



# DEVELOPMENT PERMIT

NO. DP- 2018-29 (Geotech)

TO: **Joann Hetherington**

ADDRESS: **554 Marine Drive  
Gibsons, BC  
V0N 1V1**

(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: 007-108-982**  
**Legal Description: LOT H BLOCKS D, H AND J DISTRICT LOT 686 PLAN 18689**  
**Civic Address: 554 Marine Drive, Gibsons, BC**

(Lands)

- 3) These lands are within Development Permit Areas of the Town of Gibsons Official Community Plan (Bylaw 985, 2005). This permit applies to Development Permit Area No. 1 (Geotechnical Hazards) for the purpose of protection of development from flooding and the ocean shoreline.
- 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:
  - Letter, dated December 11, 2018, by Western Geotechnical Consultants Ltd., stamped by Percy Villa, P.Eng., Geotechnical Engineer.
- 5) All requirements of the letter are to be followed. On site monitoring by the Geotechnical Engineer during construction as outlined in the letter is required.
- 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) Upon completion of the works, a letter from a qualified professional is required to confirm all conditions of this permit were met.

9) This Permit is NOT a Building Permit.

ISSUED THIS 2<sup>nd</sup> DAY OF January , 2019 .



---

Lesley-Ann Staats, MCIP, RPP  
Director of Planning

Copy of permit to the Geotechnical Engineer

December 11, 2018

Project No.: WG2-0818

Joann Hetherington  
554 Marine Drive, Gibsons, British Columbia  
t: 604.886.2551 e: casajoanna3@gmail.com



**Re: GEOTECHNICAL ASSESSMENT**  
**Deck Renovation at 554 Marine Drive, Gibsons, B.C.**

Western Geotechnical Consultants Ltd. (Western Geo) presents the following document providing geotechnical assessment for the proposed renovation works of existing deck at the referenced property. The intent of this letter is to provide our client and key stakeholders, including the Town of Gibsons, with specific information regarding the identification of potential geotechnical hazards that could affect the serviceability of the proposed structure and recommendation of measures to mitigate their effect, if applicable.

***Based on our site reconnaissance and desktop study of the property at 554 Marine Drive in Gibsons, BC, it is our opinion there are no reasonably conceivable geotechnical issues that would preclude the planned renovation of existing deck. Consequently, the proposed deck location can be considered safe for the use intended, provided our recommendations are followed.***

It should be noted that the scope of this assessment included the existing deck area only. We understand that the existing residence was already grandfathered by the Town of Gibsons. This assessment did not include any evaluation of environmental hazards or contamination that may be present on or near the site. A hand-auger borehole was completed at the site to a depth of 1.10 m to have a better understanding of surficial soil conditions.

**METHODOLOGY:**

A reconnaissance level site investigation was conducted by a Western Geo representative at the subject site on November 29, 2018. The investigation included a visual inspection of local topography, coastal morphology, geology, vegetation, surface water, subsurface conditions, and groundwater conditions.

Following the site investigation, a desktop study was performed which included the available background information such as published surficial geology maps, satellite imagery, available subsurface information, and information provided by the client.

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

Alberta Locations:  
Calgary





### SITE DESCRIPTION AND PROPOSED RENOVATION:

The site is located at 554 Marine Drive in Gibsons, British Columbia. The site is rectangular in shape and is about 30.5 m in length and 15.3 m in width, encompassing an area of approximately 464 m<sup>2</sup>. The site is bounded by developed residential parcels to the northeast and southwest, Marine Drive to the northwest, and by the Heritage Walk Trail to the southeast. Access to the site is via Marine Drive.

An existing residence is located approximately at the centre of the lot. We understand that our client is planning to replace the wooden structure of the existing deck using the same footprint. No additional building area will be used. The location of the site with existing structures is shown in Figures 1 to 3 below.



Fig 1: Location of existing residence and proposed deck renovation.



**Fig 2: Existing deck to be renovated.**



**Fig 3: Southeast elevation of existing residence.**

The site presents a gentle slope from the northwest down to the southeast of about 5% at the entrance of the property at Marine Drive for about 2.5 m. The topography then transitions to a moderately steep slope of about 55% for 10 m and finally a plain slope of about 4% for the last 3.0 m down to the southeastern property line. The vegetation at the site consists of landscaping varieties such as lawn, herbs, and decorative trees.

#### **SUBSURFACE CONDITIONS:**

Geology maps available indicate that the area is underlain by Capilano sediments, consisting of marine and glacio-marine deposits: varied gravelly, sandy, stoney, clay, and clay veneer, normally over till.

