a 0.3 m thick layer of podzol between 1.0 m and 1.3 m below ground surface. Groundwater was encountered at a depth of 1.5 m below ground surface within TP-02. It is recommended that the development have a minimum excavation depth of 1.3 m below ground surface and conditions should be confirmed by the geotechnical engineer. The areas can then be subsequently backfilled with approved engineered fill.

A substantial organic layer was exposed within TP-02 at a depth of 1.0 m below ground surface and extended to a final depth of 1.3 m below ground surface. This material should be removed from the building envelope at the onset of development. In addition an organic veneer can be expected in areas where the removal of trees and shrubs is necessary for the development of the lot. Where encountered, such material should be appropriately removed at the onset of development and backfilled with clean native soils or engineered fill.

All construction surfaces should be properly stripped as required to locally remove any surface vegetation and weeds that may be present, as well as all loose, soft, saturated, and deleterious material to expose dense soils in all locations. Prior to the placement of any structural fill, all organic



material including topsoil, roots, rootlets, podzol, and other deleterious materials should be removed beneath the final footing grade.

The on-site native fill encountered within the initial 1.0 m of TP-02 could be used as bulk fill or subgrade backfill to reestablish footing grade provided the following recommendations are followed:

- All organics, loose, soft, and deleterious materials are removed from the soil matrix;
- All particles greater than 75 mm are removed from the soil matrix;
- The material is compacted in 0.3 m lift sequences and tested by a WGC representative

All imported structural fill and native material should be compacted to 98 % Standard Proctor Density, or 100% Control Strip Density and tested in 0.3 m lift sequences. Footing subgrades should be reviewed and approved by the geotechnical engineering prior to the placement of formwork.

Water collected in the excavation during construction must be properly conveyed and discharged in accordance with local bylaws and environmental regulations.

7.2 Footings and Slabs on Grade

The recommended foundation type for the garage and/ or carriage house on the subject site is continuous concrete strip footings. These strip footings should be designed to provide the required resistance to factored structural loads. Strip footings should be designed with a minimum footing width of 450 mm. Where pad footings are required, pad footings should be designed with a minimum footing width of 600 mm.

Footings should be placed a minimum of 450 mm below surface for frost protection requirements. It is essential that all footings be placed on clean structural fill, native fill, or dense native soils approved by the geotechnical engineer. Slabs should be appropriately reinforced according to structural requirements using reinforcing bar only, instead of wire mesh; concentrated loads and special conditions may require additional reinforcing.

The allowable bearing capacity may be considered 75 kPa for footings placed on recycled fill or engineered fill. This represents a Serviceability Limits States resistance value based on reasonable subsidence in the proposed structure of no more than 25 mm depth over 6.25 m length. The Geotechnical Resistance Factor used to determine this value was 0.5. The above values are provided in compliance to the Canadian Foundation Engineering Manual (2012).

7.3 Site Drainage

Perimeter drains should be constructed as close as practical to any foundational elements, and should consist of a minimum 100 mm diameter perforated drain pipe, bedded in 19 mm clean, open-graded drain rock. The entire drain rock/pipe unit should be wrapped in an approved non-woven, polyester geotextile. In addition, the drainage trench should have a minimum width of 300 mm and the drain rock and fabric should extend to within 300 mm of the finished grade. The entire drainage system should be sloped at a minimum gradient of 2 % and should be conveyed to suitable discharge facilities.



The high end of the system and all 90 degree bends of the perimeter drain pipe should be connected to closed (non-perforated) vertical risers which extend to the surface and act as a cleanouts. The number of required cleanouts can be reduced by using sweep-90's or double 45-degree elbows at corners. All rainwater collected on the roof of the buildings should be transported through gutters, downspouts and closed pipes and should similarly be conveyed to appropriate discharge facilities.

7.4 Retaining Walls and Excavation/Trenching

The maximum height of a retaining wall without an engineered design is 1.2 m. Retaining walls over 1.2 m in height require an engineered design. Our office can provide design recommendations and permitting documents for retaining walls that may be required for this property upon request.

