STAFF REPORT

File No.: PL-RZ-2025-0138 (Seward)

DATE OF MEETING:	January 22, 2026
TO:	Gabriola Island Local Trust Committee
FROM:	Stephen Baugh, Island Planner Northern Team
SUBJECT:	Bylaw Amendment Application – PL-RZ-2025-0138 (Seward) Applicant: Toby Seward Location: 1900 Stalker Road, Gabriola Island

RECOMMENDATION

1. **That the Gabriola Island Local Trust Committee request staff to draft bylaw amendments for 1900 Stalker Road, Gabriola Island to create a site-specific zone that would permit three dwellings with limited floor area, limit the floor area of accessory buildings, and maintain the 8 hectare minimum average lot size for subdivision.**

2. **That the Gabriola Island Local Trust Committee request staff to send an early referral to Snuneymuxw First Nation and the Regional District of Nanaimo.**

3. **That the Gabriola Island Local Trust Committee request the following information from the applicant in advance of consideration of First Reading:**

    a) **A survey by a Wetland Specialist that takes place within the "wet season" to confirm the presence and boundaries of or absence of a wetland, seep or seasonally wet habitat; and an assessment by a qualified professional of the potential impact of any new well to any confirmed adjacent wetlands on the subject property.**
    b) **An inspection report from a Registered Onsite Wastewater Specialist to certify that the sewage disposal systems are functioning properly and can in their current condition support the existing dwellings.**
    c) **A survey by an appropriately qualified expert to be completed during the active period for the Moss' elfin (red-listed butterfly) (spring/early summer) to confirm likely presence/absence.**

4. **That the Gabriola Island Local Trust Committee request the following information from the applicant in advance of consideration of bylaw adoption:**

    a) **Confirmation that installation of any new well is greater than 100 metres from the shoreline.**
    b) **A report from a registered hydrogeologist showing the results of a constant rate pumping test in the new well.**
    c) **The results of a water quality test for bacteriological, routine chemical parameters, and chloride including recommendations from a qualified pump installer for groundwater filtration and treatment.**
    d) **Confirmation that the proposed transfer of property to BC Parks is completed.**

5. **That the Gabriola Island Local Trust Committee request the applicant for PL-RZ-2025-0138 (Seward) enter into a cost recovery agreement with Islands Trust for legal services to prepare a draft Section 219 covenant with requirements:**

    a) **that forested areas and archaeological features are protected from ground disturbance, vegetation clearing or new development; and**
    b) **that invasive plant species on the subject property are removed and the area replanted following recommendations from a registered professional biologist, with the work to be completed within a reasonable timeframe.**

REPORT SUMMARY

This report provides an overview of bylaw amendment application PL-RZ-2025-0138 (Seward) including rationale for the application, overview of supporting documentation received, site context, policy review, and staff recommendations.

This application proposes to amend the Gabriola Island Official Community Plan (OCP) and Gabriola Island Land Use Bylaw (LUB) to permit a three lot strata lot subdivision at 1900 Stalker Rd.

Staff recommends the Gabriola Island Local Trust Committee (LTC) proceed with bylaw amendments to permit the existing dwellings by zoning and that the proposed subdivision not be supported, that an early referral of the application be referred to Snuneymuxw First Nation, request the applicant provide additional supporting information, and that the applicant enter a cost recovery agreement with the Islands Trust for preparation of a draft covenant.

BACKGROUND

This application proposes to amend both the OCP and LUB to facilitate a bare-land strata subdivision of the subject property into three lots to correspond to the location of three existing dwellings that have been on the property since 1971. The owners are also proposing a covenant on title to limit the future development on the lot, protect specific areas of the property, commit to the removal and ongoing eradication of invasive Scottish Broom vegetation, and ensure the follow through of the donation of a portion of the property to the adjacent Drumbeg Provincial Park.

As part of the application package the applicant has submitted the following reports pertaining to the subject property:

- Biophysical Assessment by Aquaparian Environmental Consulting Ltd dated November 4, 2024 (Attachment 5);
- Geohazard Assessment prepared by Ryzuk Geotechnical dated January 2025 (Attachment 6);
- Hydrogeological Assessment prepared by Waterline Resources Inc. dated February 5, 2025 (Attachment 7); and
- Archaeological Impact Assessment prepared by Baseline Archaeological Services Ltd. Dated January 2023 (Attachment 8).

The application narrative and rationale submitted by the applicant is included as Attachment 4.

Two site visits have occurred in the review of this application, the first on June 11, 2025 and subsequently on January 19, 2026. Some photos of the site along with the site survey are included as Attachment 3.

The following table summarizes the current state of the property, what is proposed by the applicant, and the staff recommendation.

Topic	Current	Applicant Proposed	Staff Recommendation
Land Use Designation	Resource.	Small Rural Residential or Site-specific.	Site-specific.
Zoning	Resource.	Small Rural Residential or Site-specific.	Site-specific.
Density	1 Dwelling and 1 Secondary Suite permitted 3 dwellings existing as protected non-conforming uses.	3 dwellings permitted, no secondary suites.	3 dwellings permitted, no secondary suites.
Subdivision	Minimum average lot area of 8 hectares. (No subdivision potential)	Minimum average lot area equivalent to 1.2 hectares. (Allow 3 lot subdivision)	Minimum average lot area of 8 hectares. (No subdivision potential)
Floor Area	No floor area maximum for dwellings. Existing dwellings are approximately 173 square metres (1866 square feet) each.	Restrict floor area of dwellings to existing floor area plus an additional 20% (2239 ft2).	Restrict floor area of dwellings to a maximum of 210 square metres (2260 square feet) each.
Accessory Buildings	3 buildings accessory to a dwelling per lot, not including a woodshed, pump/utility house, or a secondary suite.	Allow existing accessory buildings and one additional building. Total of: - 5 accessory buildings, - 2 woodsheds, and - 2 pump/utility houses.	Limit total floor area of all accessory buildings on the lot to 100 m^2.
Covenant	No covenant.	Covenant to protect trees and vegetation of 1.4 hectares of the property with exceptions for fire smart vegetation management, dangerous trees, servicing requirements, utilities, wells, and sewer disposal systems.	Covenant to protect forested areas, archaeological features, and require invasive plant species removal.
Land Donation		Donate 0.12 hectares to adjacent Drumbeg Park as a condition of approval of subdivision of the	Donate 0.12 hectares (12 917 square feet) to adjacent Drumbeg Park concurrent with

		property. Owners work with Gabriola Land and Trails Trust and BC Parks to remove the broom in the proposed park dedication area and 3.0 metres north of the proposed park dedication area.	final adoption of bylaws (creation of additional lots not recommended). Owners responsible to ensure invasive plant species (Scotch Broom and Himalayan Blackberry) removed from area to be donated as per recommendations from Registered Professional Biologist prior to donation to BC Parks.

Pre-application Community Meeting

The applicant held an information meeting at Page's Inn on Silva Bay on October 21, 2023 and indicated there were two attendees who were both supportive of the rezoning. Two pieces of correspondence were sent to the applicant after the community information meeting which did not raise concerns about the proposal.

ANALYSIS

Policy/Regulatory

A site context analysis is provided for the subject property (Attachment 1). The following Islands Trust Policies, OCP Policies and LUB regulations are pertinent to the consideration of this application.

Islands Trust Policy Statement:

An Islands Trust Policy Statement (Directives Only) Checklist will be completed at the time draft bylaw amendments are presented to the LTC. The following directive policies from the Island Trust Policy Statement are relevant to the application for early consideration by the LTC:

NO.	DIRECTIVE POLICY
3.1.3	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the identification and protection of the environmentally sensitive areas and significant natural sites, features and landforms in their planning area.
3.2.2	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the protection of unfragmented forest ecosystems within their local planning areas from potentially adverse impacts of growth, development, and land-use.
3.4.5	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the planning for and regulation of development in coastal regions to protect natural coastal processes.
4.4.2	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address measures that ensure neither the density nor intensity of land use is increased in areas which are known to have a problem with the quality or quantity of the supply of freshwater, water quality is maintained, and existing, anticipated and seasonal demands for water are considered and allowed for.
4.4.3	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address measures that ensure water use is not to the detriment of in-stream uses
5.2.5	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address means for achieving efficient use of the land base without exceeding any density limits defined in their official community plans.

5.6.3	Local Trust Committees and Island Municipalities shall, in their official community plans and regulatory bylaws, address the preservation and protection of the heritage value and character of historic coastal settlement patterns and remains.

Official Community Plan:

A comprehensive overview of relevant OCP policies related to this application is provided in Attachment 2. The subject property is designated Resource, and the application requests a land use designation change to Small Rural Residential or a site-specific designation. The following OCP policies are relevant to the staff recommendations on the first page of this report:

2.0 f) *Applications for amendment to this OCP shall be required to include:*

i. details concerning the potential environmental impacts of the proposed development;

ii. a plan and specifications detailing how water supply and sewage disposal for the intended use are to be provided, and unless the development is residential and consists of less than five lots or dwelling units the plan and specifications must be prepared by a professional engineer; and

iii. such other requirements as may reasonably be deemed necessary in adequately reviewing the application.

2.1 a) *Increasing residential density through redesignation/rezoning shall not be permitted with the exception of Special Needs residents, Seniors and multiple-dwelling affordable housing.*

5.1 a) *The average parcel size in the Resource zone shall be 8.0 hectares (19.76 acres) and the minimum parcel size shall be 2.0 hectare (4.94 acres). In the case of a parcel serviced by community water and a community sewer the minimum parcel size shall be 1.0 hectares (2.47 acres).*

5.1 c) *The retention of lands in the Resource zone in large land holdings so as to protect significant environmental features (including marshlands), archeological sites and forested areas and maintain the area's rural character is supported. Provision is made for 8.0 hectare (19.76 acre) residential density being transferred from one parcel in the Resource zone to another parcel in the Resource zone.*

Land Use Bylaw:

The subject property is currently zoned Resource which permits one single family dwelling and one secondary suite. The subject property does not currently have the ability to be subdivided as the minimum average lot area for subdivision is 8.0 hectares and the subject property is 3.6 hectares in area.

Should the LTC request staff to prepare draft amending bylaws, staff recommend the bylaws facilitate a site-specific designation and a site-specific residential zone to:

- permit the existing dwellings with limited floor area;
- limit the floor area of accessory buildings; and
- continue to restrict subdivision of the subject property.

Staff analysis below provides the basis for this recommendation.

Islands Trust Conservancy:

The proposal does not directly affect an Islands Trust Conservancy Board (ITC) owned property or conservation covenant, nor directly affects a property adjacent to an ITC owned property or conservation covenant. Referral to ITC for comment is not required.

Issues and Opportunities

Staff have identified the following issues and opportunities for LTC consideration:

- OCP Compliance
- Subdivision
- Invasive Species Management
- Professional Reports
- Cultural Heritage

OCP Compliance

As presented, the application is not consistent with policies in the Gabriola Island Official Community Plan (OCP). The application proposes to amend the land use designation from Resource to Small Rural Residential (SRR) or site-specific designation. A site-specific designation would be required as the proposal is not consistent with SRR policies which require a minimum average lot area of 2.0 hectares.

However, redesignation and rezoning of the property to facilitate subdivision is not supported by the objectives and policies of the current Resource land use designation of the subject property. An objective of the Resource designation is to preserve large parcels of land in a largely unsubdivided state and policy 5.1(a) states the average parcel size in the Resource zone shall be 8.0 hectares and the minimum parcel size shall be 2.0 hectares. Similarly, policy 5.1(c) supports the retention of lands in the Resource zone in large land holdings so as to protect significant environmental features, archaeological sites and forested areas and maintain the area's rural character. The subject property is located on the shoreline, contains a registered archaeological site, forested areas, and a wetland is identified on the property by Islands Trust mapping. The application proposes bylaw amendments to facilitate a three-lot subdivision which is not consistent with these policies.

The application is also inconsistent with other OCP policies related to additional density. Current policy states that redesignation or rezoning for additional density should not be permitted except for special needs, seniors, or affordable housing. While the application does propose to increase the permitted density on the lot, the applicant has provided documentation to show that the three existing dwellings were constructed prior to 1971 bylaw regulations which limited the density on the lot.

Protected non-conforming residential uses are not intended to continue indefinitely. Nonetheless, in consideration of this property's history, the proposed covenant, 0.12 ha (12 917 square feet) park land donation, and proposed limits to the size of the dwellings and accessory buildings on site, staff recommend the zoning be amended to permit the three existing dwellings on the parcel with a maximum floor area for each dwelling of 210 square metres (2239 square feet) which is approximately the average size of the existing dwellings plus 20%.

Subdivision

The application requests the bylaw amendments facilitate a three-lot subdivision to enable each existing dwelling to be situated on an individual lot. As noted above, this approach is not supported by the current OCP. Staff note the LTC is currently undertaking a review of the current OCP and contemplating approaches to permitting

additional density without subdivision. In part, this is in recognition that many lots on the island are already under 1ha; small lots can make managing and conserving sensitive ecosystems less effective and fragmented. Fragmented land ownership can similarly increase the complexity of effectively protecting archaeological sites, shoreline habitat and biodiversity through proliferation of lot specific infrastructure such as trails, fences and gathering areas.

Invasive Species Management

The application proposes to donate 0.12 ha (12 917 square feet) of land to the neighbouring Drumbeg Provincial Park. The Biophysical Assessment submitted with the application recommends the removal of Scotch broom and Himalayan blackberry and restoration with native Garry oak ecosystem species in and adjacent to the area to be donated. At this time staff understand that the removal and restoration has not commenced and the application proposes that the owners will work with the Gabriola Land and Trails Trust and BC Parks to remove the broom in the proposed park dedication area and the adjoining 3 metres north of that area.

If the LTC proceeds with the bylaw amendment application, Staff are recommending that the LTC request that the owners remove the invasive species within the boundaries of, and adjacent to, the 0.12 ha (12 917 square feet) area being donated to BC Parks prior to bylaws being adopted. Staff also recommend the preparation of a Section 219 restrictive covenant between the owners and the LTC to ensure the invasive species on the remainder of the property adjacent to the new park boundary, are removed, the area replanted, and maintained until plantings are established following advice from a registered professional biologist. This follows recommendations by the professional biologist in the Biophysical Assessment (Attachment 5) for the property which states: "Removal of Scotch broom and Himalayan blackberry and restoration with native Garry oak ecosystem species is recommended to strengthen the ecology of the site."

Staff have received a letter from the President of the Gabriola Lands and Trails Trust which supports the transfer of property to Drumbeg Park, the removal of invasive species, and restoration of land to a Garry Oak meadow.

The applicant has also initiated discussions with BC Parks in regards to the property donation, they have indicated they are interested in a site meeting and conducting a detailed property evaluation.

Professional Reports

Planning staff have conducted internal referrals of the hydrogeological report to the Senior Freshwater Specialist and the Biophysical Assessment to the Professional Biologist. Comments from the Freshwater Specialist and Islands Trust Biologist are incorporated here and have informed the staff recommendations.

With regards to the Biophysical Assessment, the report states that "no watercourses or wetlands were observed" however, the Sensitive Ecosystem Inventory mapping indicates the presence of wetland/swamp habitat on that site. The site survey took place in October 2024, during a time when there had been very low levels of precipitation in the preceding months, potentially making it more difficult to identify a wetland. Some of the plants listed as being present on the site such as salal, sword fern, Nootka rose, common snowberry, western red cedar, salmonberry, have been identified as wetland plants in the BC Wildlife Federation "Wetland Plants of British Columbia" (2025).

Since the time the report was written, November 2024, an element occurrence record for the Moss' elfin (red-listed butterfly) has been identified on this site, meaning that this site is an area of land that could contain habitat for this species. Element occurrences have conservation significance and are relevant in land management decisions. A survey by an appropriately qualified expert should be completed during the active period for this insect (spring/early summer) to confirm likely presence/absence.

An additional survey by a Wetland Specialist that takes place within the "wet season" should be conducted to confirm the presence or absence of a wetland, seep or seasonally wet habitat. If such habitat is present, confirmation that the proposed additional well will not disrupt the hydrology of the site should be provided as the hydrology report provided as part of this application did not provide any information on the impact to wetlands by the construction of an additional well.

Two of the dwellings currently have a designated water supply from wells that were drilled in the 1972, the third dwelling does not have connection to a water supply and currently stores trucked water in a large cistern. The Hydrogeological report submitted with the application concludes that a new well for the third dwelling is not expected to adversely impact groundwater users and also notes that, "local impacts from additional groundwater diversion should be verified through aquifer pumping tests and groundwater monitoring." The recommendations in the report include:

- that the location of a new well should be greater than 100 metres from the shoreline;
- that a pumping test should be completed in the new well to confirm a sustainable yield of 2.5m3/day and monitor indicator parameters for salt water intrusion during testing;
- that the water from the new well should be tested for bacteriological, routine chemical parameters, and chloride, and that a qualified pump installer should be consulted to review water quality results and ensure proper filtration and treatment are provided.

Staff recommend that prior to the LTC considering adoption of the bylaws, the applicant provide information to demonstrate that these recommendations have been followed. Additionally, the pumping test is recommended to be at a constant rate, for a minimum period of 12 hours and withdrawing the total daily required volume specified over a maximum period of 24 hours and monitoring groundwater levels continuously during the pumping test and during the recovery period.

The applicant has submitted documentation that the septic tank and absorption field installed in 1972 was constructed in accordance with the regulations at the time. Staff recommend the applicant provide an inspection report from a Registered Onsite Wastewater Specialist to certify that the sewage disposal systems are functioning properly and suitable to support the three existing dwellings.

A Geohazard Assessment was also submitted with the application which states the existing residences all appear to be setback behind the flood construction level (FCL) elevation of 5.26m and recommends that any future construction be located above the FCL and setback 15m from the future estimated natural boundary.

Cultural Heritage

The applicant has submitted an Archaeological Impact Assessment Report that was conducted as part of Heritage Inspection Permit 2022-0138. The report notes that the delineation of sites was not completed and are not well defined in some areas, as a result it is recommended that ground altering activity be reviewed by a qualified archaeologist and/or the BC Archaeology Branch to determine the appropriate level of work required. Staff recommend that this be included as a requirement through a covenant as the *Heritage Conservation Act* would only require permitting for land altering activities within the boundary of a registered archaeological site.

In addition, staff recommend the LTC send an early referral of the application to Snuneymuxw First Nation.

Consultation

Statutory Requirements

As the application involves OCP amendments, the LTC is required by the *Local Government Act* to consider opportunities for consultation with First Nations and persons, organizations and authorities it considers will be affected. The statutory process for bylaw amendments is prescribed by the *Local Government Act* and *Islands Trust Act*.

Protocols

The Islands Trust Council has a protocol agreement with the Snuneymuxw First Nation (on behalf of the Gabriola Island LTC) which specifies that the Islands Trust will notify Snuneymuxw in writing of, and work in cooperation with, Snuneymuxw on applications for amendments to official community plans and land use bylaws.

A 2013 letter of understanding between Gabriola Island Local Trust Committee staff and staff at the Regional District of Nanaimo (RDN) requires that the Islands Trust provide the RDN with a draft copy of the OCP prior to first reading.

Consistent with these agreements, staff recommend notification to the Snuneymuxw First Nation and eventual early referral of draft bylaws to the RDN prior to consideration of first reading.

Rationale for Recommendation

Staff have identified the necessary information required from the applicant to address groundwater, sewerage disposal capacity, and ecosystem protection. Staff recommend that draft OCP and LUB amending bylaws be drafted to enable the application for residential development with no subdivision potential, to advance to the next stage in the application process. The staff recommendations are found on page 1 of this report.

ALTERNATIVES

The LTC may consider the following alternatives to the staff recommendation:

1. **Deny the application**

   The LTC may deny the application. Staff advise that the implications of this alternative are that no further work on this application will advance and the file will be closed. The applicant will be advised that a substantially similar application may not be submitted for one year unless the LTC has agreed to such reconsideration. If this alternative is selected, the LTC should state the reasons for denial. Recommended wording for the resolution is as follows:

   That the Gabriola Island Local Trust Committee deny application PL-RZ-2025-0138 for the following reasons [insert reasons].

2. **Proceed with application as requested by the applicant**

   If the LTC selects this alternative staff recommend resolutions 2, 3, 4, and 5 from the first page of this report be advanced along with the following resolution:

   That the Gabriola Island Local Trust Committee request staff to draft bylaws consistent with the application received by the applicant for application PL-RZ-2025-0138.

NEXT STEPS

Should the LTC concur with staff recommendations, staff will send early referral to Snuneymuxw First Nation, communicate with the applicant to provide additional information, draft a cost recovery agreement, and draft bylaws for LTC consideration.

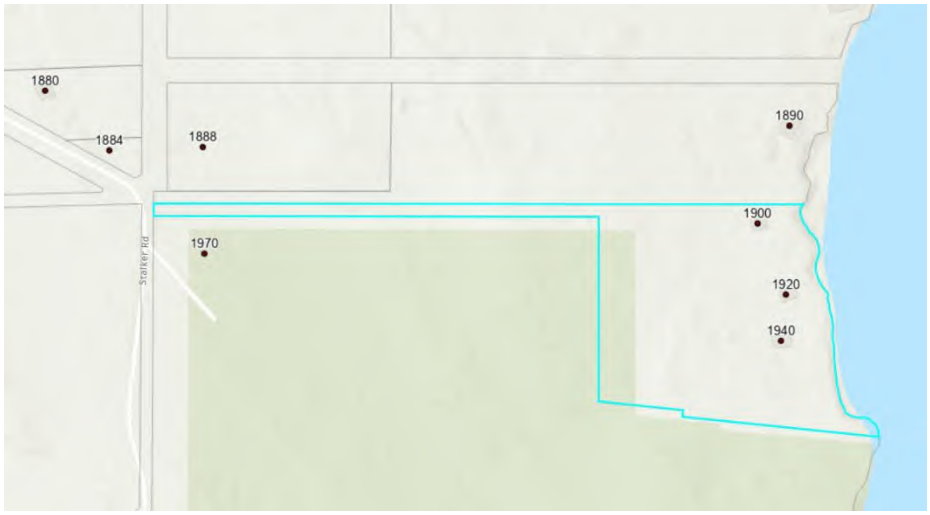
Submitted By:	Stephen Baugh, Island Planner	April 9, 2026
Concurrence:	[Managing Staff Name, Credentials Title]	Select Date.

ATTACHMENTS

1. Site Context
2. OCP Policies
3. Plans and Photographs
4. Application Narrative
5. Biophysical Assessment
6. Geohazard Assessment
7. Hydrogeological Assessment
8. Archaeological Impact Assessment (Confidential)

ATTACHMENT 1 – SITE CONTEXT – PL-RZ-2025-0138 (SEWARD)

LOCATION

Legal Description	LOT 1, SECTION 4, GABRIOLA ISLAND, NANAIMO DISTRICT, PLAN 16560
PID	004-008-910
Civic Address	1900 Stalker Rd
Lot Size	3.62 ha (8.96 acres)
Location	

LAND USE

Current Land Use	Residential
Surrounding Land Use	North – Agricultural Land Reserve South – Provincial Park – Drumbeg Provincial Park East – Water West – Park and Residential

HISTORICAL ACTIVITY

File No.	Purpose
N/A	N/A

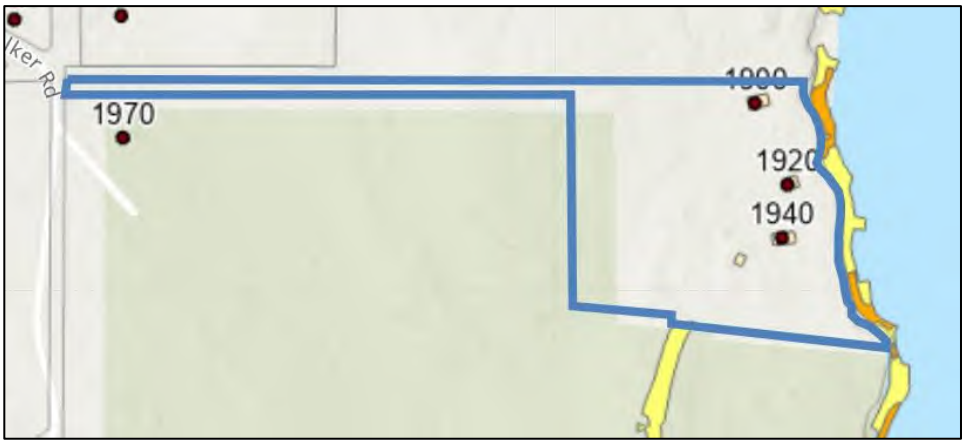
POLICY/REGULATORY

Official Community Plan Designations	***Resource* (R)** Applicant is requesting a change in OCP designation to *Small Rural Residential.* **Development Permit Area: None on subject property.** The subject property's eastern lot line coincides with the natural boundary of the sea and is adjacent to DP-4: Flat Top Islands Area and DP-5: Gabriola Pass

	Marine Protected Area; however, the subject property does not overlap with either.
Land Use Bylaw	***Resource* (R)** The applicant proposes to rezone to *Small Rural Residential* (SRR) to facilitate a future 3-lot subdivision.
Other Regulations	*Heritage Conservation Act*
Covenants	None
Bylaw Enforcement	None

SITE INFLUENCES

Islands Trust Conservancy	The proposal does not directly affect an Islands Trust Conservancy Board (ITC) owned property or conservation covenant, nor directly affects a property adjacent to an ITC owned property or conservation covenant. Referral to ITC for comment is not required.
Regional Conservation Strategy	Appendix II of the Regional Conservation Plan 2018-2027 indicates the relative value for conservation is **High** on the subject property.
Species at Risk	Mapping indicates a raptor nest is located on the southwest portion of the subject property.
Sensitive Ecosystems	SEM Primary Class: Woodland (Dark Green), Herbaceous (Purple), Wetland (Yellow) SEM Secondary Class: Wetland (Diagonal Yellow) SEM Tertiary Class: Herbaceous (Diagonal Purple)  Sensitive Ecosystem Inventory mapping indicates a cliff sensitive ecosystem (red).