Based on our site reconnaissance observations and a 1.10 m depth exploratory hand-auger borehole completed nearby the deck, the site at the deck area is underlain by about 0.30 m of topsoil followed by loose to compact dark brown sand, some gravel. The sand becomes gravelly and more compacted at 1.00 m depth. No groundwater was detected during the borehole exploration; however, we expect groundwater table to vary seasonally and affected by oceanic tides.

**GEOHAZARD ASSESSMENT:**

A qualitative review of potential geohazards was conducted at the site using the 1993 paper *Hazard Acceptability Thresholds for Development Approvals by Local Government*, by Dr. Peter W. Cave. The Cave report identifies eight distinct geotechnical hazards that may pose a risk to a site. The geotechnical hazards are summarized in Table 1 below. Due to its coastal location, the proposed deck upgrade presents evidence for susceptibility of inundation by flood waters.

**Table 1: Relevant Geotechnical Hazards.**

Hazard	Definition
Inundation by Flood Waters	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.

In addition, the site falls within the DPA No 1 outlined on the Town of Gibsons' Official Community Plan. It is described as "low geotechnical hazard" (please refer to Fig 4). As such, the site was analyzed for the potential of inundation by oceanic waters.

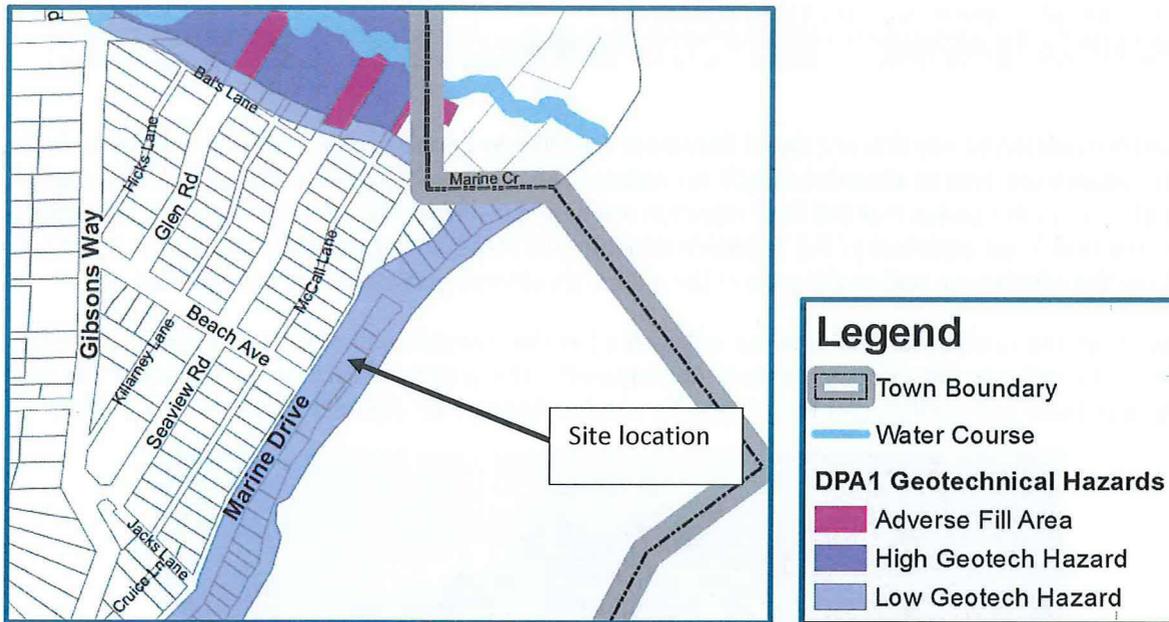


Fig 4: Town of Gibsons' DPA map and site location

**Inundation by Oceanic Waters and Coastal Erosion:**

The subject site is a coastal parcel and the southeastern portion of the lot is prone to influence by the oceanic waters of the Shoal Channel.

The subject site was analyzed for susceptibility to hazard from oceanic flooding using the criteria outlined in the document *Guidelines for Management of Coastal Flood Hazard Land Use* (January 2011) by Ausenco-Sandwell. This document provides criteria that can be used to determine a Flood Construction Level (FCL) which in turn can be used during design. The FCL is used as a basis for the proposed development as required to mitigate the effect that flooding may have on permanent structural components.