Worksafe BC Guidelines for stable excavations should be followed where excavation is required and exceeds a depth of 1.2 m. The Geotechnical Engineer should be notified in advance to review the excavation plan if Worksafe BC Guidelines cannot be adhered to due to site restrictions.

7.5 Field Review

The conclusions and recommendations presented in this report are given with the understanding that this office will be retained to provide any required design consultations and to review the geotechnical engineering aspects of the final project plans, including all foundation and retaining wall plans as well as those required for site drainage installations. In addition, for the conditions in this report to be considered accurate, our office must be provided the opportunity to provide field inspections during construction, including, but not limited to:

- Site clearing, site preparation, and grading;
- Temporary construction dewatering (if required);
- Foundation excavation and subgrade review;
- Compaction of engineered fill and backfill review; and,
- Drainage installation and permanent site dewatering.



8.0 CONSTRAINTS AND LIMITATIONS

The recommendations in this report are provided on the assumption that the contractor will be suitably qualified and experienced. In the event of report revisions, additional funds may be required. Stratigraphic variations in ground conditions are expected due to its depositional nature. As such, all explorations involve an inherent risk that some conditions will not be detected.

No other warranty, expressed or implied, is made. If the project does not start within two years of the report date, the report may become invalid and further review may be required. This report has been prepared for the exclusive use of Ian Trickett and his "Approved Users". WGC and its employees accept no responsibility to any other party for loss or liability incurred as a result of use of this report. Any use of this report for purposes other than the intended should be approved in writing by WGC. Contractors should rely upon their own explorations for costing purposes.

This report is based on the information provided by the client and/or the client's consultant. WGC cannot accept responsibility for inaccuracies, misstatements, omissions and/or deficiencies in this report resulting from the sources of this information. This report assumes that WGC will be retained to review the geotechnical conditions during construction.

9.0 CLOSURE

We trust that the information provided in this report meets the project requirements at this time. Please feel free to contact our office with any questions, concerns, or comments.

Best Regards,
Western Geotechnical Consultants Ltd.

Richard Creagan BSc
Engineering Technician



Benjamin A. Smale PEng BEng
Principal | Geotechnical Engineer



10.0 REFERENCES

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Geotechnical Assessment
623 Gower Point Road, Gibsons, British Columbia

February 21, 2017
Project No.: WG2-0598

APPENDIX A

Project Drawings



SCRD Maps

Property Report

623 GOWER POINT RD

2/21/2017

Folio: 524.00119.000 PID: 010-917-128

Address: 623 GOWER POINT RD

Jurisdiction: Gibsons

Lot: 7

Block:

Plan: VAP6318

District Lot: 685

2015 Assessed Value: 417000

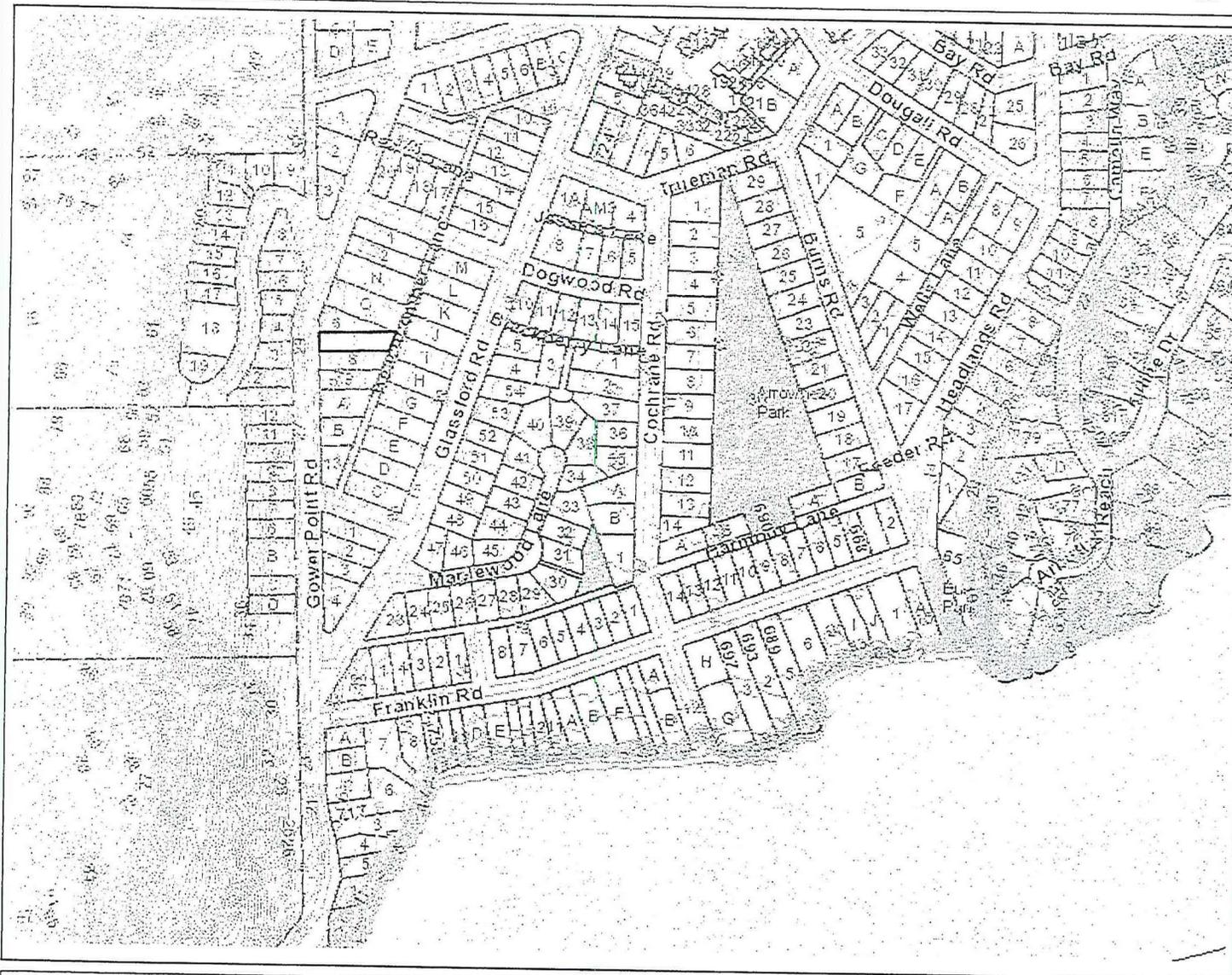
Land Value: 312000

Improvement Value: 105000

Approximate Lot Size (BC Assessment): 9583 SQUARE FEET



Vicinity Map



Legend

- Contours
- Parcel Boundaries
- Jurisdiction
- Golf Courses
- Parks**
 - SCRD Park
 - Recreation Site
 - Municipal Park
 - Provincial Park
 - Wharf
 - Cemetery
- Band Lands

359.6 0 179.30 359.6 Meters

This information has been compiled by the Sunshine Coast Regional District (SCRD) using data derived from a number of sources with varying levels of accuracy. The SCRD disclaims all responsibility for the accuracy or completeness of this information.



2/21/2017
1:7,079

Test Pit Locations



Legend

- Parcel Boundaries
- World Imagery
- Low Resolution 15m Imagery
- High Resolution 60cm Imagery
- High Resolution 30cm Imagery
- Citations
- Jurisdiction
- Roads
 - Highway
 - Roads
- Golf Courses
- Parks
 - SCRD Park
 - Recreation Site
 - Municipal Park
 - Provincial Park
 - Wharf
 - Cemetery
- Band Lands