Hazard Areas	Portion of the subject property mapped as Moderate to Low-Risk Steep Slope.  RDN Floodplain Mapping showing extent of a 0.5% annual exceedance probability flood in yellow with 1m Relative Sea Level Rise plus 0.6m freeboard. 
Archaeological Sites	Remote Access to Archaeological Data (RAAD) mapping indicates the presence of an archaeological site and areas of high archaeological potential on the subject property. Applicant has submitted an archaeological impact assessment (AIA)conducted by Baseline Archaeological Services Ltd. with their application.
Climate Change Adaptation and Mitigation	Greenhouse Gas Emissions can be expected to be commensurate with the levels associated with single family residential development patterns and use. RDN Coastal Floodplain mapping indicates the possibility for coastal flooding on the property as sea levels rise.
Shoreline Classification	Low Rock/Boulder
Shoreline Data in TAPIS	Flat continuous eelgrass meadows mapped in the marine area adjacent to the subject property.

ATTACHMENT 2 – POLICIES (PLRZ20250138 (SEWARD))

GABRIOLA ISLAND OFFICIAL COMMUNITY PLAN BYLAW NO. 166, 1997

OCP Objective/Policy	Complies?	Planner Comments
General Land Use Policies		
2.0 f) Applications for amendment to this OCP shall be required to include: i. details concerning the potential environmental impacts of the proposed development; ii. a plan and specifications detailing how water supply and sewage disposal for the intended use are to be provided, and unless the development is residential and consists of less than five lots or dwelling units the plan and specifications must be prepared by a professional engineer; and iii. such other requirements as may reasonably be deemed necessary in adequately reviewing the application.	**TBD**	The applicant has submitted a Biophysical Assessment (Attachment 5) from a registered professional biologist, a Hydrological Assessment (Attachment 7) from a Hydrologist, Geohazard Assessment (Attachment 6) from a professional geoscientist, and an Archaeological Impact Assessment (Attachment 8) Staff are recommending the LTC request the applicant, prior to first reading, to provide: • A survey by a Wetland Specialist to confirm the presence and boundaries of or absence of a wetland, seep or seasonally wet habitat; and an assessment by a qualified professional of the potential impact of any new well to any confirmed adjacent wetlands. • A survey for the Moss' elfin (red-listed butterfly) to confirm likely presence/absence. • An inspection report from a Registered Onsite Wastewater Specialist to certify that the sewage disposal systems are functioning properly and can in their current condition support the existing dwellings. And prior to bylaw adoption: • Confirmation that installation of any new well is greater than 100 metres from the shoreline. • A report from a registered hydrogeologist showing the results of a constant rate pumping test in the new well. • The results of a water quality test for bacteriological, routine chemical parameters, and chloride including recommendations from a qualified

		pump installer for groundwater filtration and treatment.
2.0 i) To avoid negative impacts on small streams and downstream properties, at the time of the development of new parcels of 2.0 hectares (4.94 acres) or smaller in areas designated as residential, an integrated storm water management plan should be designed, constructed and maintained by an appropriate authority.	**YES**	An integrated storm water management plan has not been provided. The applicant is proposing a three bare lot strata subdivision should the zoning be approved. Gabriola Island Land Use Bylaw subdivision regulations include drainage requirements (E.1.9) that must be satisfied at time of subdivision. Staff are not recommending the LTC proceed with bylaw amendments to permit subdivision and do not recommend any further action to address this policy.
Residential Land Use		
2.1 a) Increasing residential density through redesignation/rezoning shall not be permitted with the exception of Special Needs residents, Seniors and multiple-dwelling affordable housing.	**NO**	This application does not propose affordable housing, special needs housing, or seniors housing. The applicant provides rationale in their application letter (Attachment 4) that the OCP Review project that is currently underway includes discussion about suitable lands and options for increasing density while remaining consistent with the Islands Trust mandate. Staff recommend amendment of this policy should the LTC choose to proceed with this application.
2.1 d) Future residential subdivisions should be designed to consider the natural contours of the land, existing natural landscapes, trail access and the design of adjacent subdivisions in order to promote development in harmony with the land and/or seascape.	**For LTC Consideration**	Staff recommend that further fragmentation of the subject property through subdivision to create additional lots be avoided should the LTC choose to proceed with this application.
Resource		
5.1 a) The average parcel size in the Resource zone shall be 8.0 hectares (19.76 acres) and the minimum parcel size shall be 2.0 hectare (4.94 acres). In the case of a parcel serviced by community water and a community sewer the minimum parcel size shall be 1.0 hectares (2.47 acres).	**NO**	This application does not meet Resource policies and the applicant is requesting OCP amendments to redesignate the subject property to Small Rural Residential. Staff support redesignation of the subject property should the LTC choose to proceed with this application. However, the subject property does not have sufficient area to permit 3 lots in the Small Rural Residential designation. A site-

		specific land use designation would be required to permit the requested density at this location.
5.1 c) The retention of lands in the Resource zone in large land holdings so as to protect significant environmental features (including marshlands), archeological sites and forested areas and maintain the area's rural character is supported. Provision is made for 8.0 hectare (19.76 acre) residential density being transferred from one parcel in the Resource zone to another parcel in the Resource zone.	**NO**	One of the objectives of the Resource designation is, "To preserve large parcels of land in a largely unsubdivided state." The parcel contains archaeological sites, significant environmental features, and forested areas. This application does not meet Resource policies and therefore proposes OCP amendments to redesignate the subject property to Small Rural Residential. The protection of a portion of the lot is proposed to be achieved through a covenant. The applicants also propose that the zoning limit the house size and number of accessory buildings to minimize the permission for future development to impact the lots.
Environmentally Sensitive Areas		
6.1 a) Development within environmentally sensitive areas may be regulated through the use of development permits.	**For LTC Consideration**	There is no existing Development Permit Area for environmental protection on the property, the applicants are proposing that a covenant be registered on title to protect the environment. Islands Trust Sensitive Ecosystem Mapping indicates areas of the subject property are primary class Woodland Sensitive Ecosystem. A Biophysical Assessment prepared by Aquaparian Environmental Consulting on November 4, 2024 indicates that the parcel is predominantly second-growth forest canopy with scattered mature (80+ years) Douglas fir, arbutus and Garry oak. No new construction is proposed as part of the rezoning application; however, the Biophysical Assessment report recommends general environmental protection measures for any future development of the property. These recommendations would be considered while drafting an environmental covenant as part of the application.
6.1 b) With respect to an area identified as being environmentally sensitive, the registration of a natural state or environmental covenant and/or the use of a development permit shall be required as a condition of rezoning so as to ensure the long term protection of environmental features.	**For LTC Consideration**	

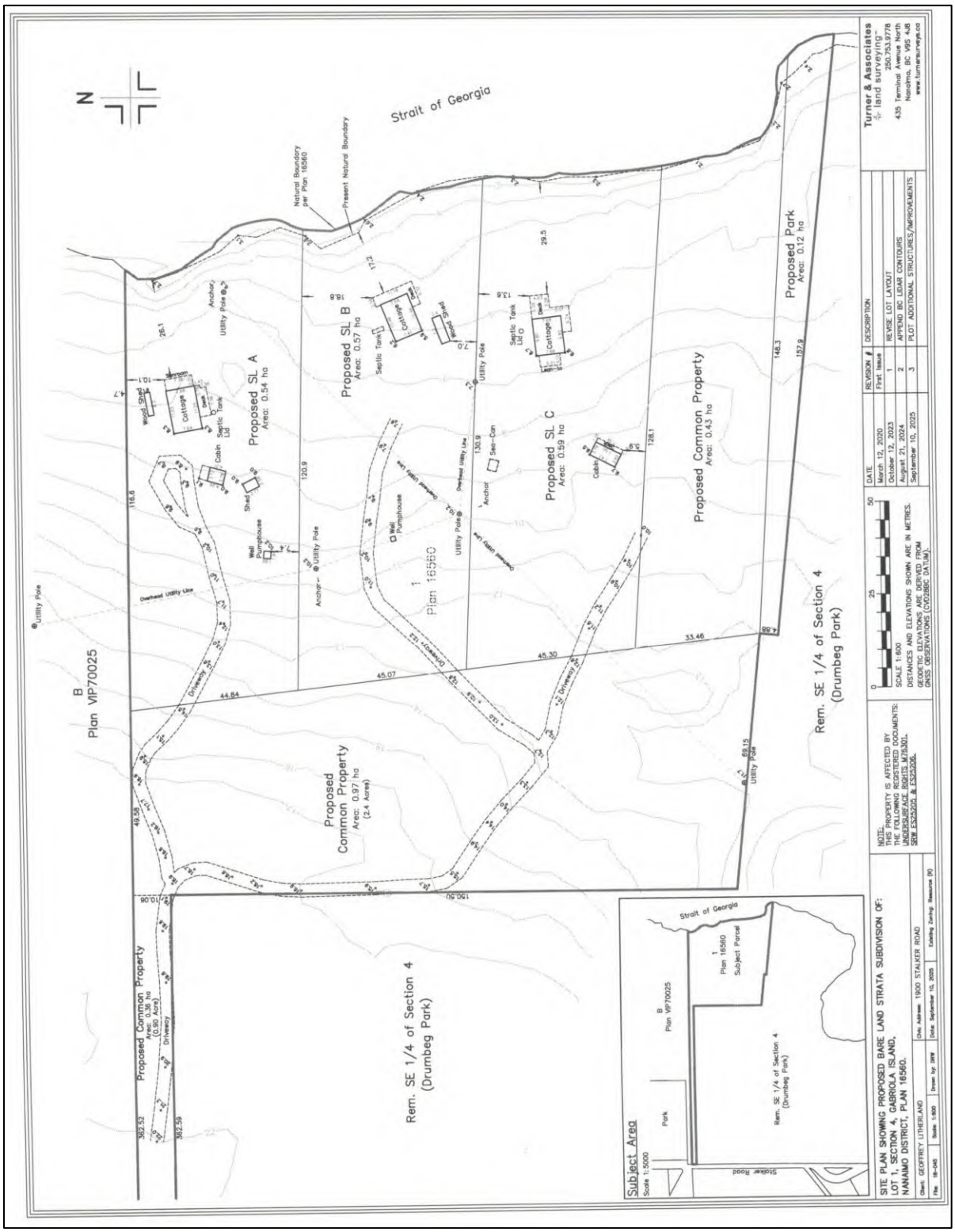
6.1 c) Voluntary covenants or easements to protect natural features and donation or sale of sensitive areas to a conservation agency shall be encouraged.	**YES**	This application does propose a covenant to protect natural features and a property donation of 1200 square meters along the southern boundary to the adjacent Drumbeg provincial park.
6.1 e) To protect against hazardous conditions and to protect environmentally sensitive areas a setback shall apply from the high water mark of the sea. In the case where a bluff or large land ridge is the prominent upland feature adjacent the sea, a setback from the upper edge of the bluff or ridge shall be applicable.	**YES**	LUB regulations include a 15m setback from the natural boundary of the sea which apply to the subject property. The existing dwellings are compliant with the minimum setback. Staff do not recommend any further action to address this policy.
6.1 f) The sandstone and conglomerate banks along Gabriola's shoreline shall be protected against the accelerated effects of erosion resulting from human activity by requiring the setback of buildings or structures and control of storm water runoff.	**YES**	Existing buildings are setback from the natural boundary of the sea. LUB subdivision regulations will require proposed development to include control of storm water runoff. A Geohazard Assessment report was prepared by Ryzuk Geotechnical Ltd. on January 30, 2025 for the proposed rezoning and subdivision. Staff do not recommend any further action to address this policy.
6.1 g) Trees bearing the nests of great blue heron, bald eagle, osprey and other raptors shall not be cut in accordance with provincial legislation. The zoning bylaw shall set standards and regulate the provision of screening for preserving and protecting trees bearing such nests. Such condition shall be applicable with respect to the rezoning of any site containing such a feature.	**YES**	Islands Trust mapping indicates a raptor nest on the southwest portion of the subject property. The Biophysical Assessment Report states this nest was registered as "Nest Down" in 2014 and that visual inspection of the tree confirmed there is no eagle nest. However, a nest of a smaller raptor species or corvid was present and the property does have suitable conditions for raptor habitat, and nesting opportunities for owls. Staff do not recommend any further action to address this policy.
6.1 i) So as to ensure the Island's environmental resource sites are protected, owners (and potential developers) of property located within an environmental sensitive area shall be encouraged to work with recognized conservancy organizations early on in the development process to ensure steps are taken to protect the environmentally sensitive site.	**YES**	No ground altering development is proposed as part of the rezoning application; however, the Biophysical Assessment report recommends general environmental protection measures for any future development of the property.
Heritage and Archaeological Resources		
6.3 a) The Snuneymuxw First Nation and the Archaeology Branch should be consulted prior to the initiation of any	**YES**	Applicant has submitted a referral to Snuneymuxw First Nation. An Archaeological Impact Assessment has also been conducted

future development which may impact on a known archaeological site on Gabriola, or an area exhibiting potential for the presence of unrecorded archaeological sites.		associated with a provincial Heritage Inspection Permit. Staff support early referral to Snuneymuxw First Nation should the LTC choose to proceed with the application.
6.3 c) The identification and preservation of heritage property shall be encouraged, through the use of voluntary covenants, heritage revitalization agreements and other means intended to encourage the owners of a heritage property to support its heritage designation and preservation.	**For LTC Consideration**	The applicant has been advised of this policy. Staff support early referral to Snuneymuxw First Nation should the LTC choose to proceed with the application.
6.3 e) Petroglyphs and other fragile archaeological sites shall be protected from inappropriate human use which may alter or destroy the significance of the site.	**For LTC Consideration**	Staff support early referral to Snuneymuxw First Nation should the LTC choose to proceed with the application.
6.3 f) Development proponents are encouraged to consider archaeological resources during all phases of project planning, design and implementation.	**YES**	Applicant has submitted a referral to Snuneymuxw First Nation and conducted an Archaeological Impact Assessment. Staff support early referral to Snuneymuxw First Nation should the LTC choose to proceed with the application.
6.3 g) The Local Trust Committee should consider the following in the Gabriola Island Land Use Bylaw: i. the creation of subdivision regulations to protect registered or potential First Nation archaeological and heritage sites; ii. establishing regulations regarding use, density and the siting and location of buildings and uses on land to protect registered or potential First Nation archaeological and heritage sites; iii. implementation of other options to protect registered or potential First Nation archaeological and heritage sites, including but not limited to designation of heritage conservation areas, dedication of	**For LTC Consideration**	Staff support early referral to Snuneymuxw First Nation should the LTC choose to proceed with the application.

parkland during subdivision, and designation of protected heritage sites; and iv. establishment of bylaws and other mechanisms to protect registered or potential First Nation archaeological and heritage sites in development application processes, including applications for amendments to this Plan and the land use bylaw, applications for permits such as heritage alteration permits, temporary commercial or industrial use permits, or development variance permits, and decisions about parkland dedication that are made in response to applications referred to the Local Trust Committee as part of the subdivision approval process.		
7.4 a) Methods of water conservation such as low water use fixtures, retention of rainwater and runoff in cisterns and ponds and other means shall be encouraged.	**For LTC Consideration**	

ATTACHMENT 3 –PLANS AND PHOTOGRAPHS

3.1 SITE SURVEY



2.2 DWELLINGS

2.5 Area Adjacent to Drumbeg Provincial Park and Forested Area

March 28, 2025

Islands Trust
Northern Office
700 North Road
Gabriola Island, BC
V0R 1X3

Email: sbaugh@islandstrust.bc.ca

Dear Steven Baugh, Planner

Re: Application to Amend the OCP and Rezone the Property at 1900 Stalker Road, Gabriola Island

Further to our discussions with Islands Trust staff regarding the OCP and rezoning application for the above noted property, attached is the following information:

-Land use application form and checklist
-Summary letter
-Proposed Bare Land Strata Subdivision plan by Turner and Associates
-Environmental report by Aquaparian Environmental
-Archaeological report by Baseline Archeology
-Geotechnical report by Ryzuk Geotechnical Engineering
-Hydrogeological report by Waterline Resources
-Rationale for rezoning and OCP amendment (Attachment A)
- Islands Trust Policy Statement review (Attachment B)
-Contact with Snuneymuxw First Nations (Attachment C)
-Contact with Parks BC staff regarding proposed park dedication (Attachment D)
-Pre-application Community Information Meeting summary (Attachment E)
-Title search and Charges on Title
-Site disclosure statement

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

Proposed OCP and Rezoning Amendment

We propose to amend the OCP from the current Resource (R) to Small Rural Residential (SRR) and the zoning from the current Resource (R) zoning to Small Rural Residential (SRR) or a site specific zoning. Providing these OCP and rezoning amendments are successful, an application will be submitted to MOTT for a three lot bare land strata subdivision, with common property located to the west and south of the proposed lots.

This 3.6 ha (8.9 acre) property was purchased by three families in 1970 and three cottages were built on the property in 1971. For the past 54 years, the property has been used by the three families and is now owned by the next generation of family members. The owners now wish to amend the OCP, rezone the property and apply for a three lot bare land strata subdivision. The owners wish to pursue the amendments noted that will allow each family to have ownership of one of the three bare land strata lots, while sharing the common property that would be adjacent to their three lots. One of the primary reasons the owners wish to pursue the amendments is that the current zoning only allows one single-family dwelling on the property and if a cabin was destroyed by fire, seismic event, etc. it could not be rebuilt without a rezoning.

Initially, the property owners had a discussion with Sonja Zupanec in 2017 regarding a future OCP and rezoning application. I was retained in 2020 to assist the owners in hiring consultants and preparing an OCP and rezoning application for submission to the Islands Trust. We have spoken with Sonja Zupanec a number of times regarding the application and on her suggestion we contacted the Snuneymuxw First Nations (SFN), BC Parks and held a community information meeting prior to making this application. Summaries of these meetings are included in attachments C, D and E of this application. Our first step in preparing the application was to retain an archaeological consultant to carry out the required archaeological reviews on the property. This archaeological review took an extended amount of time and has delayed our preparation of the OCP and rezoning application.

Property Description

The 3.6 ha (8.9 acre) waterfront property is located directly north of Drumbeg Park. Three cottages of approximately 1100 ft.^{2} each were built in 1971 and are owned by the next generation of the original owners of the property. The proposed use of the land will not change with the OCP and rezoning amendment and future subdivision, as the owners wish to continue to use the three cottages as they have done for the past 54 years. No new construction is planned on the property.

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

The legal description of the property is Lot 1, Section 4, Gabriola Island, Nanaimo District Plan 16560. The PID is 004-008-910.

The sewer drainfields are sketched in red on the attached survey plan prepared by Turner Surveying.

On the site plan prepared by Turner Surveying, the proposed common property on the south and west side of the property were chosen to address the locations of the three driveways and separation from Drumbeg Park. Common property along the waterfront was not pursued as there is limited distance between the waterfront and the three cabins.

In the Waterline Resources hydrogeological report, they provided an assessment of the nearby wells as proof of water for the OCP/rezoning application.

We understand that once the Islands Trust receives our application, they will advise us on the application fee requirements. Please advise if you require additional information to support this OCP and rezoning application.

Yours truly

Toby Seward
Seward Developments Inc

ec: Property Owners

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

Attachment A

1900 Stalker Road, Gabriola Island, OCP/Rezoning Application

Rationale for OCP and Rezoning Amendments

OCP - The current OCP designation is Resource (R) and the proposed new OCP designation is Small Rural Residential (SRR).

The surrounding properties are generally used as residential, other than Drumbeg Park to the south, which is designated Parks (P). Five properties to the north are designated as Agricultural (AG) and properties to the west are designated as Large Rural Residential (RR) and Small Rural Residential (SRR).

The fundamental principle of the OCP is to preserve and protect the Trust Area and its unique amenities and environment for the benefit of residents of the Trust Area and of the province generally. The OCP has a number of environmental goals, including to preserve the unique natural environment and the natural beauty of the Gabriola Planning area, to recognize the provincial and national significance of the unique social and physical diversity, to encourage a good stewardship and prepare for the impacts of climate change.

The Residential Land Use section of the OCP includes objectives to ensure that subdivision design is consistent with the rural character of Gabriola and require new development to be supported by adequate sewer disposal systems.

It is recognized that development of a new OCP for Gabriola is underway, with a target completion date in late 2025 or early 2026. It is understood that the fundamental principles of the current OCP will be included in the new OCP, with discussion about how to maintain those principles, while possibly increasing the allowable density.

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

The rationale for the proposed OCP amendment for this property is that if the OCP and rezoning are successful, followed by subdivision approval for a three lot bare land strata, the use of the three cottages that have existed on the property since 1971 will not change, other than each cottage will be located on a separate strata lot.
The principles and objectives of the OCP noted above and outlined in the Attachment B, Islands Trust Policy Statement included in this application will continue to be met, as the three families who own the property wish to keep each of the proposed three lots for use by current and future generations of the families. The families have no development plans for the property and the OCP amendment would be consistent with the surrounding residential use.

Zoning - The current zoning is Resource (R) and the proposed new zoning is Small Rural Residential (SRR) or a site specific zoning that would allow for a future subdivision into three bare land strata lots.

The surrounding properties are generally used as residential, other than Drumbeg Park to the south, which is zoned Parks 1 (P1), Provincial and Regional Park. Five properties to the north are zoned agricultural (AG) and the properties to the west are zoned Small Rural Residential (SRR) and Large Rural Residential (LRR).

The three cabins were constructed in 1971 and pre-date the creation of the Islands Trust in 1974 and the subsequent Islands Trust zoning bylaws. The proposed rezoning to Small Rural Residential (SRR) would not entirely meet the zoning bylaw requirements for subdivision, which require a minimum average lot area of 2.0 ha (4.94 acres) and a minimum lot area of 0.5 ha (1.24 acres). As the property is 3.6 ha (8.9 acres), the average lot size would be 1.2 ha (2.96 acres), less than the required 2.0 ha (4.94 acres). The smallest of the proposed three lots would be 0.54 ha (1.33 acres) which would comply with the SRR zoning bylaw requirements for lot size.

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

Attachment B

1900 Stalker Road, Gabriola Island, OCP/rezoning Application

Islands Trust Policy Statement

The Islands Trust objective is to preserve and protect the Trust Area and its unique amenities and environment for the benefit of the residents of the Trust Area and of British Columbia generally, in cooperation with municipalities, regional districts, improvement districts, other persons and organizations and the government of BC

The guiding principles of the Islands Trust include;

- The primary responsibility of the Islands Trust Council to provide leadership for preservation, protection, and stewardship of amenities, environment, and resources of the Trust Area
- The Trust Council will place priority on preserving and protecting the integrity of the environment and amenities in the Trust Area
- The Trust Council will seek information from a broad range of sources in its decision-making process, recognizing the importance of local knowledge in this regard
- The Trust Council believes that to achieve the Islands Trust objective, the rate and scale of growth and development in the Trust Area may be carefully managed and may require limitation
- Trust Council believes that open, consultative public participation is vital to effective decision making for the Trust Area
- Trust Council will implement a plan for advancement of the Policy Statement as part of its annual budget process, and the Executive Committee of the Trust Council will report to Council on progress in achieving the goals of the Policy Statement

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

The proposed OCP and rezoning amendments, plus the proposed future bare land strata subdivision are consistent with the Trust Area guiding principles as follows;

- The owners are making application for the proposed amendments to allow for the three cabins that have been in place on the property since 1971 to be each situated on a separate bare land strata lot. The owners have no development plans for the property, as they wish to maintain the cabins for their current and future generations use.
- The owners are fully committed to preserving and protecting the environment. As part of the proposed amendments, an environmental consultant has provided a report on identification and preservation of the environmental features of the property.
- A hydrogeological report has been undertaken to assess protection of the aquifer and ground water on the property, plus a geotechnical report has been completed to assess ground conditions, slope stability, erosion and sea level rise.
- An archaeology report has been completed to ensure protection of archaeological matter on the property. Contact has been made with the Snuneymuxw First Nations (SFN) regarding the proposed application and the archaeological consultant hired for the project has been in contact with SFN representatives and staff at the provincial archeology branch regarding their assessment of the property.
- A community information meeting was held to inform neighbouring property owners of the proposed amendments. A response from one of the neighbours was that they hoped to see the area remain for single-family dwelling use, which is consistent with the owner's plans.
- Representatives of BC parks have been contacted, as the Stalker Road property shares a property line with Drumbeg Park to the south. BC Parks have confirmed they will work with the Islands Trust and owners regarding a possible dedication of a strip of land to be added to Drumbeg Park.
- Correspondence has been received from the Gabriola Land and Trails Trust (GaLTT) regarding scotch broom infestation. The Stalker Road property owners have removed a considerable amount of scotch broom from their property and plan to follow up with GaLTT and BC Parks on the removal.

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

Attachment C

1900 Stalker Road, Gabriola Island, OCP/Rezoning Application

Contact with Snuneymuxw First Nations (SFN)

Owen Grant of Baseline Archaeology (Baseline) was hired in September, 2021 to carry out a Preliminary Field Reconnaissance (PFR) and thereafter an Archeological Impact Assessment (AIA) on the property. Baseline made application to the Archeology Branch for a permit in October, 2021. The provincial Archeology Branch forwarded a letter to SFN Chief and Council on January 31, 2022 advising that Baseline had applied for a Heritage Inspection Permit.

Desiree Thomas, Lands Clerk at the SFN provided a response to the Archeology Branch February 23, 2022 regarding their referral and advised on their Snuneymuxw Referral Management Policy, which requires an application and fee borne by the applicant.

We initially made contact with the Desiree Thomas in February 2022 regarding the application and followed up with a letter to her on February 28, 2022. In addition to the letter, we included the SFN referral checklist, map of the area, proposed subdivision and a $750 application fee as they requested.

Derrick Manson from the SFN participated as part of the field personnel, along with Baseline Archaeology staff, who completed the field review of the property. In Baseline's AIA report dated January 2023, they acknowledged Derrick Manson and Desiree Thomas from the SFN for their assistance with this project.