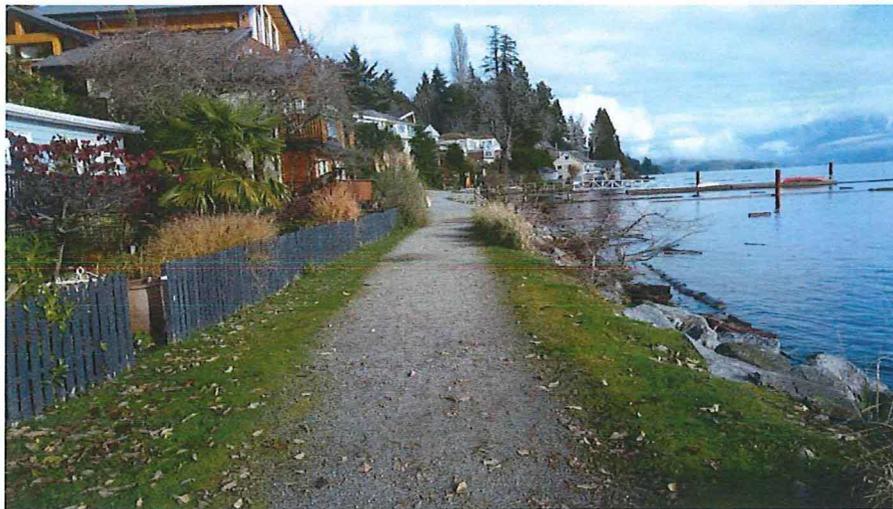
The FCL has been estimated considering the five parameters outlined in the Ausenco-Sandwell document. The effect of these parameters should be added to the actual higher high-water large tide (HHWLT) to determine the FCL, as shown on Table 2 below.

**Table 2: Estimated Flood Construction Level (FCL).**

Global Sea Level Rise Allowance	0.80 m
Regional Adjustment	-0.20 m
Storm Surge	1.15 m
Wave Effect	0.50 m
Freeboard	0.60 m
HHWLT (Geodetic elevation from the Canadian Hydrographic Service, station 7820 in Gibsons)	2.03 m
FCL in Geodetic elevation	<b>4.88 m</b>

Based on updated survey drawing dated December 11, 2018 by Bennett Land Surveying Ltd, the deck of the residence presents an elevation of 4.07 m geodetic. The deck can be considered a recreational space, therefore it is our opinion that the floor elevation can be slightly lower than the estimated FCL, provided the structure is not attached to the residence structure. Likewise, the actual horizontal setback of 11.0 m from the existing sea wall to the edge of the deck is considered acceptable for the intended use.

In addition, the existing stacked rock sea wall located at the shoreline will provide an additional line of defense to mitigate any oceanic erosion. Consequently, the proposed deck to be upgraded can be considered safe and stable under the 1/100-year oceanic flood event. Figure 5 shows existing sea wall.



**Fig 5: Existing gravel trail and sea wall.**

**DISCUSSION:**

As indicated above, the proposed renovation will occupy the same existing deck footprint. Although the original idea was to use the existing pedestal footings to support the renovated deck, we recommend to construct new footings that should be supported on the compact gravelly sand observed at 1.0 m depth during our site investigation. The design of new footings should consider an estimated soil bearing capacity of 100 kPa serviceability limit state (SLS).

## DESIGN RECOMMENDATIONS:

### Site Preparation:

After demolition of existing structures, any surface vegetation, as well as loose, soft, saturated, and deleterious material should be removed in order to expose competent native soil in the area of proposed development. Footing subgrades must be reviewed and approved by the geotechnical engineer prior to the placement of footings.

### Seismicity:

The site may be classified as Site Class C as defined in Table 4.1.8.4.A of the 2012 British Columbia Building Code. Peak ground acceleration on firm ground for the approximate site location is 0.363g (Natural Resources Canada, site coordinates: 49.4044 degrees North, 123.5022 degrees West).

### Foundations and Bearing Capacity:

We expect that new footings can be placed on the compact gravelly sand observed in our hand-auger borehole at 1.0 m depth. Footings can be designed using a serviceability limit state (SLS) bearing pressure of 100 kPa and a factored ultimate limit state (ULS) bearing pressure of 150 kPa. The settlement of foundations designed as recommended should be within the normally acceptable limits of 25 mm maximum and up to about 20 mm differential over a 10 m span.

### Field Reviews:

The conclusions and recommendations presented in this letter 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 plans. 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;
- Foundations excavation and subgrade review.

Field reviews should be requested by the client or client's representative at least 2 days before each review is required. A Schedule C-B will not be issued if field reviews are not conducted.

**CLOSURE:**

We hope that this letter addresses the information that our client and the Town of Gibsons require for the building permit application. If any further information is required, please do not hesitate to contact our office.