45.0 0 22.48 45.0 Meters

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2/21/2017
1:885



Geotechnical Assessment
623 Gower Point Road, Gibsons, British Columbia

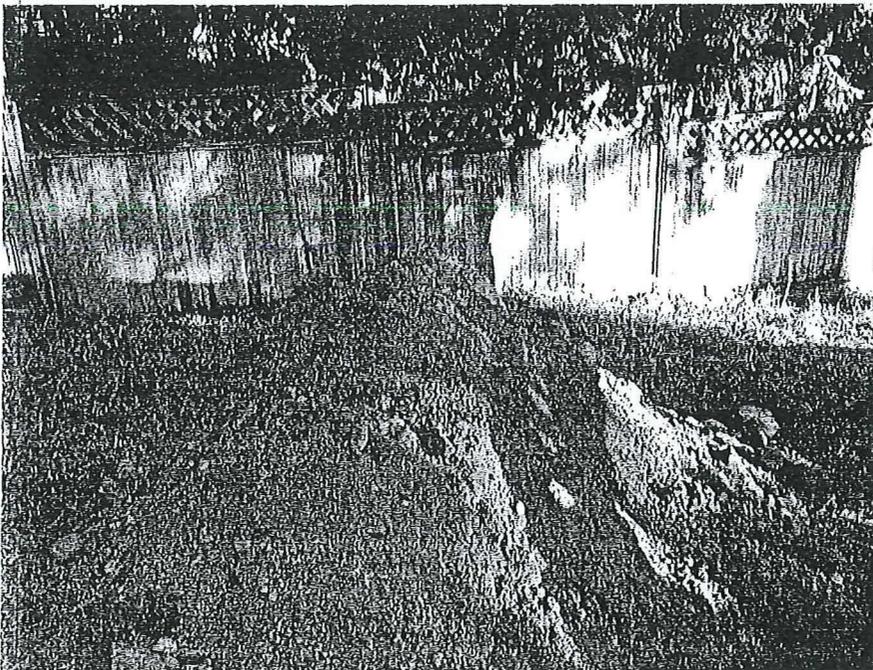
February 21, 2017
Project No.: WG2-0598

APPENDIX B

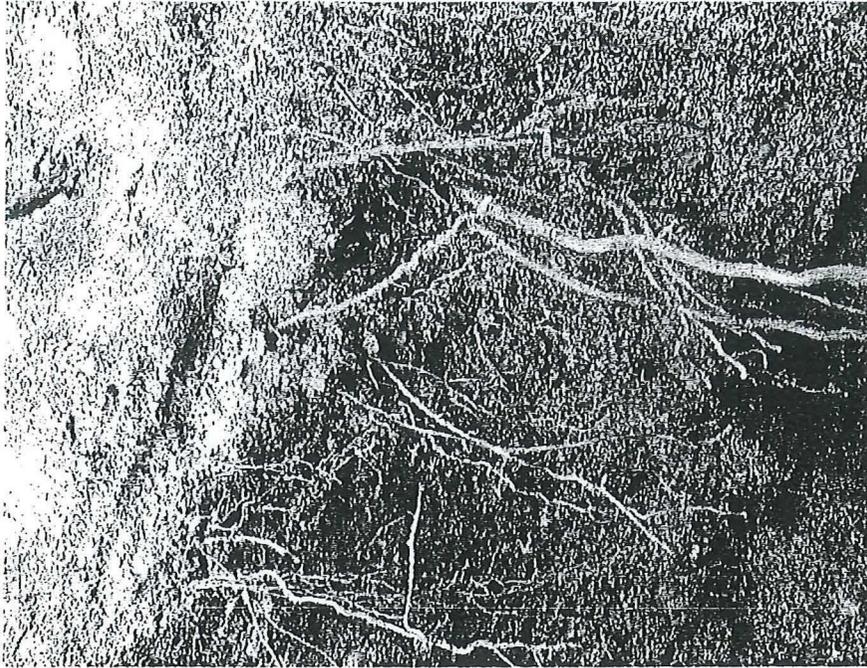
Project Photographs



Photograph 1: Area of proposed development.