Copies of correspondence with the SFN and Archeology Branch are attached.

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

2022- February-28

Snuneymuxw First Nation
668 Centre Street
Nanaimo, BC, V9R 4Z4

Attention: Desiree Thomas, Lands Clerk

Dear Desiree Thomas

Re: Snuneymuxw First Nation Referral Management Checklist – 1900 Stalker Road, Gabriola

Attached is a copy of the referral checklist, map of the area and the proposed subdivision and an application fee.

I am representing the three families who own this property, in their application to the Islands Trust for an OCP/rezoning amendment, that if successful, will allow for a future three lot bare land strata subdivision.

The owners wish to confirm that there is no proposed work or development as part of this application, as the three families who are the applicants, each already have their own cottage on the property and are wishing to maintain the existing natural habitat.

Owen Grant, Baseline Archeological Services, Courtenay, has applied for an Archeological Impact Assessment permit from the Archeology Branch, after his company completed a Preliminary Field Reconnaissance on the property last summer.

Please advise if there is any additional information you require regarding the checklist we have completed for this property.

Yours truly

Toby Seward
Seward Developments Inc
toby.seward@shaw.ca
250-713-6595

Snuneymuxw First Nation Referral Management Checklist

Part 1 – Details of Referral (to be completed by referring ministry/agency)

Date Received: 2022-MARCH-03 External file no.(s):

Referring ministry/agency: RDN

Name of contact and contact details: Toby Seward Seward Developments Inc.
toby.seward@shaw.ca 250-713-6595

Type of permit, authorization or tenure: OCP/REZONING-AMENDMENT

Name of applicant/proponent: Toby Seward

Contact details: AS ABOVE

New application Yes ☑ No ☐ Renewal or extension Yes ☐ No ☐

General location: 1900 STALKER ROAD, GABRIOLA ISLAND

Overview map received Yes ☑ No ☐ Site specific map received Yes ☑ No ☐

Ministry Deadline for initial response:

Part 2 – Administration

Is the referral package complete with all documents, maps, studies, and other supporting information necessary to effectively review the application?

Yes ☐ No ☐

Part 3 – Background

A. Does the application recognize an understanding of the existing Treaty Rights of 1854?

B. Does the applicant show a willingness to adapt their standard approach to respect the interests held by Snuneymuxw First Nation?

Part 4 – Engagement with Snuneymuxw First Nation

a. Has the applicant or proponent made an attempt to meet with SFN government prior to applying for a permit within SFN traditional territory? Yes ☐ No ☑

Part 5 – Consultation by Crown

a Does the potential for adverse impacts exist if the permit, authorization or tenure is granted?

Yes ☐ No ☑ To Aboriginal title. If yes, attach details.

Yes ☐ No ☑ To the right to hunt as formerly. If yes, attach details.

Yes ☐ No ☑ To the right to carry on fisheries as formerly. If yes, attach details.

Yes ☐ No ☑ To other Aboriginal rights. If yes, attach details.

Yes ☐ No ☑ To heritage/archaeological resources. If yes, attach details.

Contact

Please submit this information in full to Snuneymuxw First Nation's Lands Clerk at landsclerk@snuneymuxw.ca

***Referrals will only be reviewed once all attached information has been received.**

BRITISH COLUMBIA

January 31, 2022 File: **21A0639**

To Chief and Council:

Re: Application 21A0639 for Inspection Permit

Mr. Owen Grant has applied for a Heritage Inspection Permit (application enclosed), pursuant to section 12.2 of the *Heritage Conservation Act,* to conduct an Archaeological impact assessment of 1900 Stalker Road, Gabriola Island for the proposed rezoning of the property from private land to bare land strata within the boundary of DgRw-23. Through this letter, the Province is initiating consultation with your Nation regarding this application.

If approved, this application will authorize Archaeological Impact Assessments (AIAs) within the permit application area. AIAs are information-gathering studies to identify and assess potential impacts to archaeological sites and make management recommendations to support land-use decisions. This permit does not authorize any development activities (e.g., timber-harvesting).

The Province is aware of your Nation's established or claimed Aboriginal rights and/or title or treaty rights ("Aboriginal Interests") in the proposed permit area and that this application has the potential to impact these Interests. The Province recognizes that the information available to us is not conclusive or exhaustive; therefore, any additional information about your Aboriginal Interests and how they may be impacted by this application is welcome.

The enclosed application describes the proposed area to be assessed, potential impacts associated with the assessment activities, information about the study area, and the proposed archaeological methods. In addition to pedestrian survey, subsurface testing, and artifact collection, this application allows for archaeological methods which may include, but are not limited to, systematic data recovery, or machine-assisted inspections, which may result in more invasive impacts to protected sites. The applicant may have provided goals and objectives, and approaches in the application which are outside the scope of HCA permitting.

Please note, the applicant may distribute NoIs during the review period, before a decision has been made whether to issue this permit.

If you have any comments on this proposed application, please advise in writing by **March 17, 2022,** clicking the linked email address and copying in the subject line provided below:

ArchPermitApp@gov.bc.ca

Subject Line: **Attn: Kira Kristensen – Comments on Application 21A0639**

Ministry of Forests, Lands, Natural Resource Operations and Rural Development

Archaeology Branch

Phone: (250) 953-3334
Fax: (250) 953-3340

Mailing Address:
PO Box 9816 Stn Prov Govt
Victoria BC, V8W 9W3

Website: http://www.for.gov.bc.ca/archaeology/ **Email:** ArchPermitApp@gov.bc.ca

Your review and response is requested within this time period to ensure the Province is able to consider any information you provide in the decision making process for this application. If you require additional time to respond, due to COVID-19 or other considerations, please let us know as soon as possible.

The following will support your review of this proposed application:

- Permit application with maps attached
- Spatial data
- Other relevant documents (e.g., Shared Engagement Records, as appropriate)

Please advise if you require additional information to support your review of the proposed application.

The decision regarding the proposed application will consider all concerns and comments provided to the Archaeology Branch:

- Should you identify concerns regarding potential adverse impacts to Aboriginal Interests that could result from the activities proposed under this permit, please identify the specific interest, nature of the impact(s), and possible accommodations.
- Note that any comments regarding proposed archaeological methods and other proposed accommodations may be forwarded to the permit applicant(s) for input as well.

We recognize that the COVID-19 pandemic is shifting organizational priorities and is affecting the capacity of First Nations to engage in consultation activities. Consequently, except in emergency situations, we have extended all referral periods by a minimum of **15 days**.

Where possible, we will further extend timelines on consultations that involve non-urgent files or decisions. The applicant has indicated that the proposed application, however, relates to Covid-19 Essential Services.

The Branch feels it is critical and in the public interest to move forward with the consultation on this application. In these circumstances, we ask that if you can, please provide your response to the Branch by **March 17, 2022** to support the decision-making process for this application. Please let us know as soon as possible if the Branch can support your review of this application, or if you need additional time to respond, due to COVID, flooding or other circumstances. The Province proposes to proceed to decision shortly after this date.

If you have any questions about the Archaeology Branch permitting process in general, please don't hesitate to contact me.

Sincerely

Nathan Friesen
Permitting & Assessment Supervisor
NF/jgf/Encl.

pc: **Mr. Owen Grant**

Material contained in this referral may be confidential and should be delivered only to the addressee. If all pages are not received, please call 250-953-3334

From: **Desiree Thomas** Desireet@snuneymuxw.ca
Subject: HIP 21A0639
Date: February 23, 2022 at 10:33 AM
To: Archaeology Permit Applications FLNR:EX ArchPermitApp@gov.bc.ca
Cc: toby.seward@shaw.ca, dforbes@baselinearchaeological.ca

DT

Good afternoon,
Thank you for the Referral information regarding *Heritage Inspection Permit application 21A0639* for 1900 Stalker Road, Gabriola Island. Please see the receipt letter attached as confirmation of Snuneymuxw intention to participate in this referral. Snuneymuxw has developed and implemented the Snuneymuxw Referral Management Policy, a right-recognition approach to administering requests for Snuneymuxw consent and/or comments for various activities within Snuneymuxw Territory. This approach is consistent with the solemn constitutional obligations under the Snuneymuxw Treaty of 1854. This approach includes a fee structure as part of the referral policy. Due to the high volume of referrals submitted to Snuneymuxw First Nation, the fee structure assists Snuneymuxw to move through the treaty process in an efficient manner. This referral is subject to $750 admin referral fee. SFN expects that these costs to be borne by the applicant(s). Fees are due as soon as possible, and a formal SFN invoice can be provided upon request. Cheques can be made out to Snuneymuxw First Nation, Attn: HIP 21A0639 and sent to 668 Centre Street, Nanaimo BC, V9R 4Z4.

Desiree Thomas
Lands Clerk
668 Centre Street, Nanaimo BC, V9R 4Z4
EMAIL: desireet@snuneymuxw.ca
PHONE: 250-824-1351

Snuneymuxw First Nation
668 Centre Street, Nanaimo BC, V9R 4Z4
TEL: 250-740-2300/1-888-636-8789
Fax: 250-753-3492
Web: http://www.snuneymuxw.ca

Snuneymuxw First Nation
668 Centre St., Nanaimo, B.C. V9R 4Z4
Tel: 250-740-2300 / 1-888-636-8789
Fax: 250-753-3492
Web: http://www.snuneymuxw.ca

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Snuneymuxw
First Nation
www.snuneymuxw.ca

February 22, 2022

To whom it may concern,

RE: Heritage Inspection Permit # 21A0639- 1900 Stalker Road, Gabriola Island

This letter is to notify your organization that Snuneymuxw First Nation (SFN) has received the above captioned referral. In order to properly review referrals including determining completeness of the referral package, we require a minimum of 60 days ("Review Period") from February 22, 2022. Our Nation receives a high volume of referrals on a daily basis, and we appreciate your patience.

On December 23, 1854, SFN entered into a Treaty with the Governor of the Colony, Sir James Douglas, representing the Crown at Nanaimo Harbour. The Snuneymuxw people have a Nation-to-Nation relationship with Canada and a Government-to-Government relationship with British Columbia. The Treaty of 1854 is a Treaty within section 35 of the *Constitution Act, 1982* and protects the land, marine, aquatic and harvesting rights of the members of the Nation individually and as a whole. The position of Snuneymuxw, based on the Treaty of 1854, is that consent of the Nation is required before any exploration, development, permit or approval granted in relation to the traditional territory of the Snuneymuxw people.

If you require further information about the 1854 Treaty, the inherent and Aboriginal rights of the Snuneymuxw First Nation, or the traditional use and occupation of our territories and waters, please provide us with specific requests in writing.

During the Review Period, SFN will review the referral package and if the package is incomplete, we will require further information from yourself, government, the proponent and/or a related party. However, if you have not heard from SFN within the Review Period does not equate to SFN support for this referral. Depending on the referral package and the impacts to SFN treaty rights, we may require more time to review and respond appropriately.

The Snuneymuxw First Nation, as a Treaty First Nation, takes the position that the consent of the Nation is required prior to any development impacting our lands and/or resources. In some cases, there may be mitigating or accommodation measures that the Snuneymuxw First Nation can consider or accept, but such arrangements must be the product of direct discussion and consent. The honour of the Crown in relation to our

Snuneymuxw First Nation, 668 Centre St., Nanaimo, B.C. V9R 4Z4
Tel: 250-740-2300 / 1-888-636-8789 Fax: 250-753-3492 info@snuneymuxw.ca

lands, waters and peoples is a lawful obligation and is not waived by Snuneymuxw in any circumstance.

Once the application has been reviewed by your organization based on our requirements, please set up a phone call, virtual meeting, or in-person meeting to discuss next steps.

Please contact our Lands Clerk at landsclerk@snuneymuxw.ca Monday – Friday between 8:00AM-4:00PM if you have any further questions.

Sincerely,

Lands Clerk
Snuneymuxw First Nation
668 Centre Street
Nanaimo, BC V9R 4Z4

Snuneymuxw First Nation, 668 Centre St., Nanaimo, B.C. V9R 4Z4
Tel: 250-740-2300 / 1-888-636-8789 Fax: 250-753-3492 info@snuneymuxw.ca

Attachment D

1900 Stalker Road, Gabriola Island, OCP/Rezoning Application

Contact with BC Parks Regarding Proposed Park Dedication

Following exchange of emails, we set up a teams meeting call October 20, 2023 with Catherine Jacobson, Planning Section Head, West Coast, BC Parks and Bradley Lapham, Area Supervisor, BC Parks to discuss the proposed park dedication as part of the rezoning or future subdivision of the Stalker Road property.

In the call, we explained the history of the property and the plan for a future bare land strata subdivision. The subdivision would include a proposed dedication of a strip of land from the Stalker Road property to BC Parks, to be added to the adjacent Drumbeg Park property, as outlined on the survey plan from Turner Surveying.

Both Catherine Jacobson and Bradley Lapham said they were pleased to hear about the proposed dedication well in advance of the referral from the Island Trust or MOTT, as they usually don't hear of any proposed park dedication until much later in the rezoning or subdivision process. They advised the park dedication looked promising and would look forward to discussing the dedication in more detail at rezoning or subdivision stages. Bradley Lapham advised that he had recently been to Drumbeg Park and was aware that some park users may have been trespassing onto the Stalker Road property and wish to determine how best to address the trespass. He advised that the land acquisition coordinator for BC Parks would be involved in the process, if a dedication and associated boundary adjustment was formalized.

We advised them that we would look forward to working with BC Parks staff when the park dedication was further considered. They agreed that they would be happy to discuss the dedication with us when more information is available.

Previous to discussing the proposed dedication with BC Parks staff, we talked to the RDN Parks planner and she advised that Drumbeg Park was a provincial park, therefore any discussions on a dedication should be dealt with through BC Parks.

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

Attachment E

1900 Stalker Road, Gabriola Island, OCP/Rezoning Application

Community Information Meeting Summary

In advance of submitting a OCP and rezoning application, a pre-application community information meeting was held on October 21, 2023 to receive input from neighbourhood residents. The meeting was held at the boardroom at Page's Inn on Silva Bay, 3415 South Rd., Gabriola from 2.00 PM–4.00 PM

A month in advance of the meeting, we mailed out an information bulletins to 18 property owners who live nearby the Stalker Road property. At the meeting drawings of the proposed subdivision and feedback forms were made available.

At the meeting five of the property owners attended, as well as the owner's representative. Two neighbours attended the meeting and later provided a letter of support for the rezoning amendment. One feedback form was received from a neighbouring property owner, who saw no reason to oppose the application as long as there were no more than three dwellings and each dwelling was for a single family only. An email was received from another property owner, requesting a copy of the subdivision plan, which was forwarded to them. No further comments were received.

Throughout the 54 years that the families have owned the property, they have been part of the community and have established many friendships, which has resulted in a strong unreserved support for their proposal. During the families discussions with their neighbours, there has been no concerns raised regarding the proposed amendments.

A copy of the information bulletin and correspondence received from neighbours is attached.

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

1900 Stalker Road, Gabriola – Proposed Rezoning & Future Subdivision

Pre-Application Community Information Meeting – October 21, 2023

Background – The property owners plan to make an application to the Islands Trust to rezone their property at 1900 Stalker Road to allow for a future 3 lot subdivision. This 8.9 acre property was purchased by three families in 1970 and three cottages were built on the property in 1971. For the past 53 years, the property has been used by the 3 families and is now owned by the next generation of family members. The owners now wish to rezone the property, to allow each family to have their cottages on a separate lot, while sharing their common driveway. There is no development plan associated with this proposed application.

Information Meeting – In advance of submitting a rezoning application, the property owners are holding a Pre-Application Community Information Meeting, to receive input from neighbourhood residents. The meeting will be held:

Saturday, October 21, 2023, 2.00 – 4.00 PM
Page's Inn on Silva Bay, Boardroom, 3415 South Road, Gabriola

At the meeting, drawings of the proposed subdivision and feedback forms will be available. The owner's representatives will be in attendance at the meeting and will be available to provide information and answer questions.

At a later date, the Islands Trust will schedule a Public Hearing, which will allow area residents to provide feedback to the Islands Trust regarding the rezoning

If you were unable to attend the meeting and wish to provide feedback regarding the proposed rezoning, please email the attached feedback form as noted below.

Contact/Questions – If do you have any questions or require further information regarding the Pre-Application Community Information Meeting, please contact the owner's representative; Toby Seward, by email toby.seward@shaw.ca, or by telephone at 250-713-6595. Feedback forms can be emailed to the owner's representative. Please send feedback forms by October 30.

September 17, 2025

Islands Trust
Northern Office
700 North Road
Gabriola Island, BC
V0R 1X3

Email: sbaugh@islandstrust.bc.ca

Dear Steven Baugh, Planner

Re: 1900 Stalker Road, Gabriola Island - Application to Amend the OCP and Rezone the Property – Additional Information to Support the Application

Further to our OCP and rezoning application March 28, 2025, our site meeting June 7, 2025 and the meeting I had with Sonja Zupanec and you on July 16, 2025, we have prepared additional information that we discussed in our meetings. We wish to amend the OCP and rezone the property, with the goal of making a future application for three lot bare land strata subdivision. Attached is the following information for your review:

Property History from 1970 – 2025

The property owners have provided the attached history of the property from the time it was purchased by the families in 1970, until today. The owners wish to keep the property for future generations of the families, continue to be involved in the Gabriola community and as part of the proposed amendments, they propose to register a covenant that keeps the property substantially in its current form, for the enjoyment of future generations of the families.

Proposed Covenant Conditions

Further to our discussions with staff, the owners are proposing to register a covenant on the property as a condition of the OCP and zoning amendments. A copy of the proposed covenant conditions is attached.

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

Copies of Electrical and Sewer Disposal Permits from 1971-1972

As requested, attached is correspondence regarding approval of electrical and sewer disposal permits for construction of the three cottages, starting in 1971. In discussions with RDN staff, they advised that no building permits were required in 1971 for construction of the three cottages, as only electrical and sewage disposal permits were required at the time of construction.

Proposed Site Visit with Gabriola Local Trust Committee Members and Islands Trust Chair

As discussed, we request that a site meeting be scheduled with the two Gabriola Local Trust Committee (LTC) members, the Islands Trust Chair (if available), Islands Trust staff and one or two representatives of the property owners. This meeting would be scheduled to allow Islands Trust members to view the property and receive information from Islands Trust staff regarding the proposed amendments, if required. Property owner representatives would attend the site meeting to observe, but not participate in discussions about the application, unless requested.

Amended Survey Plan

As requested, Turner Surveyors have prepared an amended survey plan that includes all buildings on site (attached).

Please advise if the additional information provided in this letter addresses the points that were discussed in our June 7 and July 16, 2025 meetings or if any additional information is required.

Yours truly

Toby Seward
Seward Developments Inc

ec Property Owners

Seward Developments Inc.
toby.seward@shaw.ca
250-713-6595
1820 Argyle Avenue, Nanaimo, B.C., V9S 3K7

September 17, 2025

1900 Stalker Road, Gabriola

Proposed Covenant Conditions

Proposed conditions to be included in a restricted covenant that will be registered on the property title as a condition of final approval of the OCP/rezoning. The six attached conditions would be submitted to the Islands Trust staff, with actual wording of the covenant conditions determined by your lawyer and the Islands Trust lawyer during the OCP/rezoning process.

1.) The sizes of the three existing cabins is limited to the size of the existing building footprints, plus up to an additional 20% area of the existing building footprints.
2.) The proposed park dedication on the south side of the property, adjacent to Drumbeg Park, as shown on the Turner and Associates land survey dated October 12, 2023, will be transferred to BC Parks as a condition of final approval of a future three lot bare land strata subdivision that will be submitted to the Ministry of Transportation and Transit (MoTT), after successful completion of the OCP and rezoning.
3.) The property owners will work with the Gabriola Land and Trails Trust (GalTT) and BC Parks to remove the broom in the proposed park dedication area and the adjoining 3.0m north of the proposed park dedication area.
4.) When the broom is removed, the property owners will work with BC Parks to identify a method to delineate the new park boundary from the property owner's private property.
5.) A tree and vegetation protection area will be identified in the proposed common areas adjacent to the west and south property lines as shown on the Turner and Associates survey, which the exception that trees and vegetation can be removed to address fire smarting the property, dangerous trees, servicing requirements for driveway access for emergency vehicles/delivery vehicles, hydro lines, utilities, wells, sewer disposal systems, etc.
6.) Limit outbuilding construction to what currently exists on site, with the exception of proposed Lot B as shown on the Turner and Associates survey, which will be permitted to construct one additional outbuilding up to the size of existing outbuildings on proposed lots A and C.

AQUAPARIAN
Environmental Consulting Ltd.

BIOPHYSICAL ASSESSMENT
1900 STALKER ROAD, GABRIOLA ISLAND, BC

Completed for:
C/O Seward Developments Inc

Via Email:
toby.seward@shaw.ca

November 4, 2024

203 – 321 Wallace Street Road Nanaimo, BC V9R 5B6, 250-591-2258
Cell SARAH BONAR 250-714-8446 CHRIS ZAMORA 250-714-8864

Contents

Attachments:

Figure 1: Site Location Map
Figure 2: Site Plan – Turner & Associates
Figure 3: Ecosystem Polygon Map
Figure 4: Gabriola Island Sensitive Ecosystem Mapping– 2007
Figure 5: Islands Trust Sensitive Ecosystem Mapping (MapIT)

Appendix A: Site Photographs
Appendix B: Wildlife Tree Stewardship & BC Great Blue Heron Atlas

1.0 INTRODUCTION

Aquaparian Environmental Consulting Ltd (Aquaparian) was retained to complete a Biophysical Assessment (BA) of 1900 Stalker Road, Gabriola Island BC. The parcel is located within Electoral Area B of the Regional District of Nanaimo (RDN) and is within the Islands Trust (IT) Gabriola Island Planning Area. A review of the Islands Trust MapIT interactive mapping system and the RDN's Official Community Plan (OCP) did not identify any Development Permit Areas (DPAs) that apply to the subject parcel. The parcel is 8.9 acres (3.6 ha) in area and is legally identified as follows:

- LOT 1, SECTION 4, GABRIOLA ISLAND, NANAIMO DISTRICT, PLAN 16560 (PID 004-008-910).

A site location map of the study area in relation to Gabriola Island has been included in this report as Figure 1a with a close-up of the parcel as Figure 1b. A selection of site photographs taken during the site survey has been included as Appendix A.

In preparation for this report, Aquaparian has reviewed the RDN's OCP, RDN and IT bylaws, and relevant provincial government databases to collect background information for the site. Aquaparian completed a site assessment of the property on October 9, 2024. As understood, the waterfront property is developed with three cottages that are owned by three separate families, and the owners intend to subdivide the parcel to create three separate strata lots that each contain one of the cottages. A 0.3 acre (0.12 ha) strip of the parcel along the south side will be donated as park land. The remaining 3.73 acres (1.76 ha) will be common property containing the access driveways and a privacy buffer for the adjacent public park to the south. A site plan has been provided by Turner & Associates Land Surveying and is included with this report as Figure 2.

This BA has been prepared to provide a characterization of the study area including identification of environmentally sensitive features and attributes found within and adjacent to the parcel. This report has been prepared to reflect the Islands Trust Conservancy Baseline Inventory Standard. This assessment is required to support a rezoning application to the Islands Trust and a future subdivision. The BA will also identify any environmental regulatory approvals or permits required for any potential future development. As understood, no development is planned at this time, so this assessment has been prepared assuming no changes are proposed outside of lot creation.

2.0 REGULATORY FRAMEWORK

The following is a list of federal, provincial and municipal environmental regulations, current at the date of preparing this report, that *may* apply to development of the subject parcel:

Federal *Migratory Birds Convention Act, 1994*. Most species of birds in Canada are protected under this act. "Migratory birds" are defined by Article I of the Convention which names the families and sub-families of birds protected and provides some clarification of the species included. In general, birds not falling under federal jurisdiction within Canada include grouse, quail, pheasants, ptarmigan, hawks, owls, eagles, falcons, cormorants, pelicans, crows, jays, kingfishers, and some species of blackbirds.

Federal Migratory Birds Regulations, 2022 (MBR), provides protection to migratory bird nests when they are considered to have a high conservation value for migratory birds. The MBR prohibits the damage, destruction, removal or disturbance of nests of all migratory birds when there is a live bird or viable egg, or if the nest was built by a species that is listed in Schedule 1 of the regulation. Schedule 1 lists 18 species which are protected year-round unless their nests are shown to have been abandoned for a designated period of time depending on the species. In BC there are only two Schedule 1 species; great blue herons are protected for 24 months after reporting the nest is unoccupied, and pileated woodpecker are protected for 36 months after reporting unoccupied.

***Species-at-Risk Act*.** The *Act* is a key federal government commitment to prevent wildlife species from becoming extinct and secure the necessary actions for their recovery. It provides for the legal protection of wildlife species and the conservation of their biological diversity. This Act applies to Federal lands. It also applies to critical habitat on private lands and:

- all endangered, threatened and extirpated migratory birds listed in Schedule 1 of SARA and protected by the *Migratory Birds Convention Act*, 1994, anywhere they occur, including private lands, provincial lands and lands within a territory; and
- all endangered, threatened and extirpated aquatic species listed in Schedule 1 of SARA, anywhere they occur, including private lands, provincial lands and lands within a territory.

Section 34 of the Provincial *Wildlife Act*, states that a person commits an offence if the person, except as provided by regulation, possesses, takes, injures, molests or destroys:

- a bird or its egg,
  (b) the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron or burrowing owl, or
  (c) the nest of a bird not referred to in paragraph (b) when the nest is occupied by a bird or its egg.

During the nesting season, clearing vegetation in proximity of an active nest may 'molest' the nesting birds, and could result in an offense. Provincial guidelines indicate the songbird nesting season in this area for forest habitat is from March 15th to August 15th of a given year. Some raptors (bald eagle, hawks, owls etc.) and great blue herons start earlier in the year; nesting for these species can start as early as January or February and extend until August 15th of a given year.