Sincerely,  
**Western Geotechnical Consultants Ltd.**



Percy Villa, P. Eng.  
Geotechnical Engineer

2018-12-11



## APPENDIX A: DRAWINGS





# SCRD Maps

---

## Property Report

### 554 MARINE DR

---

12/11/2018

Folio: 524.00707.001      PID: 007-108-982

Address: 554 MARINE DR

Jurisdiction: Gibsons

Lot: H

Block: D,H,J

Plan: VAP18689

District Lot: 686

2018 Assessed Value: 1232000

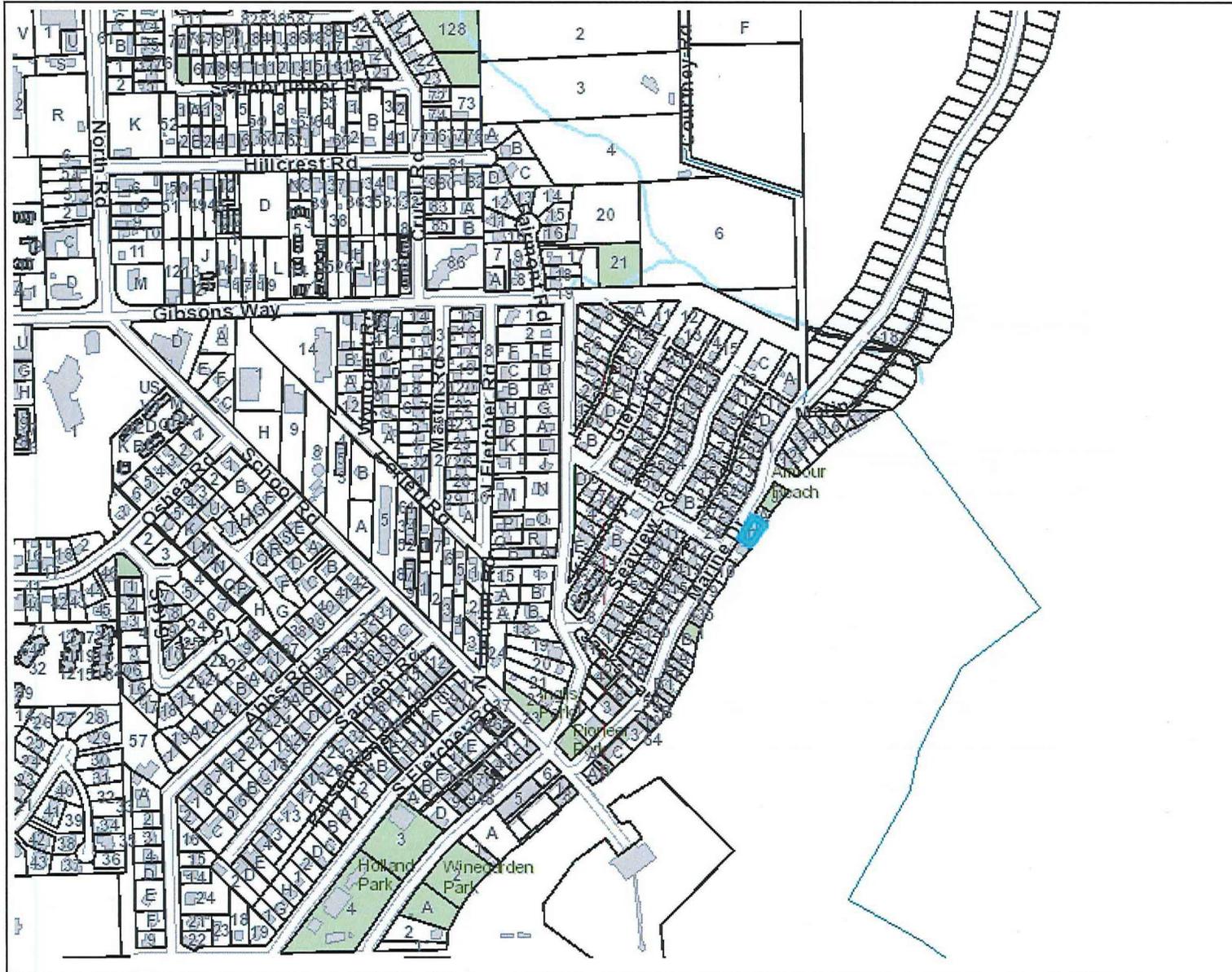
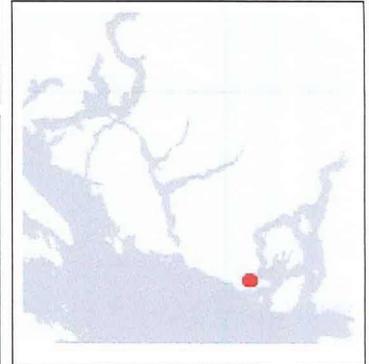
Land Value: 1025000

Improvement Value: 207000

Approximate Lot Size (BC Assessment): 5000 SQUARE FEET

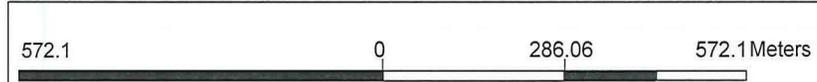


# 554 Marine Drive, Gibsons, BC Vicinity Map



### Legend

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



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.



12/11/2018  
1: 11,262