Photograph 2: Relatively clean fill found within the initial 1.0 m of excavating TP-02.



Photograph 3: Layer of podzol encountered at a depth of 1.0 m below ground surface within TP-02.



Photograph 4: Notable organics layer exposed within TP-01 which should be appropriately removed.



APPENDIX C

Test Pit Logs



Western Geotechnical Consultants Ltd.
 #4-1877 Field Road (PO Box 624)
 Sechelt, BC, V0N 3A0
 Telephone: 604.740.0920

TEST PIT NUMBER TP-01

CLIENT [REDACTED] PROJECT NAME 623 GOWER POINT ROAD
 PROJECT NUMBER WG2-0598 PROJECT LOCATION GIBSONS, BC
 DATE STARTED 06/12/16 COMPLETED 06/12/16 GROUND ELEVATION 22 m TEST PIT SIZE 1.5 m W x 2 m L
 EXCAVATION CONTRACTOR ROY POLLOCK GROUND WATER LEVELS:
 EXCAVATION METHOD EXCAVATOR AT TIME OF EXCAVATION ---
 LOGGED BY RC CHECKED BY BAS AT END OF EXCAVATION ---
 NOTES 17 m east of NE corner of existing residence AFTER EXCAVATION ---

DEPTH (m)	DCPT BLOW COUNTS (N60 VALUE)	SAMPLE TYPE NUMBER	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION
0.5			SW		Fill/Disturbed Ground - Sand, fine to coarse grained, and gravel, some cobbles, some boulders, some silt, mottled strong brown and grey, non-plastic, non-dilatant, slightly moist, loose to medium dense - moist at 1.4 m below ground surface
1.0		GB			
		GB			
1.5		GB			
20.50					Bottom of test pit at 1.50 m.
20.50					



Western Geotechnical Consultants Ltd.
 #4-1877 Field Road (PO Box 624)
 Sechelt, BC, V0N 3A0
 Telephone: 604.740.0920

TEST PIT NUMBER TP-02

PAGE 1 OF 1

CLIENT [REDACTED] PROJECT NAME 623 GOWER POINT ROAD
 PROJECT NUMBER WG2-0598 PROJECT LOCATION GIBSONS, BC
 DATE STARTED 06/12/16 COMPLETED 06/12/16 GROUND ELEVATION 20 m TEST PIT SIZE 1.5 m W x 2 m L
 EXCAVATION CONTRACTOR ROY POLLOCK GROUND WATER LEVELS:
 EXCAVATION METHOD EXCAVATOR ∇ AT TIME OF EXCAVATION 1.50 m / Elev 18.50 m
 LOGGED BY RC CHECKED BY BAS AT END OF EXCAVATION ---
 NOTES 27 m east of NE corner of existing residence AFTER EXCAVATION ---

DEPTH (m)	DCPT BLOW COUNTS (N60 VALUE)	SAMPLE TYPE NUMBER	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION
0.5		GB	SW		<u>Fill/Disturbed Ground</u> - Sand, fine to coarse grained, and gravel, some cobbles, some boulders, some silt, mottled strong brown and grey, non-plastic, non-dilatant, slightly moist, loose to medium dense
1.0		GB	OL		19.00 <u>Podzol</u> - Silt, some sand, some medium sized woody roots, trace clay, dark brown, slightly plastic, non-dilatant, moist, loose 19.00
1.5		GB	SW		18.70 <u>Sand and Gravel</u> - Sand, medium to coarse grained, and gravel, some cobbles, trace boulders, trace silt, grey, non-plastic, non-dilatant, medium dense, moist to wet with depth, medium dense 18.70
		GB			18.50 ∇ - wet at 1.5 m below ground surface 18.50

Bottom of test pit at 1.50 m.