Heritage Conservation Act. All archaeological sites, recorded or not, are protected under the *Heritage Conservation Act* and must not be altered or damaged without a site alteration permit from the Archaeology Branch. As understood, municipalities have access to provincial records that show recorded sites and sites with high potential for archaeological resources. If a known site is located on the parcel, an archaeological consultant will need to be retained to provide advice. If the site has a high potential, it is recommended to retain and archaeological consultant to provide recommendations. Archaeological assessments are outside the scope of this report.

3.0 SITE DESCRIPTION

The subject parcel is irregularly shaped and located on the east side of Gabriola Island, waterfront to the Strait of Georgia. The parcel is mostly forested and developed with three family cottages and some small ancillary buildings. Each cottage has a back yard/lawn area that has been cleared when the cottages were constructed in the 1970s. The property is a panhandle lot, accessed from the end of Stalker Road to the west via a long gravel driveway that splits within the larger property to provide access to each cottage. Drumbeg Provincial Park (66 acres (26.7 ha)) is situated to the south and west, and private property is located to the north.

The site was traversed by Aquaparian (Oct. 9, 2024) by foot and observations of ecological characteristics including topography and species composition were documented throughout the parcel. Five sample plots were assessed to collect detailed observations of the forest composition. The site is approximately 75% forested with a second growth dry Douglas fir (*Pseudotsuga menziesii*) forest that has been selectively logged in the past. Large, veteran trees are scattered throughout the forest. Overall, the parcel slopes gently to the east towards the ocean with a low sandstone bedrock shoreline at the north end, and small pocket beaches moving south. The forest terrain is relatively flat to slightly hummocky. The west side of the parcel where the panhandle driveway is located is undulating. No watercourses or wetlands were identified. A map of ecosystem polygons identified within the parcel is included as Figure 3.

4.0 ENVIRONMENTAL SETTING

4.1 Physical Resources

The following section provides a general overview of biophysical attributes and land use of the site documented by government databases, crown publications and from Aquaparian's reconnaissance of the property.

4.1.1 Topography

The site ranges in elevation from 22m above sea level at the west side near the entrance down to 0m at the shoreline to the east. There is a low rocky slope (~1m high) at the northeast side and more gradually sloped beaches to the southeast. There is a small hill along the panhandle driveway, but no other steep slopes exist. The forested portion of the parcel is gradually sloping and only hummocky at the west side.

4.1.2 Climate

The property is located within the Moist Maritime Coastal Douglas-fir Subzone (CDFmm). The CDFmm is restricted to low elevations along southeast Vancouver Island from Bowser to Victoria, the Gulf Islands south of Cortes Island, and a narrow strip along the Sunshine Coast near Halfmoon Bay. Elevational limits typically range from sea level to approximately 150m.

The CDFmm lies in the rain shadow of the Vancouver Island and Olympic Mountains resulting in warm, dry summers and mild, wet winters. Growing seasons are very long and feature pronounced water deficits on zonal and drier sites. The CDFmm represents the mildest climate in Canada. *(Green and Klinka).*

4.1.3 Land/Soil

A review of the technical report No. 43 "Soils of the Gulf Islands of British Columbia – Volume 4 Soils of Gabriola and Lesser Islands" (1990) and map indicates soils found within the study area are comprised of Bellhouse (BH) soils along the east side of the property and Saturna (ST) soils over the rest of the property. Both soils are derived from sandstone origins.

Bellhouse soils are rapidly to well-drained soils that have developed on shallow colluvial and glacial drift materials of channery, sandy loam texture over fractured or smooth, unweathered sandstone bedrock within 100cm. Coarse fragment content varies between 20 and 50%. The soil has dark-coloured Ah horizon of at least 10cm thick that is high in organic matter content. The Bellhouse landscape consists of shallow soils over bedrock on gently to moderately sloping (2-15%) topography in subdued (undulating) terrain, and in some places on steeply sloping (16-

30%) sideslopes of rock ridges. (Kenney *et al.* 1990).

Saturna soils are well-drained soils that have developed on shallow deposits of channery sandy loam textured colluvial and glacial drift over sandstone bedrock within 100cm of the surface. Coarse fragment content varies between 20 and 50%. These soils are associated with gently to strongly sloping (6-30%) topography in subdued to hummocky terrain or on very strongly to steeply sloping (31-100%) side slopes of rock ridges. (Kenney *et al.* 1990).

4.1.4 Surface Water

A review of the Provincial Habitat Wizard database, the Gabriola Island MapIT, and the RDN map did not identify any watercourses within the subject parcel. No watercourses or wetlands were observed. There is a small (3-4m) long section of ditch along a low part of the driveway that appears to direct water into the forest, no channel was observed. Soils and vegetation are indicative of dry conditions and no evidence of saturated soils was observed. Drumbeg Provincial Park has a small watercourse that originates southwest of the subject parcel and flows south to the ocean; this appears to the closest freshwater feature.

4.1.5 Groundwater

The site is overall well-drained and dry. No seepage areas or vernal pools were observed in areas near the shoreline where thinner soils were noted. Thin, dry soils overlying bedrock make up most of the parcel. No saturated soils or patches of wetland plant species were observed within the parcel that would indicate areas with deep soils and a high water table.

The provincial map Groundwater Wells and Aquifers identifies that the parcel is dependent on Aquifer 709, a fractured sedimentary rock (bedrock) aquifer that is 46.8 km^2 and is rated as high vulnerability.

4.2 Biological Resources

4.2.1 Flora

The parcel has a relatively uniform dry Douglas fir ecosystem dominated by a selectively logged second growth canopy of Douglas fir with many large veteran trees spaced throughout. Fire scars on the base of mature trees indicate a past fire or controlled slash burning during logging practices. Towards the shoreline along the east side of the parcel there is an increase in arbutus (*Arbutus menziesii*) and Garry oak (*Quercus garryana*). The forest understory is predominantly comprised of grasses, dull Oregon-grape (*Mahonia nervosa*), salal (*Gaultheria shallon*), bracken fern (*Pteridium aquilinum*), sword fern (*Polystichum munitum*), oceanspray (*Holodiscus discolor*), baldhip rose (*Rosa gymnocarpa*), trailing blackberry (*Rubus ursinus*),

hairy honeysuckle (*Lonicera hispidula*), yerba buena (*Clinopodium douglasii*), herb-Robert (*Geranium robertianum*), sweet-scented bedstraw (*Galium trifolium*), and lesser amounts of woodland strawberry (*Fragaria vesca*), grand fir saplings (*Abies grandis*), invasive holly (*Ilex aquifolium*) and invasive Scotch broom (*Cytisus scoparius*). The Biogeoclimatic site series classification is 02 FdPl – Arbutus which is categorized by Very Dry soils with a Very Poor to Medium soil nutrient regime (Green & Klinka, 1994).

Towards the shoreline where the parcel has been cleared for recreational use and soils are thinner and drier, there are more grasses in the understory as well as weedy herbs including English plantain (*Plantago lanceolota*) and dandelion (*Taraxacum* sp.). The canopy is open, less than 20% overall cover and comprised of scattered clusters of trees. Bigleaf maple (*Acer macrophyllum*), arbutus, Garry oak and Douglas fir are scattered along the shoreline with some Nootka rose (*Rosa nutkana*), common snowberry (*Symphoricarpos albus*), and Saskatoon berry (*Amelanchier alnifolia*) comprising the limited shoreline understory. The site lacks rocky outcrops or moss and lichen communities; the backyard appears to be characteristic of lawn rather than terrestrial herbaceous meadow habitat. It may have supported patches of terrestrial herbaceous meadow habitat prior to development, or else forest cover extended up to the shoreline. Aquaparian completed the site visit during the fall (October) so spring flowering species were not identifiable; no seed pods or evidence of meadow wildflower species were observed. No seeps or vernal pools that typically support rare wildflower species were noted. A spring and summer wildflower study would be required to confirm the absence of sensitive wildflower species within the parcel.

There is distinct terrestrial herbaceous meadow habitat within south-facing open canopy habitat in Drumbeg Provincial Park. Along the south property line between the park and the subject parcel there have been restoration plots created through a joint effort between Gabriola Land & Trails Trust (GaLTT) and BC Parks to remove invasive Scotch broom and orchard grass (*Dactylis glomerata*) and plant native Garry oak meadow species such as common camas (*Camassia quamash*) and yarrow (*Achillea millefolium*). Along the southeast side of the parcel adjacent to the restoration area is a large patch of Scotch broom and Himalayan blackberry (*Rubus armeniacus*), invasive species that readily spread in open, disturbed areas.

In the northwest corner of the larger portion of the parcel there are some clusters of snags with woodpecker cavities observed. Towards the west end of the panhandle (driveway), there are some lower areas alongside the driveway supporting western redcedar (*Thuja plicata*), bigleaf maple, bitter cherry (*Prunus emarginata*), salmonberry (*Rubus spectabilis*) and moss indicating moister soils.

4.2.2 Fauna

The subject parcel offers good quality forest habitat for racoon (*Procyon lotor*), red-squirrel (*Tamiasciurius hudsonicus*), western deer mouse (*Peromyscus sonoriensis*), black rat (*Rattus rattus*), Vancouver Island vagrant shrew (*Sorex vagrans* ssp. *isolatus*), American mink (*Neogale vison*), northern river otter (*Lontra canadensis*), and black-tailed deer (*Odocoileus hemionus)* for cover, forage and as a wildlife corridor to other forested areas on the island. A variety of local bat species are expected to utilize wildlife trees for roosting and may find insect forage in the clearing. The property owners have installed some bat boxes around the property. River otter, Steller sea lion (*Eumetopias jubatus*), and harbour seal (*Phoca vitulina*) were documented swimming near the shoreline during the site visit and a sea lion haul-out area was heard to the east. Other marine mammals that may be seen in the Strait from the subject parcel include California sea lion (*Zalophus californianus*), orca (*Orcinus orca*), and humpback whale (*Megaptera novaeangliae*); and less commonly grey whale (*Eschrichtius robustus*) and minke whale (*Balaenoptera acutorostrata*).

The open grassy area may be ideal for reptiles such as the western terrestrial garter snake, subspecies wandering garter snake (*Thamnophis elegans vagrans*), northwestern garter snake (*Thamnophis ordinoides*), common garter snake (*Thamnophis sirtalis*), and the northern alligator lizard (*Elgaria coerulea*). These species are often associated with the edges of meadows and typically associated with conifer forests (*St. John, 2002*). All three garter snake species have been documented near the subject parcel in Drumbeg Provincial Park by users of *iNaturalist.* Sharp-tailed snakes (*Contia tenuis*) have been found on some of the Southern Gulf Islands, but no documented evidence of populations on Gabriola Island was available.

The site is very dry and lacks resources for amphibians. Limited large woody debris on the forest floor may offer breeding habitat for terrestrial salamanders, but the site lacks seasonal standing water to provide breeding habitat for aquatic salamanders or frog species.

A detailed survey to confirm wildlife species presence was not completed as part of this assessment.

4.2.4 Birds

A variety of resident and migratory bird species are likely to inhabit and utilize the forested site for cover, forage, and a wildlife corridor to surrounding forested sites. Many bird species are expected to utilize the property on a seasonal basis for nesting. The migratory bird nesting period recognized for the area is March 15th to August 15th. Bird species identified during the site visit include common raven (*Corvus corax*), belted kingfisher (*Megaceryle alcyon*), spotted

towhee (*Pipilo maculatus*), red-breasted nuthatch (*Sitta canadensis*), chestnut-backed chickadee (*Poecile rufescens*), golden-crowned kinglet (*Regulus satrapa*), song sparrow (*Melospiza melodia*), dark-eyed junco (*Junco hyemalis*), common loon (*Gavia immer*), and rufous hummingbird (*Amazilia tzacatl*).

Some clusters of standing dead trees (snags) were identified in the northwest portion of the property that would be expected to provide feeding, nesting and/or roosting habitat to some bird species such as woodpeckers and secondary cavity nesting species that are dependent on woodpecker cavities. No tree removal is planned so Aquaparian did not complete a comprehensive pileated woodpecker (*Dryocopus pileatus*) nest tree survey. No pileated woodpecker nest trees were confirmed during the site visit.

Reviews of the provincial Wildlife Tree Stewardship (WITS) identified one mapped bald eagle (*Haliaeetus leucocephalus*) nest within the property identified as BAEA-101-012 “Drumbeg Park A”. The status was registered as “Nest Down” in 2014. Aquaparian located the tree and noted the Wildlife Tree sign on its base but did not see an eagle nest. A messy stick nest was observed that was not large enough to be an eagle nest or deep enough for a heron. It is expected to be a nest of a smaller raptor species (e.g. hawk) or a corvid (e.g. raven). The property owners reported to have seen many eagles perching throughout the parcel along the shoreline over the years but have never seen them nesting within the property or within this wildlife tree. There is another mapped tree BAEA-101-037 located approximately 130m north of the parcel that was registered as “Tree Cut” in 2004. A review of the BC Great Blue Heron nest inventory database did not show any mapped great blue heron (*Ardea Herodias fannini*) nests within or adjacent to the parcel. Aquaparian did not identify any eagle or heron nests or evidence of eagle or heron nests (i.e. whitewash, prey remains, feathers, etc.) within the parcel. The site has suitable conditions for raptor habitat due to the abundance of mature trees including some old growth trees that would be capable of supporting a larger stick nest, and the proximity to the ocean. The site also has several larger snags and mature trees that could offer nesting opportunities for owls.

A detailed bird survey was not conducted during the assessment. Species presence will change seasonally throughout the year.

4.2.5 Fisheries

No freshwater fish habitat was identified on site. The shoreline is expected to be frequented by a variety of marine species. Boulder and bedrock shoreline to the south (Drumbeg Provincial Park) was observed to have perch swimming along rock, and some small sandy pocket beaches along the shoreline of the subject parcel may have limited forage fish spawning potential. The BC Eelgrass Inventory website shows eelgrass mapped north and south of the

subject parcel.

4.2.6 Sensitive Ecosystems Inventory Mapping

The Sensitive Ecosystems Inventory of southeast Vancouver Island and the Gulf Islands (SEI) systematically identified and mapped specific rare and fragile ecosystems in this region. The purpose of the SEI project was to identify remnants of rare and fragile terrestrial ecosystems and to encourage land-use decisions that will ensure the continued integrity of these ecosystems.

Seven sensitive ecosystem types were mapped in the east coast of Vancouver Island study area as follows: Wetland, Woodland, Riparian, Older Forest (>100yrs), Terrestrial Herbaceous, Sparsely Vegetated and Coastal Bluff. Two other important ecosystems were mapped for their general biodiversity and wildlife habitat values: Older Second Growth Forest (60-100yrs) and Seasonally Flooded Agricultural Fields.

Several maps regarding sensitive ecosystem polygons are available on the Islands Trust website, but the maps are not consistent with one another. A review of the 2007 Gabriola Island SEI map (*Islands Trust*) identifies that the west side of the parcel has a primary Wetland ecosystem polygon that transitions into a secondary Wetland ecosystem mixed with a primary non-sensitive ecosystem in the central portion of the parcel. No Wetland habitat is found within the subject property. The SEI (2007) map also indicates that the east side of the parcel has a primary Woodland ecosystem mixed with a tertiary Terrestrial Herbaceous ecosystem polygon along the east side; some elements of these ecosystems are found in the site but the habitat is not entirely consistent with the definitions of Woodland and Terrestrial Herbaceous habitat. Woodland habitat is typically restricted to south-facing slopes and ridges with dry, shallow soils with bedrock outcroppings, and can exist in areas with dry conditions that prevent the development of dense forests (*Islands Trust*). The site has deeper soils and if left to regenerate the forest would likely extend south with a canopy cover of greater than 30% as determined by clusters of trees observed along the east side of the parcel. Typical Woodland habitat has between 10% and 30% canopy cover while Terrestrial Herbaceous habitat has <10% canopy cover (*Islands Trust*). The SEI (2007) map has been included with this report as Figure 4.

The MapIT interactive map has a Sensitive Ecosystems Inventory (SEI) layer (Fig. 5a) that incorrectly maps the southeast 1/4 of the parcel as Cliff habitat, while the Islands Trust Ecosystem Mapping (ITEM) layer (Fig. 5b) identifies Terrestrial Herbaceous meadow habitat along a small southeast portion of the parcel which is currently dominated by invasive Himalayan blackberry and Scotch broom. While natural Terrestrial Herbaceous meadow habitat was confirmed in Drumbeg Provincial Park, the subject parcel *may* have historically supported this habitat particularly at the south east side, until it was developed for recreational use in the

1970s, though soils appear deeper and forest would likely regenerate over most of the cleared portion if left alone. A mapped polygon identified as “Modified” correlates with the cleared recreational portion of the parcel. There is also a Mature Forest polygon mapped over most of the parcel, but site reconnaissance determined that the forest ecosystem is better represented by selectively logged second growth forest. Mature Forest is defined as 80-250 years old which was only represented by scattered mature (80+ years) trees, while regenerated Young Forest (40-80 years) dominates the canopy.

4.2.7 Species-At-Risk

The federal *Species-at-Risk Act* (SARA) is designed to prevent or reduce the likelihood of wildlife species becoming extinct or extirpated and to provide for the recovery and management of endangered, threatened and species of special concern as a result from harm by human activity. Provisions of SARA include prohibiting the taking or possession of listed species and the damaging or destruction of their residence and critical habitat. On private lands, this *Act* applies to aquatic or migratory bird species listed on Schedule 1 or critical habitat of Schedule 1 listed species that have a recovery plan.

The provincial BC Conservation Data Centre (BC CDC) assists in conservation of biodiversity in the province by collecting and sharing information about wildlife and ecosystems in the province. Species and ecosystems are placed on a Red, Blue or Yellow list to rank them according to their conservation status. Provincially Red-Listed species includes any ecological community, and indigenous species and subspecies that is extirpated, endangered, or threatened in British Columbia. Red-listed species and sub-species may be legally designated as or may be considered candidates for legal designation as Extirpated, Endangered or Threatened under the *Wildlife Act*. Blue-Listed species includes any ecological community, and indigenous species and subspecies considered to be of special concern (formerly vulnerable) in British Columbia.

The BC Conservation Data Centre identifies ecosystems at risk based on species composition and habitat condition. A search of occurrence records for designated rare or endangered plant and animal species or ecosystems for the study area with the British Columbia Conservation Data Centre (BC CDC) resulted in no records within the subject site. One small species occurrence polygon of Macoun’s meadowfoam (*Limnanthes macounii*) (Polygon 6724) is located in Drumbeg Provincial Park and depends on the presence of seeps or seasonally wet depressions in meadow habitat. These microhabitats are not found within the subject property.

There are a number of at-risk species listed by the BC CDC Ecosystems Explorer search tool which are considered to have some potential to occur at the study site. The search parameters

used were: animals or plants; BC conservation status red or blue; Gabriola Island Local Trust Area; CDFmm biogeoclimatic zone(subzone); habitat types/subtypes conifer forest – dry. A copy of the BC CDC Ecosystem Explorer search results for the region has been included as Appendix B. Species generated by the search results that have a *reasonable potential* to be found within the site are discussed briefly below:

Common Nighthawk (*Chordeiles minor*): Provincially Blue-listed; SARA 1-SC (2023)

A member of the nightjar family. Feeds on flying insects (e.g., mosquitoes, moths, beetles, flies, caddisflies). Forages at night or during the day catching insects high in the air or close to the ground and may forage on insects around artificial lights. Habitats include open and semi-open areas: open coniferous forests, savanna, grasslands, beaches, fields, vicinity of cities and towns including disturbed sites. Nesting occurs on the ground (no nest-building) on a bare site in an open area. In some areas, this species also nests on flat gravel roofs of buildings, perhaps related to prey availability at artificial lights. It prefers areas with sandy soil. In BC, this species typically lays eggs in mid-May and incubation is 18 days on Vancouver Island. (*BC CDC*). The coniferous forest with its open understory and the clear, grassy open area to the east may offer nesting and forage habitat for this species. Be mindful of potential nesting on bare ground when landscaping (i.e. mowing) in the late spring and early summer. Eggs are highly camouflaged and hard to spot but adults may display nest behaviours such as feigning wing injury, leading away from nest, or beating wings and hissing when defending eggs (*Poulin et al. 1996*). If eggs or nesting behaviour are observed within the site, avoid disturbance and keep dogs away from the nesting location between May and June or until young have fledged.

Band-tailed Pigeon (*Patagioenas fasciata*): Provincially Blue-listed

The Canadian breeding range of this large pigeon is restricted to southern British Columbia, mainly on southern Vancouver Island and along the mainland coast. The Band-tailed Pigeon uses a variety of habitats in coastal B.C., including forest edges and openings, urban backyards, urban parks, bushland, golf courses, and orchards. Winter habitat includes open woodland and edges with berries and acorns. Fall migrants use open coniferous habitat near farmland, shorelines with mineral sites, riparian habitat, railways, farmyards, and regenerating clear-cuts. The Band-tailed Pigeon eats mainly grain, fruit, acorns, pine nuts, and the flowers and new buds of shrubs and trees. Primary threats to the Band-tailed Pigeon include forestry practices, urban and industrial development and climate change (*BC CDC August 2024*). The subject parcel provides some suitable habitat for band-tailed pigeons due to the intact forest canopy for nesting, acorns as a food source, and berry-producing shrubs (holly, salal, dull Oregon grape, blackberry) for forage. A mineral source is critical to offset the high potassium level associated with their fruit diet; typical mineral sources include underground springs,

deposits on soils, and marine beaches (*COSEWIC, 2008*). Primary threats to the Band-tailed Pigeon include forestry practices, urban and industrial development and climate change (*BC CDC*). Sightings of this species observed on Gabriola Island have been recorded on *iNaturalist*, including a sighting documented in Drumbeg Provincial Park.

Howell's Triteleia (*Triteleia howellii*): Provincially Red-listed

Grows in Garry oak woodlands. Deep, dark soils and an extremely rich understory of low shrubs characterise the Garry oak woodlands in the Cowichan Garry oak Preserve. This species also occurs in Garry oak – arbutus stands at the base of rock outcrops, where the well-developed shrub layer has a high cover of oceanspray and tall Oregon-grape. Disturbed sites include private yards and roadsides. Flowers in late May and June. Outcompeted by Scotch broom and invasive grasses. (*BC CDC*). According to the Salt Spring Island Conservancy website, this species favours high pH soil found on sites on old shell middens. As the subject parcel has a shell midden visible along the shoreline and Garry oak habitat it may support this species. A spring wildflower study was not completed as part of this project.

Hoary Bat (*Lasiurus cinereus*): Provincially Blue-listed

Vancouver Island's largest bat with adult body length of 120-146mm. This bat is typically solitary, except for mother-young association; however, may form groups of hundreds during migration. Habitat includes primarily deciduous and coniferous forests and woodlands, including areas altered by humans. Forages for insects, especially moths, over various open areas and along riparian corridors. Usually roosts in foliage of large coniferous or deciduous trees near the end of branches 9-13m above the ground. May roost in rock crevices but rarely in caves. Roost site fidelity is low. Likely overwinters in southeastern USA, Western California and Mexico. May hibernate in tree cavities, squirrel's nests or in a clump of Spanish moss. (*BC CDC*). The intact forest with mature trees, wildlife trees, and an open clearing may provide suitable habitat for this species. They are not typically associated with bat boxes (*Community Bat Programs of BC*).

Little Brown Myotis (*Myotis lucifugus*): Provincially Blue-listed; SARA Endangered (1-E (2014))

The core range of this species appears to be from the Alaska-Canada Boreal Forest south through the northeastern United States, with smaller populations in the southern and western United States. In the northeast, individuals may migrate hundreds of kilometers between winter and summer habitats; in the west, these bats are believed to hibernate near their summer range. These bats use a wide range of habitats including human-made structures for resting and maternity sites as well as caves and hollow trees. Winter hibernation sites have a stable

temperature of 2-12ºC and include caves, mines, tunnels, etc. Maternity colonies are commonly found in warm buildings (eg. attics) and less commonly in hollow trees. Foraging requirements are also generalized, typically over water, along stream and lake edges or in woodlands near water. (*BC CDC*). This species was changed from Yellow- to Blue-listed in 2022. The forest stand containing some large diameter trees, bat boxes, and wildlife trees may provide suitable roosting habitat for this species, and the open clearing area provides forage.

Northern pygmy owl, *swarthi* species (*Glaucidium gnoma swarthi*): Provincially Blue-listed

There are three species of the seven owl species recognized in North America that breed in BC. The *swarthi* subspecies is endemic to Vancouver Island and adjacent islands. These owls are crepuscular, feeding on small mammals, reptiles, amphibians, a variety of bird species and invertebrates using a perch and pounce hunting method. They forage along roads through forested areas, openings within continuous forest, open stands, riparian corridors and open habitats along lakeshores and higher elevations. Forage sites include shrub, pole sapling, young, mature or old forest seral stages. This obligate secondary cavity nester is dependent on woodpecker or natural cavities in coniferous trees. Nesting sites include young forest with suitable wildlife trees, mature forest or old forest sites. (*Cooper and Beauchesne, 2004*). The intact young forest with scattered mature trees and stands of wildlife trees may provide nesting habitat for this species. Forage is expected to be available within the site.

Townsend's Big-eared Bat (*Corynorhinus townsendii):* Provincially Blue-listed

In Canada, it is restricted to British Columbia. On the coast, it inhabits Vancouver Island, the Gulf Islands and the Vancouver area. In British Columbia this species is associated with a variety of habitats from coastal forests to arid grasslands of the interior. Its elevational range in the province is from sea level to 1070 metres, although most occurrences are from low elevations. Although it is widespread across most of southern British Columbia, this bat is particularly vulnerable to human activity. Disturbing females with young will affect breeding success, and repeated disturbance at winter hibernacula will increase winter mortality. Females form colonies of a dozen to several hundred in dimly lit areas in buildings, caves or mines. This is one of the few bats that have been consistently found hibernating in British Columbia. The only nursery colony found in British Columbia was in the attic of a house on Vancouver Island; it consisted of about 60 females and their young. A late flyer, Townsend's Big-eared Bat emerges an hour or so after dark. It is an agile bat that is capable of flying at slow speeds *(BC CDC).* The parcel has an intact forest stand with a number of large diameter trees, standing dead trees, a forest edge next to an open grassy area, and bat boxes. It is expected that the property may provide foraging and roosting habitat for these bats.