Geotechnical Assessment
623 Gower Point Road, Gibsons, British Columbia

February 21, 2017
Project No.: WG2-0598

APPENDIX D

Standard Limitations

STANDARD LIMITATIONS



1. **General:** *Western Geotechnical Consultants Ltd. (WESTERNGEO)* shall render the Services, as specified in the attached Scope of Services, to the client for this Project in accordance with the following terms of engagement. WESTERNGEO may, at its discretion and at any stage, engage sub-consultants to perform all or any part of the Services.
2. **Representatives:** Each party shall designate a representative who is authorized to act on behalf of that party and receive notices under this Agreement.
3. **Authorization to Proceed:** Ordering of work over the telephone or by written instructions will serve as authorization for WESTERNGEO to proceed with the services called for in this proposal and agreement with the terms. This Agreement, including attachments incorporated herein by reference, represents the entire agreement between WESTERNGEO and Client. This Agreement may be altered only by written instrument signed by authorized representatives of both Client and WESTERNGEO.
4. **Extent of Agreement:** Work beyond the scope of services or redoing any part of the project through no fault of WESTERNGEO, shall constitute extra work and shall be paid for on a time-and-materials basis in addition to any other payment provided for in this Agreement. If, during the course of performance of this Agreement, conditions or circumstances are discovered which were not contemplated by WESTERNGEO at the commencement of this Agreement, WESTERNGEO shall notify Client in writing of the newly discovered conditions or circumstances, and Client and WESTERNGEO shall renegotiate, in good faith, the terms and conditions of this Agreement.
5. **Compensation:** Charges for the Services rendered will be made in accordance with WESTERNGEO Schedule of Fees and Disbursements in effect from time the services are rendered. WESTERNGEO Schedule of Fees and Disbursements are included in WESTERNGEO Budget Estimate. All charges will be payable in Canadian Dollars. WESTERNGEO shall invoice the Client on a monthly basis for the services performed under this Agreement and shall provide a monthly summary of costs to date. The Client shall pay such invoice upon receipt. Invoices not paid within thirty (30) days of the invoice date shall be subject to a late payment charge of 1.5 percent per month (18% per annum) from date of billing until paid. The invoice amounts shall be presumed to be correct unless Client notifies WESTERNGEO in writing within fourteen (14) days of receipt. Overdue accounts over 90 days will be forwarded to a collections agency.
6. **Probable Costs:** WESTERNGEO does not guarantee the accuracy of probable costs for providing Engineering Services. Such probable costs represent only WESTERNGEO judgment as a Professional and are supplied only for the general guidance of the Client.
7. **Standard of Care:** WESTERNGEO shall perform its services in a manner consistent with the standard of care and skill ordinarily exercised by members of the profession practicing under similar conditions in the geographic vicinity and at the time the services are performed. This Agreement neither makes nor intends a warranty or guarantee, expressed or implied.
8. **Indemnity:** Client waives any claim against WESTERNGEO, its officers, employees and agents and agrees to defend, indemnify, protect and hold harmless WESTERNGEO and its officers, employees and agents from any and all claims, liabilities, damages or expenses, including but not limited to delay of the project, reduction of property value, fear of or actual exposure to or release of toxic or hazardous substances, and any consequential damages of whatever nature, which may arise directly or indirectly, to any party, as a result of the services provided by WESTERNGEO under this Agreement, unless such injury or loss is caused by the sole negligence of WESTERNGEO.
9. **Limitation of Liability:** Client agrees to limit WESTERNGEO and its officers, employees, and agents liability due to professional negligence and to any liability arising out of or relating to this Agreement to Fifty Thousand Dollars (\$50,000) or the amount of WESTERNGEO fee, whichever is less. This limit applies to all services on this project, whether provided under this or subsequent agreements, unless modified in writing, agreed to and signed by authorized representatives of the parties. No claims may be brought against WESTERNGEO in contract or tort more than two (2) years after Services were completed or terminated under this engagement. Note: WESTERNGEO will not be responsible for water ingress related problems as our insurance policy contains an Absolute Water Ingress Exclusion.
10. **Additional Limits:** For special projects, higher liability limits are available from our underwriter for an additional fee.
11. **Insurance:** WESTERNGEO warrants it is protected by WorkSafe BC Insurance, General Liability Insurance, Professional Errors and Omissions Insurance, and Automobile Liability Insurance. Certificates for such policies of insurance shall be provided to the Client upon request.
12. **Responsibility:** WESTERNGEO is not responsible for the completion or quality of work that is dependent upon or performed by the Client or third parties not under the direct control of WESTERNGEO, nor is WESTERNGEO responsible for their acts or omissions or for any damages resulting therefrom. WESTERNGEO shall not be responsible for:
 - a. The failure of a contractor, retained by the Client, to perform the work required for the Project in accordance with the applicable contract documents;
 - b. The design of or defects in equipment supplied or provided by the Client for incorporation into the Project
 - c. Any cross-contamination resulting from subsurface investigations;
 - d. Any damage to subsurface structures and utilities which were identified and located by the Client;
 - e. Any Project decisions made by the Client if the decisions were made without consultation of WESTERNGEO or contrary to or inconsistent with WESTERNGEO recommendations;
 - f. Any consequential loss, injury, or damages suffered by the Client, including but not limited to loss of use, earnings, and business interruption; and,