Western Screech Owl, *kennicotti* subspecies (*Megascops kennicottii kennicottii*): Provincially Blue-listed

This owl species occurs at lower elevations within moist, coniferous and mixed forests and riparian woodlands. Often, they are associated with bigleaf maple or black cottonwood in riparian areas. They nest in natural tree cavities or abandoned woodpecker holes. This species is a generalist predator, feeding on small mammals (mice and shrews), insects and small birds but also fish, frogs and slugs (*BC CDC*). The intact forest with standing dead trees within the study area may provide suitable habitat for this secondary cavity nester.

White-lip Rein Orchid: Provincially Blue-listed

A perennial herb from tubers. Grows 20-55cm tall with terminal flower spike of small white flowers, sometimes faintly green, and an unpleasant scent. Found in dry forests and forest margins in the lowland to montane zones, north to Alaska and south to California; rare in coastal BC. (*E-flora*). Little information is available about this species. The dry forest ecosystem found within the site may provide suitable habitat for this orchid.

4.3 Land Use

4.3.1 Current Land Use

The parcel is developed for recreational use with three cottages and some ancillary buildings but is mainly forested. A long driveway off Stalker Road extends into the parcel to a clearing at the eastern end of the property, splitting into three driveways to access the cottages. The parcel is serviced by septic and well water. Ancillary buildings include a well pumphouse, shed, and two small cabins (bunkies). An overhead utility line extends diagonally (southwest to northeast) across the parcel with a connection extending from the centre of the parcel north into the neighboring parcel.

As understood, three families bought the property in 1970. The parcel has remained owned by the original three families and is used recreationally by multiple generations. No development has been proposed.

4.3.2 Archaeological Chance Finds

A detailed archaeological assessment and report have been completed by Baseline Archaeology. Aquaparian observed that there is a shell midden along the sand and gravel shoreline. Gabriola Island is part of the traditional territory of the Snuneymuxw First Nation and the lands remain unceded (*GaLTT*). Other First Nations also made seasonal use of Gabriola

and its resources and have overlapping claims (*GaLTT*). Archaeological sites, both recorded and unrecorded are protected under the *Heritage Conservation Act*. As understood, no development is proposed. If an archaeological find is encountered during any future development the BC Archaeological Branch contacted at 250-953-3334 for directions.

5.0 SUMMARY

The subject parcel is currently used recreationally by three families that purchased the property in the 1970s. The proposed rezoning is intended to allow for subdivision of the property to create three strata lot parcels for each family to own including Common Property and Park Dedication. No Development Permit Areas apply to the parcel. The parcel is predominantly forested and has been partially cleared at the east side for recreational development, but no further development is proposed. The site has a uniform, selectively logged, second growth forest canopy over most of it, with scattered mature (80+ years) Douglas fir, arbutus and Garry oak. The open area near the shoreline to the east was likely once Terrestrial Herbaceous meadow but is now lawn/yard with scattered clusters of Garry oak, arbutus and Douglas fir. Sensitive meadow habitat is preserved in Drumbeg Park to the south. There is a large patch of Himalayan blackberry and Scotch broom to the southeast

Several species of migratory birds were identified during the site visit and it is expected that a wide diversity of songbirds would make use of the layered canopy within the site as nesting habitat and forage on cones and berries throughout the property. No eagle or heron nests were identified within the property though there appears to be suitable nesting habitat for small and large raptor species. Standing dead trees and snags are expected to provide cavity nesting habitat for woodpeckers and secondary cavity nesting species as well as bat roosting habitat. A variety of small mammal species are expected to utilize the intact forest habitat and river otter and marine mammals are seen in the nearshore marine waters fronting the parcel. Reptile species are likely to be found in the open cleared area, but amphibian habitat is limited due to dry, thin soils and no freshwater habitat. The parcel also has features that may potentially support a number of species-at-risk.

No watercourses or wetlands were identified within the parcel. Ground conditions include dry, thin soils over sandstone bedrock with no springs, seeps or vernal pools observed. Marine shoreline habitat dominates the east side of the parcel. Shell middens were observed along the eroding shoreline soils.

This Biophysical Assessment has been completed using the Islands Trust Baseline Inventory Report Standard as a guideline. The assessment includes an inventory of physical and

biological features of the parcel to provide a baseline environmental overview and to identify any sensitive attributes associated with the property. This report is intended to support a rezoning application to the Islands Trust.

6.0 ENVIRONMENTAL PROTECTION RECOMMENDATIONS

At the time of writing this assessment report no development is proposed. The following general environmental protection measures are provided for planning purposes for any future development of this property. Additional measures may be warranted depending on finalized development plans and construction timing:

- Vegetation clearing is to be completed outside the migratory songbird nesting season for the area (March 15th – August 15th). Clearing proposed within this time frame requires one or more pre-clearing nest surveys by a suitably qualified Biologist to avoid damage or disturbance to breeding birds. Clearing during the peak season is not recommended (April 15 – July 15) because spotting small songbird nests or discrete nesting behaviour would be difficult in the site's high, multi-layered canopy.

- Trees with pileated woodpecker nest cavities are protected under the Migratory Bird Regulation (2022) for 36 months after being confirmed inactive. If clearing of trees with potential pileated woodpecker nest cavities is proposed, retain a qualified Biologist to confirm before removal.

- Archaeological consultation may be warranted for ground disturbance based on evidence of shell middens exposed along the shoreline. Baseline Archaeological has completed an archaeological assessment and should be consulted at the development planning stage. Archaeological sites, both recorded and unrecorded are protected under the *Heritage Conservation Act*. If an archaeological find is encountered during construction, activities must be halted, and the BC Archaeological Branch contacted at 250-953-3334 for directions.

- No sediment-laden water is to be discharged into the marine environment. Sediment and erosion measures are to be implemented as necessary to protect the marine environment depending on weather conditions and construction method.

- No deleterious substances (oils, grease, gasoline, diesel, etc.) are to be allowed to enter the marine environment.

- On-site machinery should be power washed and free of leaks before entering the site. All heavy equipment used on-site should be inspected daily and have a proper spill kit on board in case of any leakage or spills of hydrocarbons.

- All fill brought to the site is to be clean i.e. free of hazardous contaminants and free of invasive weeds or seeds. And,

- Removal of Scotch broom and Himalayan blackberry and restoration with native Garry oak ecosystem species is recommended to strengthen the ecology of the site. This work could take multiple seasons to complete and would be considered an ongoing project. The patch of invasive plants is located adjacent to restoration efforts in Drumbeg Provincial Park to the south. Additional clusters of Scotch broom are found along the edge of cleared forest (e.g. around the edge of the clearing for the middle cottage) The following recommendations for eradication of these invasives is based on the *Invasive Species Council of BC: Himalayan Blackberry Factsheet & Scotch Broom Tips*:

  1. **Himalayan blackberry**
  - Plan for blackberry removal in late August/September when the plants are stressed and when the migratory bird nesting season (March 15-August 15) is over;
  - Removal is only successful if all parts of the plant are removed. This includes canes, roots and root crowns;
  - Cut canes down to ~30cm before digging/grubbing to remove thickets while easily locating root crowns;
  - Hand pulling is recommended for small seedlings or young plants or shade-supressed canes. Pull when plants are large enough to grasp but have not produced seeds.
  - Dig/grub more established plants, avoid leaving root fragments behind as they may resprout. Claw mattocks or Pulaskis have been proven to be effective tools;
  - If machines will be used, dig deep and carefully to get all of the root crown; and,
  - Bag or tarp all plant parts and seeds before transporting to a designated disposal facility such as a landfill or destroy by incineration.

  2. **Scotch broom**
  - Minimize soil disturbance adjacent to infestations to contain seed spread;
  - Cut plants below soil before flowering and seeds set (late winter, early spring),
  - Smaller plants (<1.5cm) can be hand pulled in late spring when plant is using energy for flower production, but hand pulling may encourage growth due to soil disturbance;

- Due to enormous seed banking and regenerating, mechanical control needs to be repeated over a 3-5 yr period;
- Burning is ineffective as seeds germinate following a burn;
- After mechanical treatment, promptly re-vegetate with an appropriate seed mix (e.g. Garry Oak Ecosystem seed blend from Satinflower Nurseries), followed by an application of phosphorus-rich fertilizer and wood mulch;
- Promptly establish competitive shrubbery, including snowberry, thimbleberry, and dull Oregon-grape to reduce broom growth, or, restore with Garry oak meadow species. Contact GaLTT for advice on what species and restoration methods they are using in Drumbeg Provincial Park.

7.0 CLOSURE

Aquaparian Environmental Consulting Ltd (Aquaparian) was retained to complete a Biophysical Assessment (BA) of 1900 Stalker Road on Gabriola Island BC to support a rezoning application to the Islands Trust and future subdivision. This report was completed to identify general habitat conditions and features within the study area. No detailed species presence assessments were completed for this study.

This report has been completed in accordance with generally accepted biological practices. No other warranty is made, either expressed or implied. Aquaparian trusts that the information provided in this report meets your requirements. Any questions regarding information provided in this document, please contact the undersigned at (250) 591-2258.

Respectfully submitted,
AQUAPARIAN ENVIRONMENTAL CONSULTING LTD.

PREPARED BY:

Jeni Rowell, B.Sc.
Biologist-in-Training

REVIEWED BY:

COLLEGE OF APPLIED BIOLOGY
Sarah E. Bonar
R.P. Bio #1947
CAB

Sarah Bonar, R.P.Bio.
Senior Biologist/Principal

Aquaparian ENVIRONMENTAL CONSULTING
203- 321 Wallace Street, Nanaimo, BC V9R 5B6
SARAH BONAR 250-714-8446 CHRIS ZAMORA 250-714-8864

8.0 REFERENCES

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FIGURE 1A & 1B

SITE LOCATION MAP

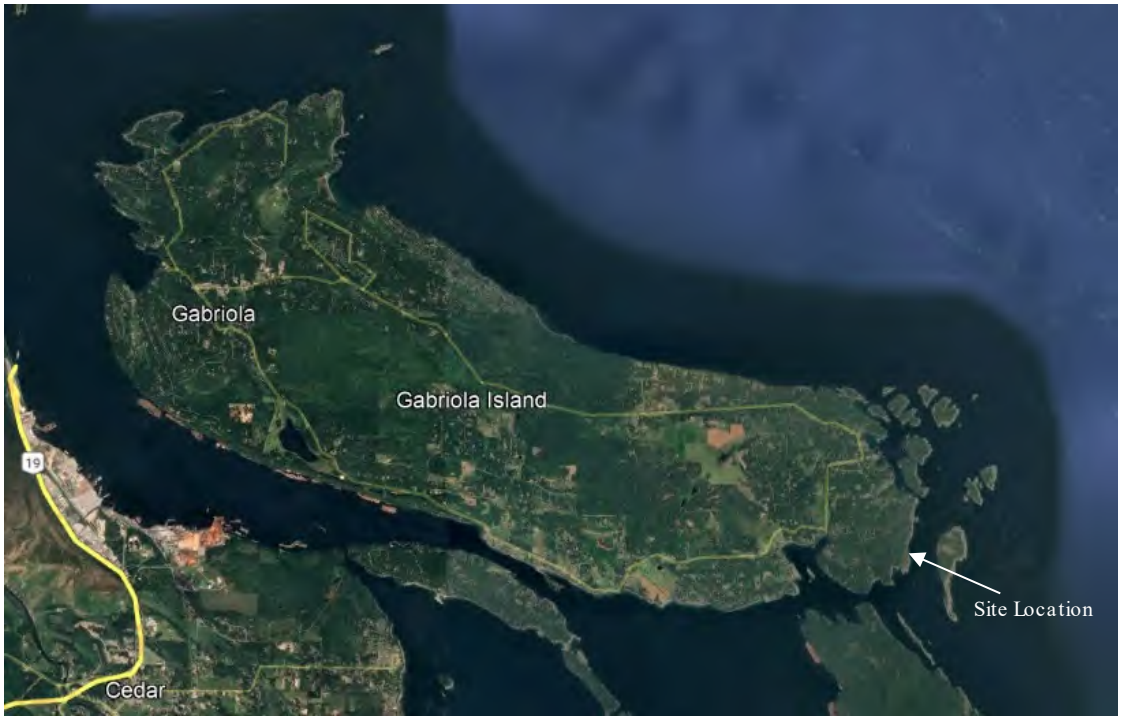
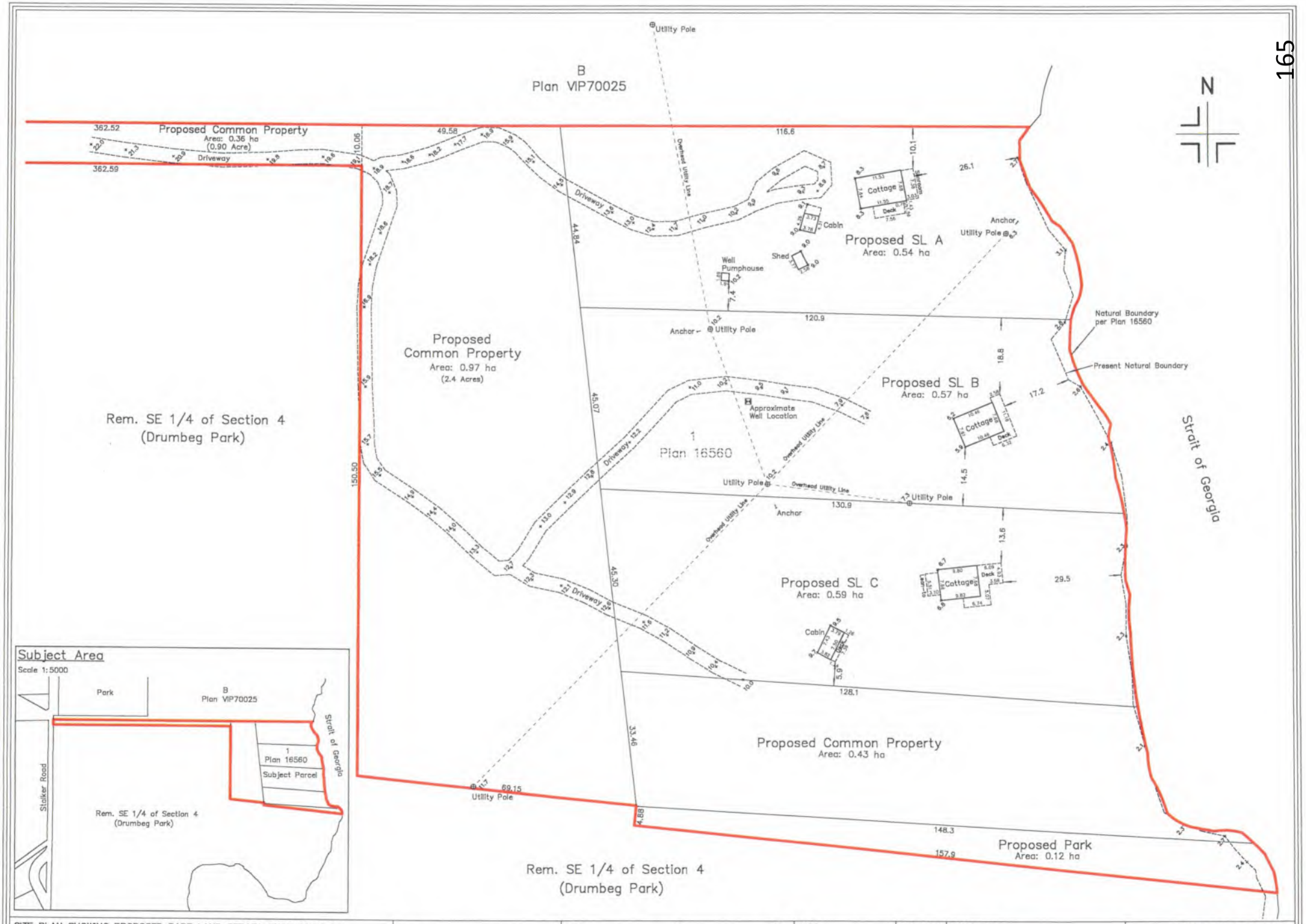


Figure 1a – Site Location Map

Figure 1b – Parcel Map

FIGURE 2

SITE PLAN
(TURNER & ASSOCIATES)



SITE PLAN SHOWING PROPOSED BARE LAND STRATA SUBDIVISION OF:
LOT 1, SECTION 4, GABRIOLA ISLAND,
NANAIMO DISTRICT, PLAN 16560.

Client: GEOFFREY LITHERLAND			Civic Address: 1900 STALKER ROAD	
File: 18-045	Scale: 1:600	Drawn by: DRW	Date: October 12, 2023	Existing Zoning: Resource (R)

NOTE:
THIS PROPERTY IS AFFECTED BY THE FOLLOWING REGISTERED DOCUMENTS:
UNDERSURFACE RIGHTS M76301,
SRW ES25205 & ES25206.

0 25 50
SCALE 1:600
DISTANCES AND ELEVATIONS SHOWN ARE IN METRES.
GEODETIC ELEVATIONS ARE DERIVED FROM GNSS OBSERVATIONS (CVD28BC DATUM).

DATE	REVISION #	DESCRIPTION
March 12, 2020	First Issue	
October 12, 2023	1	REVISE LOT LAYOUT

Turner & Associates
land surveying™
250.753.9778
435 Terminal Avenue North
Nanaimo, BC V9S 4J8
www.turnersurveys.ca

FIGURE 3

ECOSYSTEM POLYGON MAP

FIGURE 3 – ECOSYSTEM POLYGON MAP

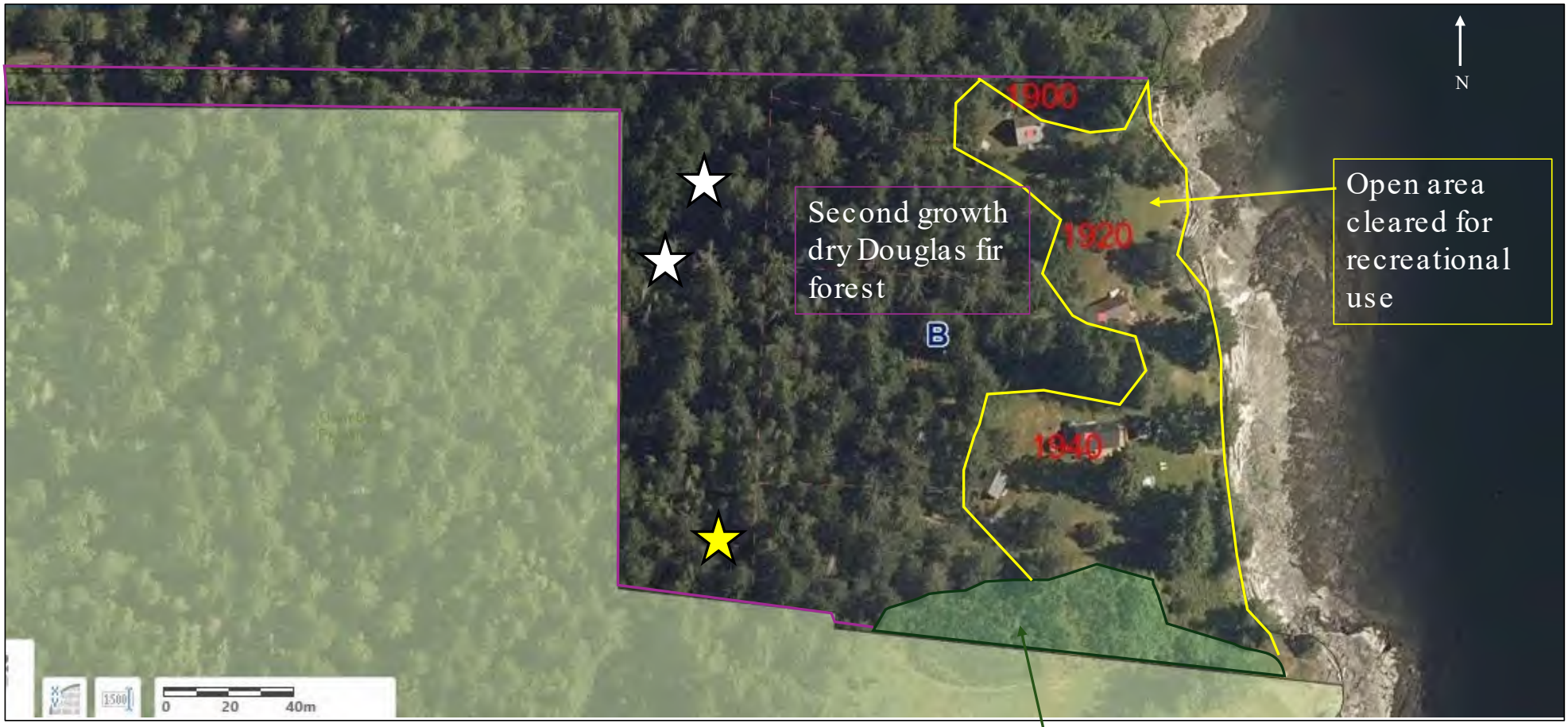
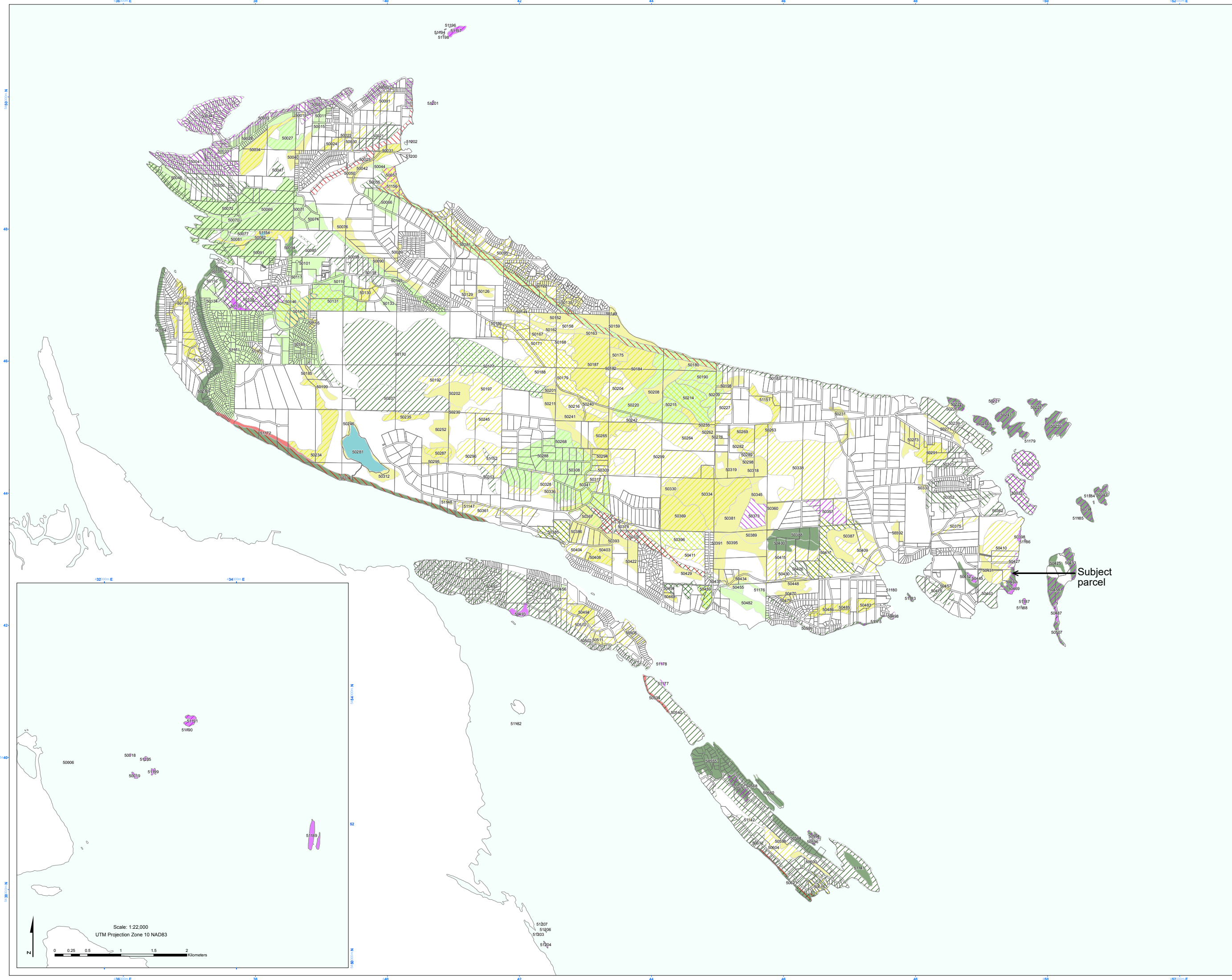


FIGURE 4

GABRIOLA ISLAND SENSITIVE ECOSYSTEM MAPPING AIRPHOTO – 2007
(ISLANDS TRUST & PROVINCE OF BRITISH COLUMBIA)

Gabriola Island Sensitive Ecosystem Mapping Airphoto - 2007

Sensitive and Terrestrial Ecosystems Label



Scale: 1:22,000

UTM Projection Zone 10 NAD83

Sensitive Ecosystems

Sensitive ecosystems are fragile and/or rare, or are ecologically important because of the diversity of species they support.

Old Forest (OF): Primary Ecosystem / Secondary / Tertiary

Definition: Conifer-dominated dry to moist forest types, structural stage 7, generally >250yrs.

Importance: Due to the lack of disturbance, old forest ecosystems are often associated with rich communities of plants and animals that may be dependent upon the unique environmental conditions created by these forests.

Subclasses:

co (conifer-dominated) - greater than 75% coniferous species

mx (mixed conifer and deciduous) - forests dominated with a mixture of coniferous and broadleaf trees (<75% coniferous and >25% broadleaf)

Woodland (WD): Primary Ecosystem / Secondary / Tertiary

Definition: Dry open forests, generally between 10 and 30% tree cover, can be conifer-dominated or mixed conifer and arbutus stands; because of open canopy, will include non-forested openings, often with shallow soils and bedrock outcroppings.

Importance: Woodlands are nationally, provincially and regionally rare and highly fragmented . A rich assemblage of plants, insects, reptiles and birds are drawn to these ecosystems due to the food sources, habitat and proximity to the ocean. Garry oak woodlands, for example support the highest plant species diversity of any terrestrial ecosystem in British Columbia and are especially vulnerable to rural development.

Subclasses:

bd (broadleaf) - dominant broadleaf with <15% coniferous species

mx (mixed conifer and deciduous) - mixed conifer and broadleaf with a minimum of 25% cover of either group is included in the total tree cover

Herbaceous (HB): Primary Ecosystem / Secondary / Tertiary

Definition: Non-forested ecosystems (less than 10% tree cover), generally with shallow soils. They include bedrock outcroppings, large openings within forested areas, spits, dunes and shorelines vegetetated with grasses and herbs.

Importance: Terrestrial Herbaceous ecosystems are characterized by thin soils which are easily disturbed. Herbaceous plants can be easily trampled or dislodged onto bare rock where they cannot re-establish. Thus they are highly vulnerable to a range of human disturbance factors including residential development and various recreational uses.

Subclasses:

hb (herbaceous) - non-forested, less than 10% tree cover, generally shallow soils, often with exposed bedrock, predominantly a mix of grasses and forbs, also lichens and mosses

cs (coastal herbaceous) - rocky shoreline or islet, influenced by the marine environment and characterized by less than 20% vegetation cover of grasses herbs, mosses and lichens.

sp (spit) - finger-like extension of beach, comprised of sand or gravel deposited by longshore drifting; low to moderate cover of salt-tolerant grasses and herbs

du (dunes) - ridge or hill, or beach area created by windblown sand; may be more or less vegetated depending on depositional activity, beach dunes will have low cover of salt-tolerant grasses and herbs

sh (shrub) - >20% of total vegetation cover is shrub cover, with grasses and herbs

ro (rock) - rock outcrops not dominated by shrubs

Wetland (WN): Primary Ecosystem / Secondary / Tertiary

Definition: Areas that are saturated or inundated with water for long enough periods of time to develop vegetation and biological activity adapted to wet environments. This may result from flooding, fluctuating water tables, tidal influences or poor drainage conditions.

Importance: Wetland ecosystems are sensitive and important because they exhibit rarity, high biodiversity, fragility, specialized habitat, specialized functions and connectivity.

Subclasses:

bg (bog) - nutrient poor wetland, on organic soils (sphagnum peat), water source predominantly from precipitation; may be treed or shrub dominated

fn (fen) - nutrient medium wetland (sedge peat) where ground water inflow is the dominant water source, open water channels common; dominated by sedges, grasses and mosses

ms (marsh) - wetland with fluctuating water table, often with shallow surface water, usually organically enriched mineral soils; dominated by rushes, reeds, grasses and sedges

sp (swamp) - poor to very rich wetland on mineral soils or with an organic layer over mineral soil, with gently flowing or seasonally flooding water table; woody vegetation

sw (shallow water) - standing or flowing water less than 2m deep, transition between deep water bodies and other wetland ecosystems (i.e. bogs, swamps, fens, etc.); often with vegetation rooted below the water surface

wm (wet meadow) - periodically saturated but not inundated with water, organically enriched mineral soils; grasses, sedges, rushes and forbs dominate

Cliff (CL): Primary Ecosystem / Secondary / Tertiary

Definition: Very steep slope, often exposed bedrock, may include steep-sided sand bluffs.

Importance: Open ledges and horizontal fissures on cliffs are known to provide nesting sites. Cliff crevices are used for roosting bats while deep crevices are used for shelter and overwintering of snakes and lizards.

Subclasses:

cc (coastal cliffs) - cliffs with a marine influence, generally near vertical bedrock with accumulation of soil limited to fissures and ledges.

ic (inland cliffs) - inland cliffs: typically formed as a result of erosion, catastrophic failures or mass wastage. Generally characterized by rapid drainage and the accumulation of soil that is limited to bedrock fissures and ledges

Freshwater (FW): Primary Ecosystem / Secondary / Tertiary

Definition: Freshwater ecosystem includes bodies of water such as lakes and ponds that usually lack floating vegetation.

Importance: Freshwater ecosystems are home to numerous organisms such as, fish, amphibians, aquatic plants, and invertebrates.

Subclasses: Lakes and ponds play a vital role in the lifecycle of many species.

la (lake) - a naturally occurring static body of water, greater than 2m deep in some portion.

pd (pond) - a small body of water greater than 2m deep, but not large enough to be classified as a lake

Rare Ecosystems

Other important ecosystems have high biodiversity values.

Mature Forest (MF): Primary Ecosystem / Secondary / Tertiary

Definition: Usually conifer-dominated, occasionally deciduous, dry to moist forest types, structural stage 6, generally >80yrs.

Importance: ***Future older forests*** Within 20 years, many Mature Forests that were logged early this century will become Older Forests. The biodiversity values of Mature Forests generally become higher with age. This means it will be able to sustain more and larger species of plants and animals.

Landscape connectivity Mature Forest stands provide connections between other natural areas that promote the movement and dispersal of many forest-dwelling species across the landscape.

Buffers Mature Forest can minimize disturbance to sensitive ecosystems that occur within or adjacent to the forest patch. Where they border or surround wetlands, patches of older forest or other sensitive ecosystems, the Mature Forest area serves an important role in buffering the adjacent sensitive areas.

Subclasses:

co (conifer dominated) - greater than 75% coniferous species

mx (mixed conifer and deciduous) - a minimum of 25% cover of either group is included in the total tree cover

bd (broadleaf) - greater than 75% broadleaf species

Other Mapped Ecosystems

Young Forest (YF):

Definition: Limited to areas of young forest dispersed amongst sensitive and important ecosystems. Forest is 40 - 80 yrs old depending on species and ecological conditions; canopy has begun to differentiate.

Seasonally Flooded Agricultural Fields (FS):

Definition: Limited to areas of annually flooded cultivated fields or hay fields dispersed amongst sensitive and important ecosystems.

Non-Sensitive (NA):

Definition: Limited to areas of disturbance or human impact dispersed amongst sensitive and important ecosystems.

Ecosystem Map Symbols

Ecosystem composition is complex and often contains a dominant ecosystem with secondary and tertiary ecosystems. In this map the dominant ecosystem has a solid shading and the secondary and tertiary ecosystems are identified by cross-hatched lines.

Example of a primary sensitive Woodland ecosystem with a secondary sensitive Herbaceous ecosystem

Occassionally sensitive ecosystems will mix with non-sensitive ecosystems. In this map a sensitive ecosystems mixed with non-sensitive is identified by cross-hatched lines with solid white shading.

Example of a secondary sensitive Herbaceous and tertiary sensitive Woodland ecosystems mixed with a non-sensitive primary ecosystem

Sensitive ecosystems can also mix with important ecosystems. In this map a sensitive ecosystem mixed with an important ecosystem is identified by cross-hatched lines with solid green shading.

Example of a tertiary sensitive Herbaceous ecosystem mixed with a primary important Mature Forest ecosystem

What is a Sensitive Ecosystem?

For the purpose of this study, an *ecosystem* is considered to be a portion of the landscape with relatively uniform dominant vegetation.

Sensitive ecosystems are those which are fragile and/or rare, or those ecosystems which are ecologically important because of the diversity of species they support.

Rationale

Intense development pressure fueled by population and economic growth has fragmented and degraded many terrestrial ecosystems. A high proportion of these ecosystems are now designated as 'at risk' in BC. Sensitive ecosystems typically have high biological diversity and are a vital part of the landscape. They provide ecosystem services for a healthy economy and for social well being. They regulate climate, clean water, generate and clean soils, recycle nutrients and pollinate our crops. To protect these areas, sensitive ecosystems must be located, identified and mapped. From 1993 to 1999 the Provincial and Federal Governments completed a Sensitive Ecosystems Inventory of East Vancouver Island and the Gulf Islands. This mapping product is an updated version of that product.

Purpose

The purpose of this Sensitive Ecosystems map is to identify the location of sensitive ecosystems. The goal of this mapping exercise is to encourage informed land use decisions that will conserve sensitive ecosystems. This map and the accompanying data provide site-specific ecological information that can be used to flag sites of conservation concern, to promote land stewardship and to prompt detailed field surveys and consideration of ecological values before changes to the land are initiated.

Methodology

Mapping methods are based on the Resource Information Standards Committee (RISC) Standard for Terrestrial Ecosystem Mapping (TEM) in BC. This Sensitive Ecosystems map was themed from TEM data using the RISC Standard for Mapping Ecosystems at Risk in BC. Field survey protocols followed Describing Terrestrial Ecosystems in the Field (RISC 1998).

Data Limitations

The Sensitive Ecosystems map is a tool to alert decision makers to the existence of sensitive ecosystems. However, **when land-use changes are proposed, detailed on-the-ground site assessments are necessary**. For sites that were not field checked, the accuracy of the data depends heavily on the expertise, local knowledge, and professional judgment of the mapper and the quality and quantity of available source data. Because the area is changing rapidly, reference to the data set(s) used as the information source is advised.

Due to the mapping scale of the aerial photographs, the minimum polygon size is generally ½ hectare. Enlargement of the data beyond the source scale may result in unacceptable distortion and faulty registration with other data sets.

What can be done to protect the sensitive ecosystems?

Direct and indirect impacts to these ecosystems can be avoided by:

- Retaining or creating vegetated buffers around sensitive ecosystems to isolate them from outside disturbances;
- Controlling land and water access to fragile ecosystems;
- Controlling invasive species;
- Allowing natural disturbances to occur;
- Maintaining water quality

If development must occur, develop carefully!

Conduct an ecological inventory to identify the existing flora and fauna and to locate any threatened or endangered plant and animal species, plant communities, and habitat features needing protection.

Plan and implement all development activities in a manner that will not adversely affect or disturb the sensitive ecosystem. Consult a qualified professional to interpret the ecological inventory data and work to incorporate designs that maintain the functions and values of the natural ecosystem.

Acknowledgements:

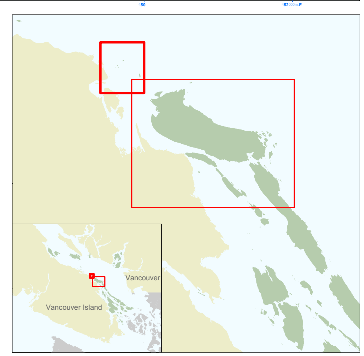
Project Co-ordination:
Kate Emmings – Islands Trust Fund
Brodie Porter – Islands Trust, Local Planning Services

Terrestrial Ecosystem Mapping:
Madrone Environmental Services Ltd.

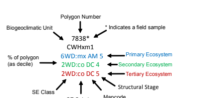
Sensitive Ecosystem Mapping Conversion Tables:
Carmen Cadrin - BC Ministry of Environment
Jo-Anne Stacey - BC Ministry of Environment
Andy MacKinnon - BC Ministry of Forests and Range
Todd Golumbia - Gulf Islands National Park Reserve

Sensitive Ecosystem Mapping Review:
Kate Emmings – Islands Trust Fund
Corey Erwin - BC Ministry of Environment
Sid Tsang - BC Ministry of Environment

GIS Mapping Support:
Mark van Bakel - Islands Trust



Sensitive and Terrestrial Ecosystems Label



The example label above indicates the SEM and TEM attributes mapped for polygon 7838. The polygon occurs in the Coast Western Hemlock Eastern Very Dry Maritime variant; 60% of the polygon is WD:mx - Woodland: mixed conifer and broadleaf (Primary Ecosystem), map code AM - Arbutus - Hairy manzanita, structural stage 5. The remaining 40% of the polygon is WD:co - Woodland: conifer dominated, map code DC - Douglas-fir - Western hemlock – Cladina (Secondary and Tertiary Ecosystems). Of this 40%, 20% is structural stage 4 and 20% is structural stage 5.

Structural Stage & Biogeoclimatic Units

Structural Stage	Description
0	No Structural Stage (usually rock or open water)
1	Sparse/bryoid
2	Herb
3	Shrub/Herb
4	Pole/Sapling
5	Young Forest
6	Mature Forest
7	Old Forest
Biogeoclimatic Units	**Description**
CDFmm	Coastal Douglas-fir Moist Maritime Subzone

Terrestrial Ecosystem Map Codes and Site Unit Names

Map Code	Site Unit Name	Map Code	Site Unit Name	Map Code	Site Unit Name	Map Code	Site Unit Name
CDFmm - Forested		CDFmm - Non-Forested		CDFmm - Non-Forested		Anthropogenic	
AS	Aspen - Slough sedge	Ed01	Tufted hairgrass - Meadow barley estuarine meadow	Wf51	Sitka sedge - Peat moss fen	RE	Reservoir
CS	Western redcedar - Slough sedge	Em02	Glasswort - Sea-milkwort estuarine marsh	Wf52	Sweet gale - Sitka sedge fen	RW	Rural residential
CW	Black cottonwood - willow	Em03	Seashore saltgrass	Wf53	Slender sedge - White beak-rush fen	RZ	Road surface
DA	Douglas-fir - Shore Pine - Arbutus	Em05	Lyngbye's sedge estuarine marsh	Wm05	Cattail marsh	UR	Urban
DG	Douglas-fir - Grand Fir - Oregon Grape	FC	Fescue - Camas	Wm50	Sitka sedge - Hemlock-parsely marsh	Map Code	Site Unit Name
DO	Douglas-fir - Oniongrass	HL	Hardhack - Labrador tea	Ws50	Pink spirea - Sitka sedge swamp	Sparsely Vegetated	
DS	Douglas-fir - Salal	LM	Dunegrass - Beach pea	Ws51	Sitka willow - Pacific willow - Skunk cabbage swamp	BE	Beach
GO	Garry oak - Oceanspray	OM	Garry oak - moss	Map Code	Site Unit Name	CL	Cliff
LS	Shore pine - Sphagnum	OR	Oceanspray - rose	Anthropogenic		LA	Lake
RC	Western redcedar - Skunk cabbage	QB	Garry oak - Brome (or mixed grasses)	CF	Cultivated field	MU	Mudflat
RF	Western redcedar - Grand fir - Foamflower	RA	Nootka rose - Pacific crab apple	CO	Cultivated orchard	OW	Open water (< 2m deep)
RK	Western redcedar - Douglas-fir - Oregon beaked moss	SC	Cladina - Wallace's selaginella	ES	Exposed soil	PD	Pond (> 2m deep)
RP	Western redcedar - Indian-plum	SL	Sedge - Western lilaeopsis	GC	Golf course	RI	River
RS	Western redcedar - Snowberry	SS	Spirea - Sedge wetland	GP	Gravel pit	RO	Rock outcrop
RV	Western redcedar - Vanilla-leaf	Wb50	Labrador tea - Bog laurel - Peat-moss bog	IN	Industrial		

FIGURE 5

MAPIT SENSITIVE ECOSYSTEM MAPS (ISLANDS TRUST)

FIGURE 5 – ISLANDS TRUST SENSITIVE ECOSYSTEM MAPS

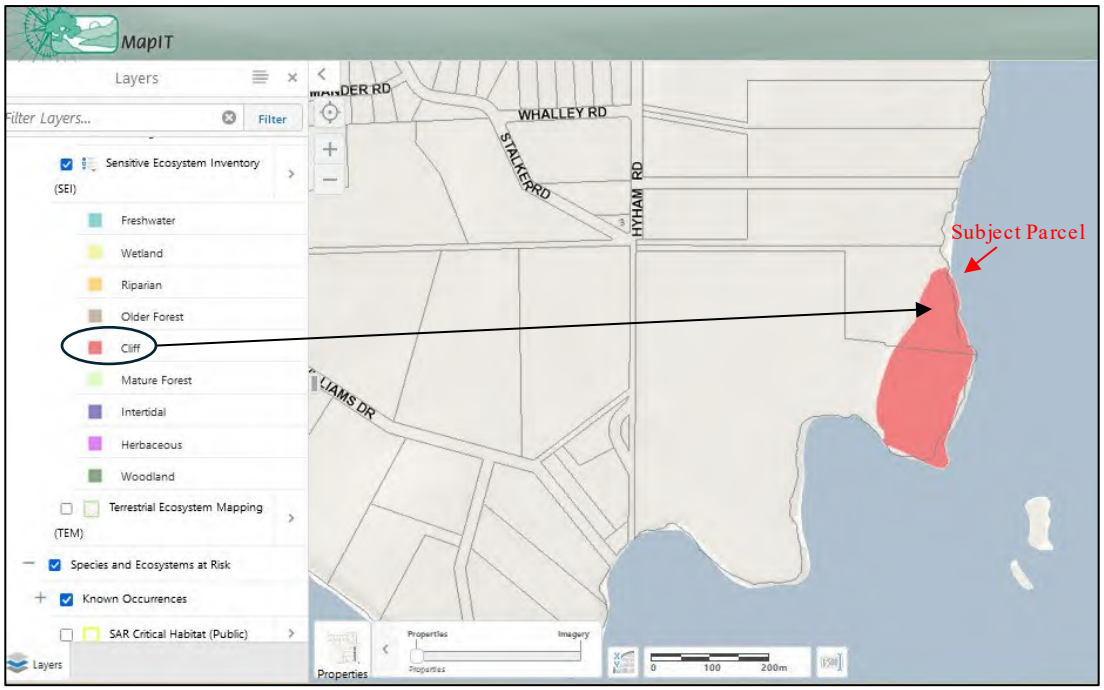


Figure 5a – Islands Trust "MapIT" SEI Mapping Layer

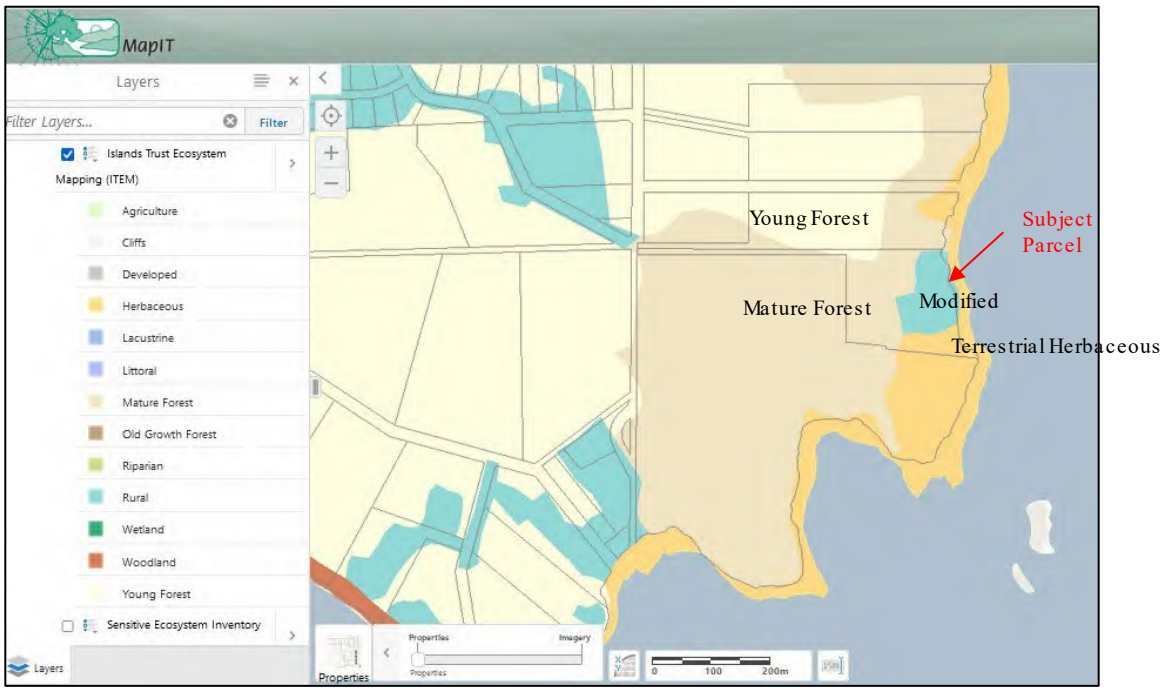


Figure 5b – Islands Trust "MapIT" ITEM Mapping Layer

APPENDIX A

SITE PHOTOGRAPHS

APPENDIX A – SITE PHOTOGRAPHS

Photo 1: Some low spots have a moist soil regime at west side of panhandle supporting bigleaf maple and western redcedar. No wetland habitat.

Photo 2: Looking east up driveway along panhandle section.

Photo 3: Looking southeast into the larger part of the parcel from base of panhandle where driveway splits to access cottages.

Photos 4-6: Typical forest composition, dry 2nd growth Douglas fir forest with scattered mature trees. Flat, open understory. Minimal downed wood.

Photo 7: Stand of snags with woodpecker cavities.

Photo 8: One large fir with fire scars and a “Wildlife Tree” sign. May have once been an eagle nest tree; corresponds with old WiTS mapping.

Photo 9: Fir had one smaller stick nest not characteristic of an eagle. Likely a smaller hawk spp. or corvid spp.

Photo 10: Firth (north) cottage looking southeast towards ocean.

Photo 11: North end of shoreline looking northeast. Low bedrock slope with large arbutus and sandstone intertidal.

Photo 12: Second (middle) cottage, cabin & lawn; facing southwest.

Photo 13: Third (south) cottage, patio & lawn; facing southwest.

Photo 14: Looking northwest along shoreline from south side of parcel. Note sandstone bedrock with small gravel and/or sand pocket beaches.

Photo 15: Shoreline has eroding shell midden.

Photo 16: Thickets of Scotch broom and Himalayan blackberry in southeast corner of the parcel.

Photo 17 & 18: Restoration project in the adjacent Drumbeg Provincial Park to replace invasive species with Garry oak ecosystem. Shows a restoration plot adjacent to subject parcel boundary looking north.

Photo 19: Example of terrestrial herbaceous ecosystem located in Drumbeg Provincial Park.

APPENDIX B

BC CONSERVATION DATA CENTRE (BC CDC) ECOSYSTEMS EXPLORER SEARCH RESULTS

(//www2.gov.bc.ca/)

BC Species & Ecosystems Explorer

Modify Search (/pub/eswp/search.do?method=change) | New Search (/pub/eswp/search.do?method=reset) | Print (/pub/eswp/results_print.do)

Export Results | Help

Search Results 30 records

Show 50 rows | Column Visibility | Sort Order

Scientific Name

Ascending

Scientific Name	English Name	BC List	COSEWIC	SARA
Accipiter atricapillus laingi (/pub/eswp/reports.do?elcode=ABNKC12062)	American Goshawk, *laingi* subspecies	Red	T	1-T (2003)
Aplodontia rufa (/pub/eswp/reports.do?elcode=AMAFA01010)	Mountain Beaver	Blue	SC	1-SC (2003)
Buteo swainsoni (/pub/eswp/reports.do?elcode=ABNKC19070)	Swainson's Hawk	Red		
Cardellina canadensis (/pub/eswp/reports.do?elcode=ABPBX16030)	Canada Warbler	Blue	SC	1-T (2010)
Cercyonis pegala incana (/pub/eswp/reports.do?elcode=IILEPN701G)	Common Wood-nymph, *incana* subspecies	Red		
Chordeiles minor (/pub/eswp/reports.do?elcode=ABNTA02020)	Common Nighthawk	Blue	SC	1-SC (2023)
Claytonia washingtoniana (/pub/eswp/reports.do?elcode=PDPOR030U0)	Washington springbeauty	Blue		
Coenonympha california insulana (/pub/eswp/reports.do?elcode=IILEPN6038)	Common Ringlet, *insulana* subspecies	Red		
Contia tenuis (/pub/eswp/reports.do?elcode=ARADB09010)	Common Sharp-tailed Snake	Red	E/T	1-E (2003)
Corynorhinus townsendii (/pub/eswp/reports.do?elcode=AMACC08010)	Townsend's Big-eared Bat	Blue		
Dryopteris arguta (/pub/eswp/reports.do?elcode=PPDRY0A020)	coastal wood fern	Blue	SC	1-SC (2003)
Epilobium torreyi (/pub/eswp/reports.do?elcode=PDONA01050)	brook spike-primrose	Red	E	1-E (2007)
Eurybia radulina (/pub/eswp/reports.do?elcode=PDASTEB0K0)	rough-leaved aster	Red	T	
Glaucidium gnoma swarthi (/pub/eswp/reports.do?elcode=ABNSB08015)	Northern Pygmy-Owl, *swarthi* subspecies	Blue		
Lepus americanus washingtonii (/pub/eswp/reports.do?elcode=AMAEB03014)	Snowshoe Hare, *washingtonii* subspecies	Red		
Lomatium papilioniferum (/pub/eswp/reports.do?elcode=PDAPI1B2V0)	butterfly bearing lomatium	Red	T	1-T (2011)
Megascops kennicottii kennicottii (/pub/eswp/reports.do?elcode=ABNSB01042)	Western Screech-Owl, *kennicottii* subspecies	Blue	T	1-T (2005)
Melanerpes lewis (/pub/eswp/reports.do?elcode=ABNYF04010)	Lewis's Woodpecker	Blue	T	1-T (2012)
Mustela richardsonii anguinae (/pub/eswp/reports.do?elcode=AMAJF02014)	Ermine, *anguinae* subspecies	Blue		
Myotis lucifugus (/pub/eswp/reports.do?elcode=AMACC01010)	Little Brown Myotis	Blue	E	1-E (2014)

Scientific Name	English Name	BC List	COSEWIC	SARA
Neogale frenata altifrontalis (/pub/eswp/reports.do?elcode=AMAJF02034)	Long-tailed weasel, *altifrontalis* subspecies	Red		
Oreamnos americanus (/pub/eswp/reports.do?elcode=AMALE02010)	Mountain Goat	Blue		
Plagiobothrys tenellus (/pub/eswp/reports.do?elcode=PDBOR0V130)	slender popcornflower	Red	T	1-T (2011)
Platanthera ephemerantha (/pub/eswp/reports.do?elcode=PMORC1X050)	white-lip rein orchid	Blue		
Pristiloma johnsoni (/pub/eswp/reports.do?elcode=IMGAS80050)	Broadwhorl Tightcoil	Blue		
Progne subis (/pub/eswp/reports.do?elcode=ABPAU01010)	Purple Martin	Blue		
Sabulina pusilla (/pub/eswp/reports.do?elcode=PDCAR0G0Q2)	dwarf sandwort	Red	E	1-E (2005)
Tonella tenella (/pub/eswp/reports.do?elcode=PDSCR1Y020)	small-flowered tonella	Blue	E	1-E (2005)
Triteleia howellii (/pub/eswp/reports.do?elcode=PMLIL21061)	Howell's triteleia	Red	E	1-E (2005)
Uropappus lindleyi (/pub/eswp/reports.do?elcode=PDAST6E0B0)	Lindley's microseris	Red	E	1-E (2010)

Showing 1 to 30 of 30 entries

First Previous 1 Next Last

Search Criteria

Plants OR Animals
AND BC Conservation Status:Red (Extirpated, Endangered, or Threatened) OR Blue (Special Concern)
AND 'Local Trust Areas':Gabriola Island Local Trust Area
AND Habitat Subtypes: Conifer Forest - Dry
AND BGC Zone, Subzone: CDFmm
Sort Order:Scientific Name Ascending

Notes

1. Citation: B.C. Conservation Data Centre. 2024. BC Species and Ecosystems Explorer. B.C. Minist. of Environ. Victoria, B.C. Available: https://a100.gov.bc.ca/pub/eswp/ (https://a100.gov.bc.ca/pub/eswp/) (accessed Oct 21, 2024).