STANDARD LIMITATIONS



- g. The unauthorized distribution of any document or report prepared by or on behalf of WESTERNGEO for the exclusive use of the Client.
13. **Exclusive Use:** Services provided under this Agreement, including all reports, information or recommendations prepared or issued by WESTERNGEO, are instruments of service for the execution of the Project. WESTERNGEO retains the property and copyright in these documents, whether the Project is executed or not. No other use of these documents is authorized under this Agreement without the prior written agreement of WESTERNGEO.
 14. **Samples:** All non-consumed samples shall remain the property of the Client, and Client shall be responsible for and promptly pay for the removal and lawful disposal of samples, cuttings and hazardous materials, unless otherwise agreed in writing. If appropriate, WESTERNGEO shall preserve samples obtained for the project for not longer than thirty (30) days after the issuance of any document that includes the data obtained from those samples.
 15. **Environmental:** WESTERNGEO's field investigation, laboratory testing and engineering recommendations will not address or evaluate pollution of air, soil and/or groundwater, unless otherwise specifically listed in the attached Scope of Services. WESTERNGEO will co-operate with the Client's environmental consultant during field work phase of the investigation.
 16. **Field Services:** Where applicable, field services recommended for the Project are the minimum necessary, in the sole discretion of WESTERNGEO, to review whether the work of a contractor retained by the client is being carried out in general conformity with the intent of the Services. Any reduction from the level of services recommended will result in WESTERNGEO not providing qualified certifications for the work.
 17. **Termination:** This Agreement may be terminated by either party upon ten (10) days written notice to the other. In the event of a termination, the Client shall pay for all reasonable charges for work performed and demobilization by WESTERNGEO to the date of notice of termination. The limitation of liability and indemnity obligations of this Agreement shall be binding notwithstanding any termination of this Agreement.
 18. **Dispute Resolution:** If requested in writing by either the Client or WESTERNGEO, the Client and WESTERNGEO shall attempt to resolve any dispute between them arising out of or in connection with this Agreement by entering into structured, non-binding negotiations with the assistance of a mediator on a without prejudice basis. The mediator shall be appointed by agreement of the parties. If a dispute cannot be settled within a period of thirty (30) calendar days with the mediator, the dispute shall be referred to and finally resolved by arbitration under the rules of British Columbia or by an arbitrator appointed by agreement of the parties or by reference to a Judge of the Supreme Court of British Columbia.
 19. **Governing Law:** This Agreement is governed by the law British Columbia, and any litigation shall be brought and tried in, the judicial jurisdiction of the WESTERNGEO office that entered this Agreement, as stated herein.
 20. **Non-Solicitation:** The Client agrees they shall not recruit for employment or hire any WESTERNGEO employees who provide services pursuant to this Agreement during the term of this Agreement and for a period of one (1) year following its termination.