2. The data contained in the Results Export in BCSEE are provided under the Open Government License - BC (http://www.data.gov.bc.ca/local/dbc/docs/license/OGL-vbc2.0.pdf).

3. We welcome your comments at cdcdata@gov.bc.ca.

RYZUK GEOTECHNICAL

Geohazard Assessment for Proposed Rezoning and Subdivision

1900 Stalker Road – Gabriola Island, BC

Prepared for:

Seward Developments Inc.
1820 Argyle Avenue
Nanaimo, BC V9S 3K7

Toby Seward
Toby.seward@shaw.ca

Prepared by:

Ryzuk Geotechnical Ltd.
#100-771 Vernon Avenue
Victoria, BC V8X 5A7

CONTENTS

1. INTRODUCTION

As requested, we have completed a geohazard assessment of the referenced property as required by the Islands Trust as part of the proposed rezoning and subdivision application. Further, we note that the Approving Authority for subdivision on Gabriola Island lies with the Approving Officer of the Ministry of Transportation and Transit (MOTT). The Islands Trust and MOTT are both considered authorized users of this report and may rely on its contents.

We understand the current proposal consists of a 3-lot subdivision and rezoning application, as shown on the attached survey plan by Turner and Associates Land Surveying, (project number 18-045) dated October 12, 2023. We further understand that no construction is currently proposed. Our work in this regard has been carried out in accordance with our proposal dated July 14, 2023, and the accepted Terms of Engagement.

2. SCOPE OF ASSESSMENT

Our assessment has consisted of a review of available background information, as well as our site visit to assess the subsurface soils and visual geotechnical conditions. Our background work has included review of the subdivision layout, online satellite imagery of the terrain (Google Earth), and Quaternary geology mapping. Our site visit was completed on October 21, 2024, and consisted of a walking reconnaissance of the property to review surficial geotechnical conditions. Additionally, a subsurface investigation to assess the depth to native soils was carried out by hand digging test pits. Our assessment and this report have been prepared in accordance with Engineers and Geoscientists of BC's (EGBC) Professional Practice Guidelines for *Landslide Assessments in British Columbia (Version 4.1, published March 1, 2023*), and *Legislated Flood Assessments in a Changing Climate in BC (Version 2.1 published August 28, 2018)*. Our completed Landslide Assessment Assurance Statement along with the Flood Assurance Statement is attached.

3. SITE DESCRIPTION

The property is located along the east side of Stalker Rd. along the southeastern shoreline of Gabriola Island. It is a panhandle lot approximately 3.6 hectares in size and bounded by a residential lot to the north, the Strait of Georgia to the east, Drumbeg Provincial Park to the south, and Stalker Rd. to the west. According to the Regional District of Nanaimo GIS mapping and survey plan provided, the land slopes gently down along the access drive from about 23 m (geodetic) elevation at the road to 19 m. The parcel then widens and slopes down to the present natural boundary (PNB) of the Strait of Georgia between 2 and 3 m elevation. The average slope is between 2 to 5 degrees within the main area of the lot, with the slope above the foreshore descending at approximately 20 degrees or less. Based on Gabriola Island Official Community

Plan (Bylaw No 166) mapping, the lot is not within a Development Permit Area (DPA) and is classified as a “resource” land area. Resource designations are characterized as land parcels being 8.0 hectares or larger and may (or may not) contain environmental, social, or culturally significant features. Resource land designations are also not within Provincial Agricultural Land Reserve’s (ALR) or former Forest Land Reserve’s (FLR).

Currently, there are three cottage type structures and two cabins within the eastern half of the lot. The cottages were observed to be setback 26.1 m (northern cottage), 17.2 m (middle cottage), and 29.5 m (southern cottage) from the Present Natural Boundary (PNB). The cabins are setback upwards of 30 m. The structures are located within a grassy area that is nearly flat/level with sporadic mature trees spread throughout. The western half of the lot (behind the cottages) is more densely forested with bushes and mature trees. Pictures of our site reconnaissance are shown in the attached Photo Log.

3.1 SURFACE AND SUBSURFACE CONDITIONS

Based on available Quaternary Geology mapping (British Columbia Soil Survey Report No 43, Volume 4), the lot is characterized by colluvial deposits consisting of glacial drift overtop very shallow bedrock. Bedrock is expected to belong to the late-cretaceous Nanaimo Group Formations, consisting of Gabriola Sandstone. During our site visit, it was evident that the property is bedrock controlled as several outcrops were noted throughout the property as well as along and above the beach, as shown in the Photo Log.

Our subsurface investigation comprised two hand dug test pits to roughly 0.3 m below surface grade where they were ended due to the density of the native soils. Two representative test pits were excavated along the north and south of the property within the flat/level area noted above and as shown in the attached Site Plan. Stratigraphy comprised topsoil approximately 0.25 m thick which then transitioned to native dense brown sand and gravel with some silt (inferred glacial till) atop shallow sandstone bedrock. The soils and bedrock noted were consistent with geological mapping. No groundwater or seepage was observed in either of the test pits and there was no evidence of water pooling within the lot.

4. LANDSLIDE SAFETY AND HAZARD ASSESSMENT CLASS

For the purposes of the landslide and flood hazard assessment and the corresponding Appendix D and Appendix I statements, Islands Trust and the Province of British Columbia do not have an adopted level of landslide safety or an adopted level of flood hazard or flood risk tolerance. However, MOTT has indicated on previous projects that when considering risk from an event based on its probability of occurrence, the qualified professional must distinguish between damaging events and life-threatening events. For damaging events, a probability of occurrence of 1 in 475 years (10% probability in 50 years) should be considered for landslide hazards, and a probability of occurrence of 1 in 200 years should be considered for flooding hazards. For life threatening catastrophic events, a probability of occurrence of 1 in 10,000 years should be considered. In addition, the BC Building Code requires new construction to be designed to remain

safe for egress due to a seismic event with a probability of occurrence of 1 in 2,475 years (2% probability of exceedance in 50 years). We understand that this is also consistent with current BC Building Code Bulletin B10-01 as such relates to seismic slope stability.

Given the proposed rezoning/subdivision and anticipated geotechnical conditions, we consider the project to fall under Class 1 from *Table B-6: Types of Static and Seismic Slope Stability Analysis* from the EGBC *Guidelines for Landslide Assessments in British Columbia*, which provides guidance on level of effort for hazard assessments. Typical assessment methods for Class 1 include conducting a geotechnical hazard assessment, performing site exploration and in-situ testing of soil/rock/groundwater conditions and associated testing, and slope stability analysis, and consideration of climate change impacts.

5. GEOTECHNICAL ASSESSMENT

Our assessment has considered the following geohazards and return periods for their potential to impact the subject property and proposed development:

- A design seismic event with a 1:2,475-year return period (2% probability of exceedance in 50 years)
- A 500-year indicative return period (0.5% Annual Exceedance Probability) flood and 1.0 Relative Sea Level Rise (RSLR) to the year 2100.

5.1 STATIC/SEISMIC SLOPE STABILITY ASSESSMENT

As described previously, the slope within the lot is bedrock controlled with minimal soil cover and is well vegetated. We note that the slope is classified as gentle with an overall inclination between approximately 2 to 5 degrees, with the foreshore steeper at an inclination of roughly 20 degrees or less. We did not observe any evidence of active slopes or potential for slope instability. We note that no rockfall hazard is present within the site, including from upslope areas. Based on available mapping data, the gentle topography of the lot, and bedrock-controlled terrain, we do not consider there to be a concern of creep/movement.

Based on the available GIS mapping from the Nanaimo Regional District, Section A (shown in the attached Site Plan) was generated based on the contours. We consider this section to generally be the most representative of the overall site conditions and to be the marginally steepest. A slope stability analysis was carried out for both static and seismic scenarios using Slide2 software. The seismic scenario considers an event with a 2% probability of exceedance in 50 years with a Peak Ground Acceleration (PGA) of 0.576g (local value from NBCC 2020 for Site Class ‘C’). Stratigraphy was estimated based on our subsurface investigation and visual observations. Our results yielded a minimum static factor of safety of 5.6 while the seismic scenario yielded a factor of safety of 1.6.

Given the low elevation and gentle terrain we conclude that the site is not subject to global instability nor life threatening catastrophic events. Furthermore, given the gentle slope and

minimal soil cover atop the bedrock, we conclude there is insufficient thickness of soil to develop liquefaction. No further modelling has been completed at this time.

5.2 FLOOD HAZARD ASSESSMENT

We have considered the potential flooding hazard to the site from overland watercourses and from coastal flooding. No overland watercourses or drainages were noted near the property nor mapped nearby on the reference drawing Gabriola, Valdes, Thetis and Kuper Islands Water Allocation Plan developed by the British Columbia Ministry of Environment, Lands, and Parks Vancouver Island Region and therefore no associated hazard is considered to be present. Regarding coastal flooding, given the proximity to the natural boundary of the sea, a review of coastal flooding hazard potential was completed.

Assessment of coastal flooding hazard involves considering high tide in combination with estimated sea level rise to the year 2100, and storm surge and wave runup associated with a design storm with a 1 in 500 annual exceedance probability. These values, in addition to a factor for local subsidence or rebound, are combined to determine a Flood Construction Level (FCL) used to establish the elevation of the underside of a wooden floor system or the top of a concrete slab for habitable spaces (Reference: Province of British Columbia – Flood Hazard Area Land Use Management ("FHALUM") Guidelines, May 2004, Amended January 2018 (Sections 3.5 and 3.6)).

We note that all existing habitable structures are located at least 17 m or more (horizontally) from the PNB. Based on the site survey plan, the structures are located where spot elevations range between approximately 5.9 and 8.3 m (geodetic elevation CVD28BC). The structures do not appear to have any portion below grade, with the floor levels located roughly 0.3 m to 0.6 m above surrounding grade. Based on the Regional District of Nanaimo Coastal Flood Hazard Map Atlas (Electoral Area B 2 of 3) completed by Ebbwater Consulting and Cascadia Coast Research Ltd. in 2019, a FCL of 5.1 m (CGVD 2013) was determined for this area. Further work by Ebbwater and Cascadia in 2022 generated Regulatory Coastal Floodplain Map (Electoral Area B, 3 of 6) which identifies the shoreline area of the property as within the flood extent but does not provide a FCL elevation. Accordingly, we have calculated a FCL for the site using the Combined Method cited in Section 3.5.5.1 of the FHALUM Guidelines. The resulting FCL is provided in Table 1 below.

Table 1: Summary of FCL calculations (Combined Method)

Item:	**(m CGVD28)**	**Notes:**
Higher High Water Large Tide (HHWLT)	2.04	As per CHS[1] – based on Point Atkinson (primary port) and Silva Bay #7550 (secondary port)
Total Storm Surge during "designated storm"	1.3	0.2% AEP storm event (Kerr Wood Leidal, 2011[2])
Estimated wave effect	0.65	As per Guidelines[3]

Uplift	-0.08	-1.06 mm/year for region - As per Guidelines[3]
Sea Level Rise (SLR)	0.75	SLR for 2100 is 1.0 m, 75 years left from 2025
Free Board Factor	0.6	As per Guidelines[4]
FLOOD CONSTRUCTION LEVEL	**5.26**	

[1] Canadian Hydrographic Service

[2] Kerr Wood Leidal – Provincial Guidelines for Coastal Floodplain Mapping, June 2011

[3] Ausenco Sandwell – Climate Change Adaption Guidelines for Sea Dikes and Coastal Flood Hazard Land Use; Guidelines for Management of Coastal Flood Hazard Land Use, 27 January 2011

[4] Province of British Columbia – Flood Hazard Area Land Use Management (FHALUM) Guidelines, May 2004, Amended January 2018 (Sections 3.5 and 3.6)

Based on the available information, the existing residences appear to be above this elevation. We have also considered setback, in accordance with the Provincial Guidelines Section 3.5.5.1, which notes the setback should be at least the greater of 15 m from the year 2100 estimated natural boundary, or the location where the ground surface elevation equals the FCL. Given the non-erodible sandstone bedrock shoreline, we consider the former would be a 15 m setback from the 2.71 m elevation contour (HHWLT + SLR – Uplift), which is likely satisfied although sufficient information is not available on the survey plan to confirm this. The residences all appear to be setback behind the FCL elevation of 5.26 m.

While no construction is anticipated at this time, we recommend any future construction be located above the noted FCL and setback 15 m from the future estimated NB, the location of which should be confirmed by a surveyor. However, a reduced setback may be acceptable and should be assessed by a geotechnical professional at the time of any planning/design.

6. CLOSURE

In summary, we consider the proposed rezoning and subdivision can be completed without undue risk of geohazard with respect to both slope stability and flooding, including anticipated future climate change. It is our professional opinion that that the land may be used safely for the use intended, pursuant to and in accordance with Section 56 of the Community Charter. Our assessment is provided in consideration with Section 86(d) of the Land Title Act, pursuant to the

Guidelines for Landslide Assessments in British Columbia V4.1 and the Legislated Flood Assessments in a Changing Climate in British Columbia V2.1.

This report has been prepared for the exclusive use of our client and the authorized representatives. The Islands Trust and Ministry of Transportation and Transit (MOTT) may also rely on this report for the sole purpose of the current rezoning and subdivision application.

Any use of this report by a third party, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

We trust the preceding is suitable for your purposes at present. If you require anything further at this time or have any questions with respect to the above, please contact us.

Sincerely,

Ryzuk Geotechnical

Sean Gugay, EIT
Advanced Junior Engineer

Laura Lessingham, P. Geo.
Lead Geoscientist

Permit to Practice Number: 1002996

Attachments:
- Photo Log
- Subdivision Layout Survey
- Site Plan with 2 m contours
- Seismic and Static Slope Model
- Appendix D: Landslide Assessment Assurance Statement
- Appendix I: Flood Assurance Statement
- Checklist and Signoff for an Independent Review

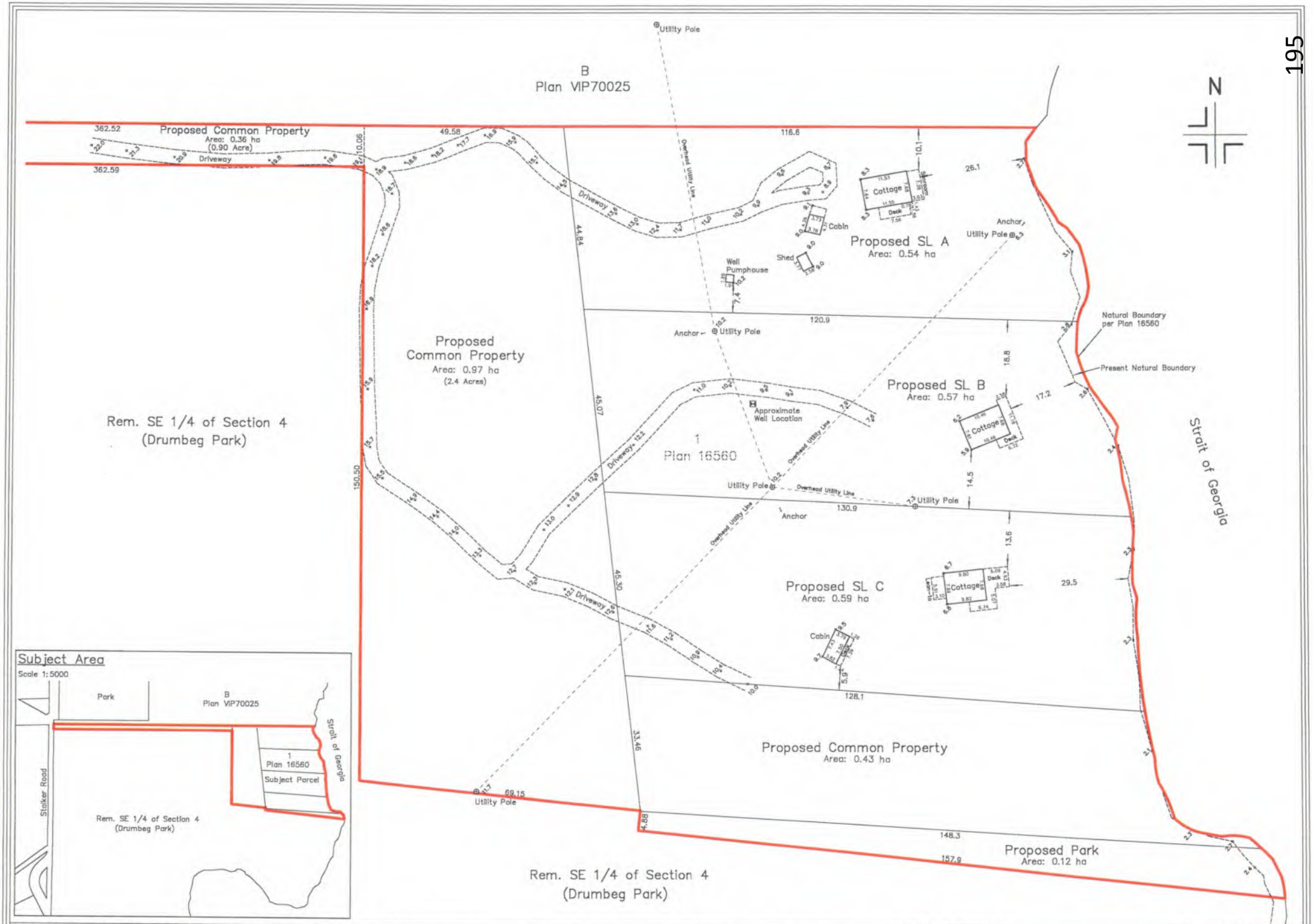
	Photo Log
Photo 1: Flat grassy area of North cottage looking towards the foreshore	
Photo 2: North cottage standing near the foreshore. Shallow bedrock observed with sporadic outcrops (bottom left)	

Photo 3: Foreshore of southern cottage. Average slope of foreshore measured to be 20 degrees or less	
Photo 4: Setback of middle cottage looking south	

Photo 5: Setback of southern most cottage looking south	
Photo 6: Sporadic bedrock outcrops throughout the lot indicating thin soil cover	

Photo 7: Observed native mineral soils (glacial till) intermixed with topsoil from hand dug test pit investigation.	
Photo 8: Forested area behind the cottages (within proposed common property) near property line	


RYZUK
GEOTECHNICAL



SITE PLAN SHOWING PROPOSED BARE LAND STRATA SUBDIVISION OF:
LOT 1, SECTION 4, GABRIOLA ISLAND,
NANAIMO DISTRICT, PLAN 16560.

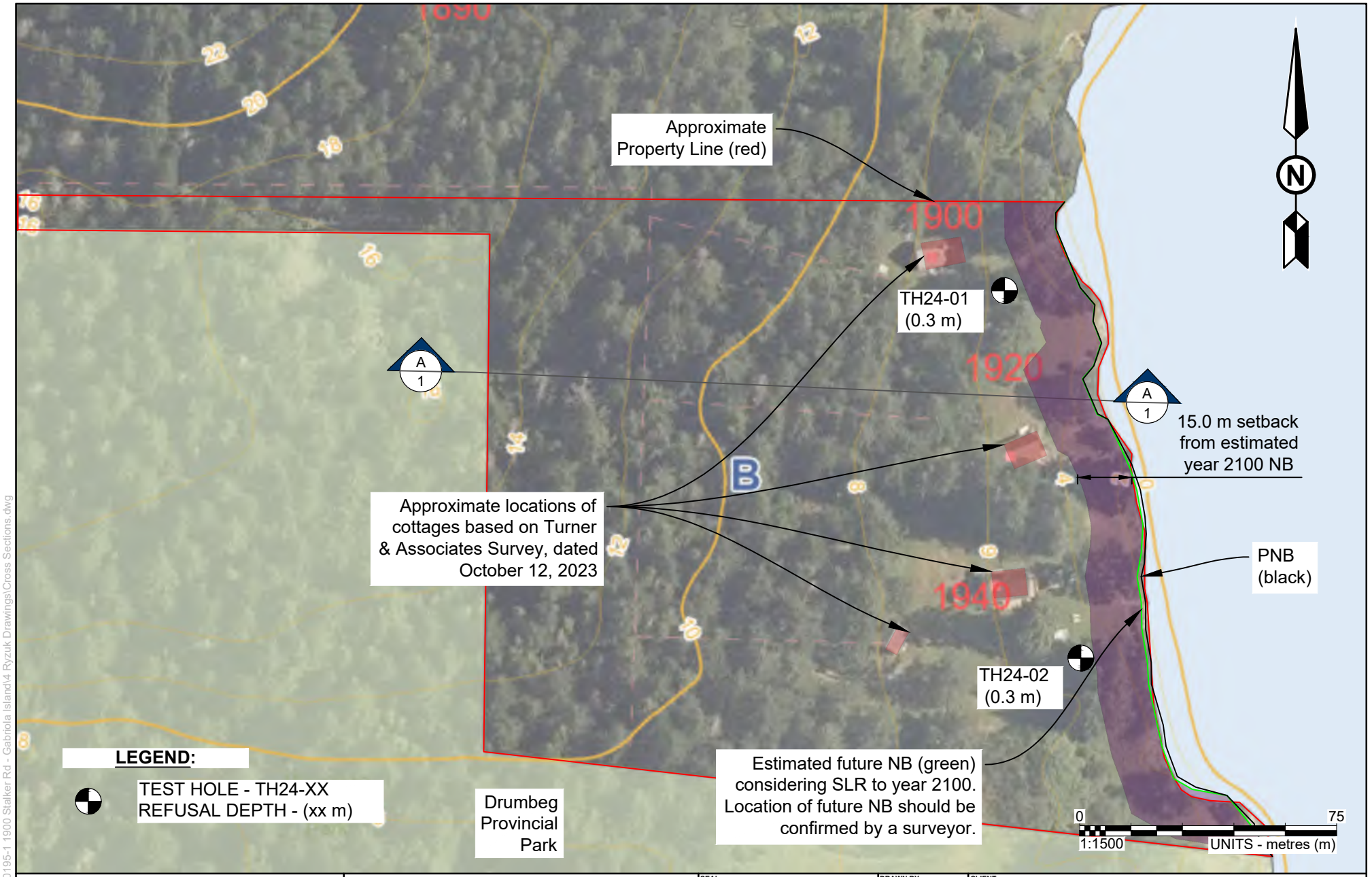
Client: GEOFFREY LITHERLAND			Civic Address: 1900 STALKER ROAD	
File: 18-045	Scale: 1:600	Drawn by: DRW	Date: October 12, 2023	Existing Zoning: Resource (R)

NOTE:
THIS PROPERTY IS AFFECTED BY THE FOLLOWING REGISTERED DOCUMENTS:
UNDERSURFACE RIGHTS M76301,
SRW ES25205 & ES25206.

0 25 50
SCALE 1:600
DISTANCES AND ELEVATIONS SHOWN ARE IN METRES.
GEODETIC ELEVATIONS ARE DERIVED FROM GNSS OBSERVATIONS (CVD28BC DATUM).

DATE	REVISION #	DESCRIPTION
March 12, 2020	First Issue	
October 12, 2023	1	REVISE LOT LAYOUT

Turner & Associates
land surveying
250.753.9778
435 Terminal Avenue North
Nanaimo, BC V9S 4J8
www.turnersurveys.ca



NOTES

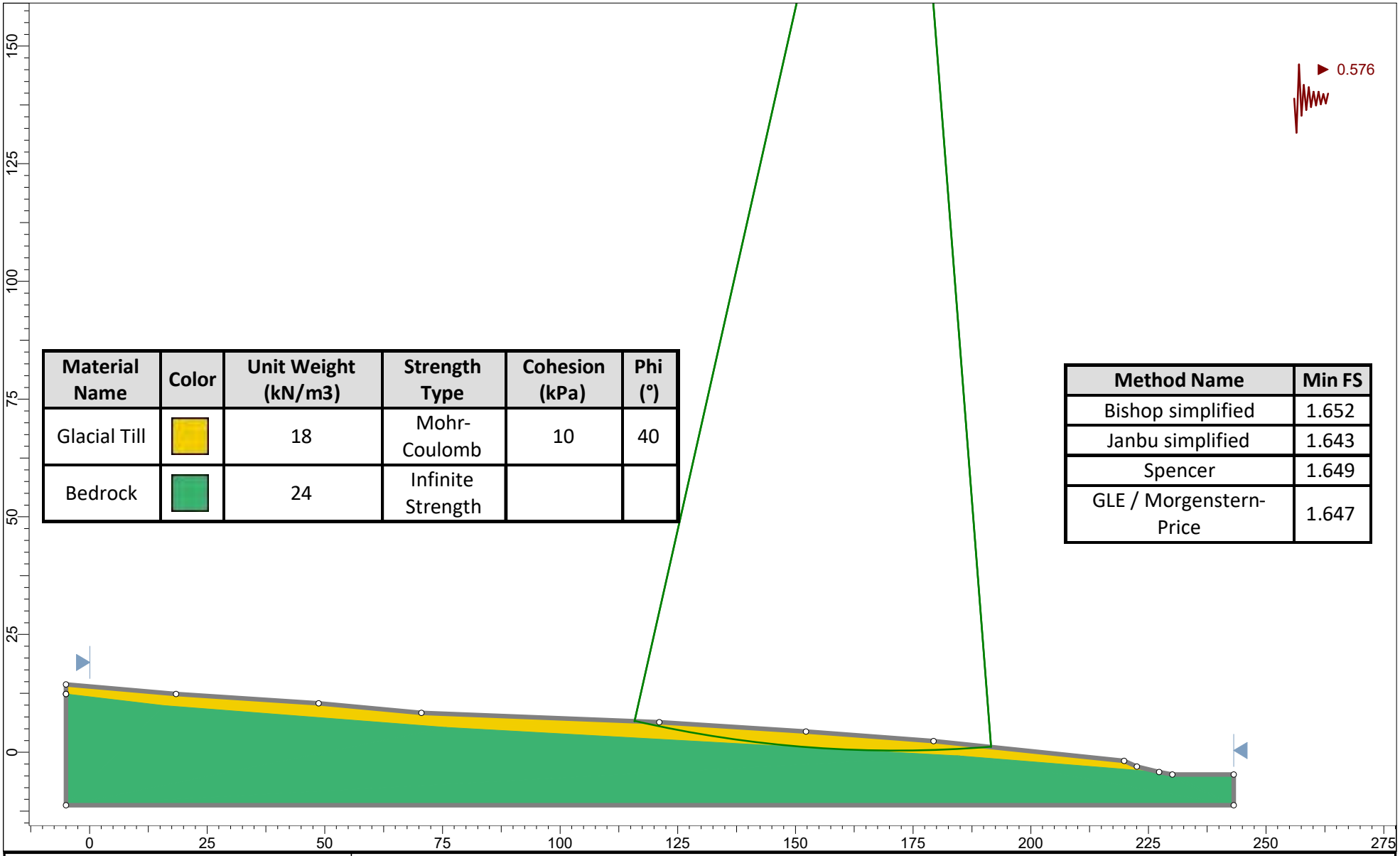
1. This drawing is scaled for 8.5x11 sheet and does not require further scaling to fit. Scales will differ if printed on different sheet size.
2. Background imagery taken from RDN GIS mapping services.
3. All setbacks and boundaries should be confirmed by a surveyor.
4. Estimated future NB based on calculated SLR and spot elevations from survey.

RYZUK GEOTECHNICAL
100 - 771 Vernon Avenue - Victoria, BC V8X 5A7
250-475-3131 mail@ryzuk.com

SEAL

PTPN: 1002996

DRAWN BY: SG	CLIENT: SEWARD DEVELOPMENTS
EOR/LEAD: LBL	PROJECT TITLE: GEOHAZARD ASSESSMENT
REVIEW:	PROJECT ADDRESS: 1900 STALKER ROAD - GABRIOLA ISLAND, BC
SCALE: 1:1500	DRAWING NAME: **SITE PLAN**
DATE: 2024/12/12	PROJECT No.: 10195-1
	SHEET No.: 01 of 01
	REVISION: 00



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)
Glacial Till		18	Mohr-Coulomb	10	40
Bedrock		24	Infinite Strength		

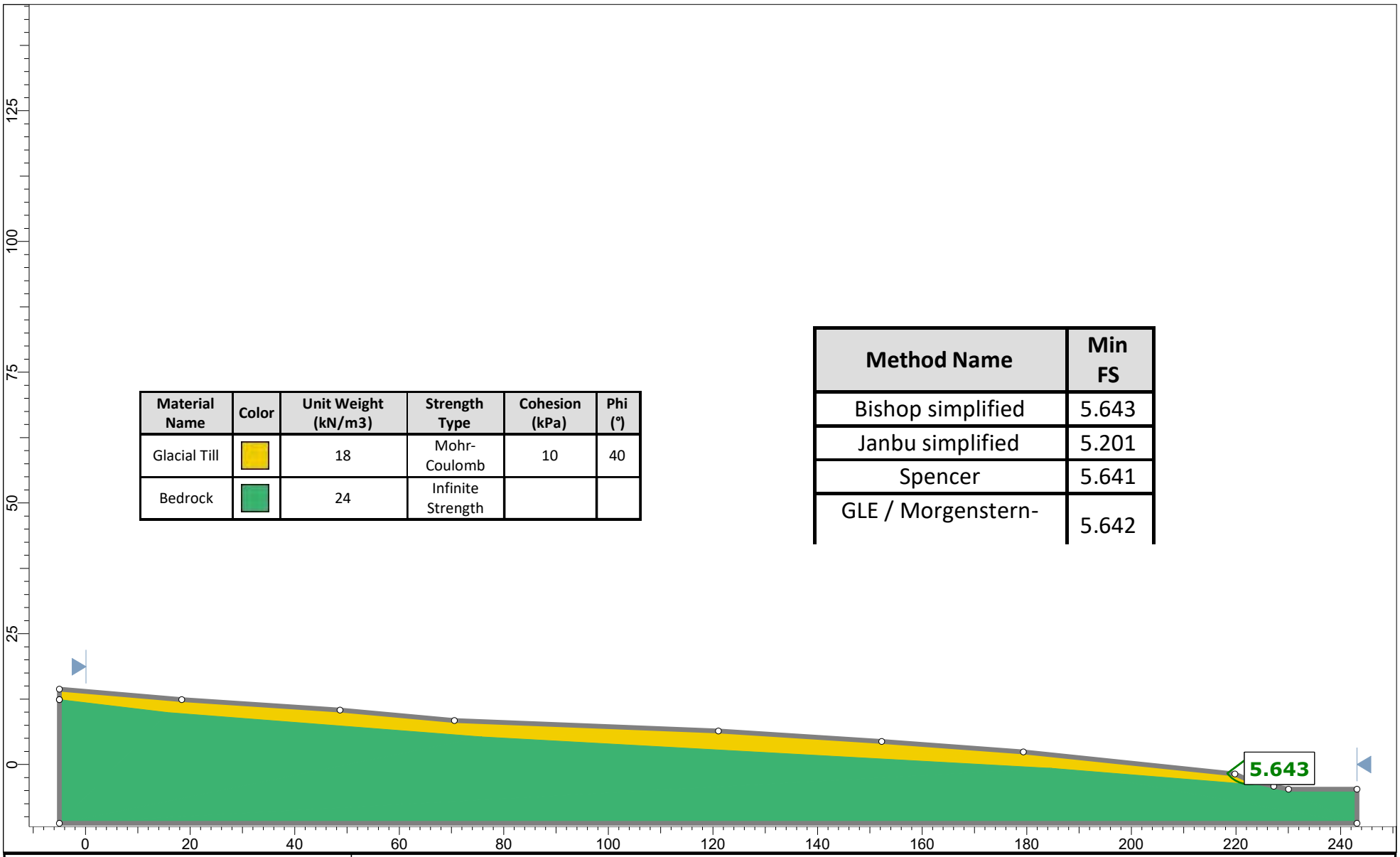
Method Name	Min FS
Bishop simplified	1.652
Janbu simplified	1.643
Spencer	1.649
GLE / Morgenstern-Price	1.647

RYZUK GEOTECHNICAL

Project	1900 Stalker Road - Gabriola Island, BC		
Group		*Scenario*	Seismic Stability
Drawn By	SG	*Company*	Ryzuk Geotechnical
	2024-12-04	*File Name*	Full2%.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)
Glacial Till		18	Mohr-Coulomb	10	40
Bedrock		24	Infinite Strength		

Method Name	Min FS
Bishop simplified	5.643
Janbu simplified	5.201
Spencer	5.641
GLE / Morgenstern-	5.642



RYZUK GEOTECHNICAL

Project	1900 Stalker Road - Gabriola Island, BC		
Group		Scenario	Static Stability
Drawn By	SG	Company	Ryzuk Geotechnical
	2024-12-04	File Name	Full2%.slmd

LANDSLIDE ASSESSMENT ASSURANCE STATEMENT

Notes: This statement is to be read and completed in conjunction with the Engineers and Geoscientists BC *Professional Practice Guidelines – Landslide Assessments in British Columbia* ("the guidelines") and the current *BC Building Code* (*BCBC*), and is to be provided for Landslide Assessments (not floods or flood controls), particularly those produced for the purposes of the *Land Title Act*, *Community Charter*, or *Local Government Act*. Some jurisdictions (e.g., the Fraser Valley Regional District or the Cowichan Valley Regional District) have developed more comprehensive assurance statements in collaboration with Engineers and Geoscientists BC. Where those exist, the Qualified Professional is to fill out the local version only. Defined terms are capitalized; see the Defined Terms section of the guidelines for definitions.

To: The Approving Authority (or Client) Date: January 30, 2025

Islands Trust

700 North Road, Gabriola Island - BC

Jurisdiction/name and address

With reference to (CHECK ONE):

- ☑ A. *Land Title Act* (Section 86) – Subdivision Approval
- ☐ B. *Local Government Act* (Sections 919.1 and 920) – Development Permit
- ☐ C. Community Charter (Section 56) – Building Permit
- ☐ D. Non-legislated assessment

For the following property (the "Property"):

1900 Stalker Road, Gabriola Island - BC

Civic address of the Property

The undersigned hereby gives assurance that they are a Qualified Professional and a professional engineer or professional geoscientist who fulfils the education, training, and experience requirements as outlined in the guidelines.

I have signed, authenticated, and dated, and thereby certified, the attached Landslide Assessment Report on the Property in accordance with the guidelines. That report must be read in conjunction this statement.

In preparing that report I have:

[CHECK TO THE LEFT OF APPLICABLE ITEMS]

- ☑ 1. Collected and reviewed appropriate background information
- ☐ 2. Reviewed the proposed Residential Development or other development on the Property
- ☑ 3. Conducted field work on and, if required, beyond the Property
- ☑ 4. Reported on the results of the field work on and, if required, beyond the Property
- ☑ 5. Considered any changed conditions on and, if required, beyond the Property
- 6. For a Landslide Hazard analysis or Landslide Risk analysis, I have:
  - ☑ 6.1 reviewed and characterized, if appropriate, any Landslide that may affect the Property
  - ☑ 6.2 estimated the Landslide Hazard
  - ☑ 6.3 identified existing and anticipated future Elements at Risk on and, if required, beyond the Property
  - ☑ 6.4 estimated the potential Consequences to those Elements at Risk
- 7. Where the Approving Authority has adopted a Level of Landslide Safety, I have:
  - ☐ 7.1 compared the Level of Landslide Safety adopted by the Approving Authority with the findings of my investigation
  - ☐ 7.2 made a finding on the Level of Landslide Safety on the Property based on the comparison
  - ☐ 7.3 made recommendations to reduce Landslide Hazards and/or Landslide Risks

8. Where the Approving Authority has **not** adopted a Level of Landslide Safety, or where the Landslide Assessment is not produced in response to a legislated requirement, I have:
   - [x] 8.1 described the method of Landslide Hazard analysis or Landslide Risk analysis used
   - [x] 8.2 referred to an appropriate and identified provincial, national, or international guideline for Level of Landslide Safety
   - [x] 8.3 compared those guidelines (per item 8.2) with the findings of my investigation
   - [x] 8.4 made a finding on the Level of Landslide Safety on the Property based on the comparison
   - [ ] 8.5 made recommendations to reduce Landslide Hazards and/or Landslide Risks
- [ ] 9. Reported on the requirements for future inspections of the Property and recommended who should conduct those inspections

Based on my comparison between:

[CHECK ONE]

- [ ] the findings from the investigation and the adopted Level of Landslide Safety (item 7.2 above)
- [x] the appropriate and identified provincial, national, or international guideline for Level of Landslide Safety (item 8.4 above)

Where the Landslide Assessment is not produced in response to a legislated requirement, I hereby give my assurance that, based on the conditions[1] contained in the attached Landslide Assessment Report:

A. SUBDIVISION APPROVAL

- [x] For subdivision approval, as required by the *Land Title Act* (Section 86), "the land may be used safely for the use intended"

  [CHECK ONE]

  - [ ] with one or more recommended additional registered Covenants
  - [x] without an additional registered Covenant(s)

B. DEVELOPMENT PERMIT

- [ ] For a development permit, as required by the *Local Government Act* (Sections 488 and 491), my report will "assist the local government in determining what conditions or requirements it will impose under subsection (2) of [Section 491]"

  [CHECK ONE]

  - [ ] with one or more recommended additional registered Covenants
  - [ ] without an additional registered Covenant(s)

C. BUILDING PERMIT

- [ ] For a building permit, as required by the *Community Charter* (Section 56), "the land may be used safely for the use intended"

  [CHECK ONE]

  - [ ] with one or more recommended additional registered Covenants
  - [ ] without any additional registered Covenant(s)

[1] When seismic slope stability assessments are involved, Level of Landslide Safety is considered to be a "life safety" criteria, as described in Commentary JJJ of the *National Building Code of Canada (NBC) 2015*, Structural Commentaries (User's Guide – NBC 2015: part 4 of division B). This states:

> "The primary objective of seismic design is to provide an acceptable level of safety for building occupants and the general public as the building responds to strong ground motion; in other words, to minimize loss of life. This implies that, although there will likely be extensive structural and non-structural damage, during the DGM (design ground motion), there is a reasonable degree of confidence that the building will not collapse, nor will its attachments break off and fall on people near the building. This performance level is termed 'extensive damage' because, although the structure may be heavily damaged and may have lost a substantial amount of its initial strength and stiffness, it retains some margin of resistance against collapse."

Laura Lessingham, P. Geo.

Name (print)

January 30, 2025

Date

#100-771 Vernon Avenue

Address

Victoria, BC V8X 5A7

250-475-3131

Telephone

laura@ryzuk.com

Email

(Affix PROFESSIONAL SEAL and signature here)

The Qualified Professional, as a registrant on the roster of a registrant firm, must complete the following:

I am a member of the firm Ryzuk Geotechnical Ltd.

(Print name of firm)

with Permit to Practice Number 1002996

(Print permit to practice number)

and I sign this letter on behalf of the firm.

FLOOD ASSURANCE STATEMENT

Note: This statement is to be read and completed in conjunction with the current Engineers and Geoscientists BC *Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC* ("the guidelines") and is to be provided for flood assessments for the purposes of the *Land Title Act*, Community Charter, or the *Local Government Act*. Defined terms are capitalized; see the Defined Terms section of the guidelines for definitions.

To: The Approving Authority

Date: January 30, 2025

Islands Trust

700 North Road, Gabriola Island - BC

Jurisdiction and address

With reference to (CHECK ONE):

- ☑ *Land Title Act* (Section 86) – Subdivision Approval
- ☐ *Local Government Act* (Part 14, Division 7) – Development Permit
- ☐ Community Charter (Section 56) – Building Permit
- ☐ *Local Government Act* (Section 524) – Flood Plain Bylaw Variance
- ☐ *Local Government Act* (Section 524) – Flood Plain Bylaw Exemption

For the following property ("the Property"):

1900 Stalker Road, Gabriola Island - BC

Legal description and civic address of the Property

The undersigned hereby gives assurance that he/she is a Qualified Professional and is a Professional Engineer or Professional Geoscientist who fulfils the education, training, and experience requirements as outlined in the guidelines.

I have signed, sealed, and dated, and thereby certified, the attached Flood Assessment Report on the Property in accordance with the guidelines. That report and this statement must be read in conjunction with each other. In preparing that Flood Assessment Report I have:

[CHECK TO THE LEFT OF APPLICABLE ITEMS]

☐ 1. Consulted with representatives of the following government organizations:

_____

☑ 2. Collected and reviewed appropriate background information

☐ 3. Reviewed the Proposed Development on the Property

☐ 4. Investigated the presence of Covenants on the Property, and reported any relevant information

☑ 5. Conducted field work on and, if required, beyond the Property

☑ 6. Reported on the results of the field work on and, if required, beyond the Property

☑ 7. Considered any changed conditions on and, if required, beyond the Property

8. For a Flood Hazard analysis I have:
   - ☑ 8.1 Reviewed and characterized, if appropriate, Flood Hazard that may affect the Property
   - ☑ 8.2 Estimated the Flood Hazard on the Property
   - ☑ 8.3 Considered (if appropriate) the effects of climate change and land use change
   - ☑ 8.4 Relied on a previous Flood Hazard Assessment (FHA) by others
   - ☐ 8.5 Identified any potential hazards that are not addressed by the Flood Assessment Report

9. For a Flood Risk analysis I have:
   - ☑ 9.1 Estimated the Flood Risk on the Property
   - ☑ 9.2 Identified existing and anticipated future Elements at Risk on and, if required, beyond the Property
   - ☑ 9.3 Estimated the Consequences to those Elements at Risk

10. In order to mitigate the estimated Flood Hazard for the Property, the following approach is taken:
- ☐ 10.1 A standard-based approach
- ☐ 10.2 A Risk-based approach
- ☑ 10.3 The approach outlined in the guidelines, Appendix F: Flood Assessment Considerations for Development Approvals
- ☐ 10.4 No mitigation is required because the completed flood assessment determined that the site is not subject to a Flood Hazard

11. Where the Approving Authority has adopted a specific level of Flood Hazard or Flood Risk tolerance, I have:
- ☐ 11.1 Made a finding on the level of Flood Hazard or Flood Risk on the Property
- ☐ 11.2 Compared the level of Flood Hazard or Flood Risk tolerance adopted by the Approving Authority with my findings
- ☐ 11.3 Made recommendations to reduce the Flood Hazard or Flood Risk on the Property

12. Where the Approving Authority has not adopted a level of Flood Hazard or Flood Risk tolerance, I have:
- ☑ 12.1 Described the method of Flood Hazard analysis or Flood Risk analysis used
- ☑ 12.2 Referred to an appropriate and identified provincial or national guideline for level of Flood Hazard or Flood Risk
- ☐ 12.3 Made a finding on the level of Flood Hazard of Flood Risk tolerance on the Property
- ☑ 12.4 Compared the guidelines with the findings of my flood assessment
- ☐ 12.5 Made recommendations to reduce the Flood Hazard or Flood Risk

☐ 13. Considered the potential for transfer of Flood Risk and the potential impacts to adjacent properties

☐ 14. Reported on the requirements for implementation of the mitigation recommendations, including the need for subsequent professional certifications and future inspections.

Based on my comparison between:

[CHECK ONE]

☐ The findings from the flood assessment and the adopted level of Flood Hazard or Flood Risk tolerance (item 11.2 above)

☑ The findings from the flood assessment and the appropriate and identified provincial or national guideline for level of Flood Hazard or Flood Risk tolerance (item 12.4 above)

I hereby give my assurance that, based on the conditions contained in the attached Flood Assessment Report:

[CHECK ONE]

☑ For subdivision approval, as required by the *Land Title Act* (Section 86), "that the land may be used safely for the use intended":

[CHECK ONE]

- ☑ With one or more recommended registered Covenants.
- ☐ Without any registered Covenant.

☐ For a development permit, as required by the *Local Government Act* (Part 14, Division 7), my Flood Assessment Report will "assist the local government in determining what conditions or requirements it will impose under subsection (2) of this section [Section 491 (4)]".

☐ For a building permit, as required by the Community Charter (Section 56), "the land may be used safely for the use intended":

[CHECK ONE]

- ☐ With one or more recommended registered Covenants.
- ☐ Without any registered Covenant.

☐ For flood plain bylaw variance, as required by the *Flood Hazard Area Land Use Management Guidelines* and the *Amendment Section 3.5 and 3.6* associated with the *Local Government Act* (Section 524), "the development may occur safely".

☐ For flood plain bylaw exemption, as required by the *Local Government Act* (Section 524), "the land may be used safely for the use intended".

I certify that I am a Qualified Professional as defined below.

January 30, 2025

Date

Laura Lessingham, P.Geo

Prepared by

Laura Lessingham, P.Geo

Name (print)

Signature

Jordan Gybels, P.Eng.

Reviewed by

Jordan Gybels, P.Eng.

Name (print)

Signature

#100 - 771 Vernon Ave

Address

Victoria, BC, V8Z 1T2

2504753131

Telephone

laura@ryzuk.com

Email

(Affix PROFESSIONAL SEAL here)

If the Qualified Professional is a member of a firm, complete the following:

I am a member of the firm Ryzuk Geotechnical Ltd.

and I sign this letter on behalf of the firm.

(Name of firm)

CHECKLIST AND SIGNOFF FOR AN INDEPENDENT REVIEW OF HIGH-RISK PROFESSIONAL ACTIVITIES OR WORK

[Print clearly and legibly]

RE: Rezoning and Subdivision
Name of project, activity, or work

1900 Stalker Rd. - Gabriola Island, BC
Address of project, activity, or work

PROFESSIONAL OF RECORD

Laura Lessingham, P.Geo.
Name of professional and designation (P.Eng., P.Geo., P.L.Eng., or P.L.Geo.)

Ryzuk Geotechnical Ltd.
Firm name

1002996
Permit to Practice number

#100 - 771 Vernon Ave. - Victc
Address of firm

ITEM	REVIEWED	REMARKS
	INITIALS	Independent review of
Criteria for carrying out Professional Activities or Work		moderate to high risk work and confirmation that requirements
N Applicable codes, standards, and other requirements (laws, regulations, design requirements, etc.)		Report is compliant with current BCBC, local codes, and MOTT requirements.
Geographical and/or environmental conditions and requirements		Gently to moderately sloping
Assumptions for Professional Activities or Work		Bedrock controlled site with
Concept for Professional Activities or Work		Hand dug test pits to refusal.
Test and analysis procedures and results		Slide modeling to confirm
Quality control and quality analysis procedures		Report and
Calculations or analysis of representative elements		Modeling with slide 2 software
Review of representative details		Review of conservative slope
Integration of third-party components and artifacts		CHS data used and third party
Representation of output (e.g., drawings, reports, spreadsheets, models)		Site plan and cross sections for slope stability analysis.
Hazards (current and future) identified in the Risk Assessment		Geological hazards were reviewed and identified
Adequacy and implementation of mitigation measures		none required
Concerns discussed with the Professional of Record		none
For global, repetitive, or iterative design, recommendation for intervals of Independent Review		n/a

[…continued]

INDEPENDENT REVIEWER

Jordan Gybels, P.Eng.

Name of professional and designation
(P.Eng., P.Geo., P.L.Eng., or P.L.Geo.)

Ryzuk Geotechnical Ltd.

Firm name

1002996

Permit to Practice number

#100 - 771 Vernon Ave. - Victoria BC

Address of firm

25/01/30

Date: (yy/mm/dd)

Signature

CHECKLIST AND SIGNOFF FOR AN INDEPENDENT REVIEW OF HIGH-RISK PROFESSIONAL ACTIVITIES OR WORK

[Print clearly and legibly]

TO: PROFESSIONAL OF RECORD **DATE** (yy/mm/dd): 25/01/30

Laura Lessingham, P.Geo.

Name of professional and designation
(P.Eng., P.Geo., P.L.Eng., or P.L.Geo.)

Ryzuk Geotechnical Ltd. 1002996

Firm name Permit to Practice number

#100 - 771 Vernon Ave. - Victoria BC

Address of firm

Rezoning and Subdivision

RE: Name of project, activity, or work

1900 Stalker Rd. - Gabriola Island, BC

Address of project, activity, or work

The undersigned hereby records that an Independent Review of the professional activity or work, based on the documentation prepared by the Professional of Record for the professional activity or work, has been completed by this Independent Reviewer.

I am a member of the firm Ryzuk Geotechnical Ltd.
(Name of firm)

With the Permit to Practice number: 1002996
(Permit to Practice number)

and I sign this letter on behalf of the firm.

I certify that I am a Professional Registrant as defined below.

DATE (yy/mm/dd): 25/01/30

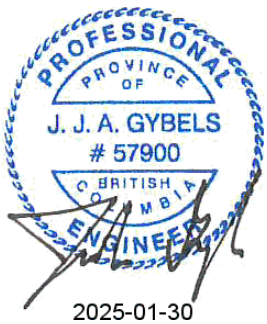
Jordan Gybels, P.Eng.

Name of professional and designation
(P.Eng., P.Geo., P.L.Eng., or P.L.Geo.)

Signed

#100 - 771 Vernon Ave. - Victoria BC

Address



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Telephone

(Affix PROFESSIONAL SEAL here)

NOTE:1. The above letter must be signed by a Professional Registrant (professional engineer, professional geoscientist, professional licensee engineering, or professional licensee geoscience, licensed to practice by Engineers and Geoscientists BC) qualified to conduct an Independent Review on the Professional Activity or Work being reviewed.

2. This letter is endorsed by Engineers and Geoscientists BC

HYDROGEOLOGICAL ASSESSMENT IN SUPPORT OF A RE-ZONING APPLICATION FOR 1900 STALKER ROAD GABRIOLA ISLAND, BC

Submitted To:

Seward Development Inc.
1820 Argyle Avenue, Nanaimo,
British Columbia V9S 3K7

Submitted By:

Waterline Resources Inc.
Nanaimo, British Columbia
February 5, 2025
3330-24-001

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1.0 INTRODUCTION

1.1 Background and Objective

Seward Developments Inc. (Seward) is seeking re-zoning approval to subdivide a land parcel, Lot 1, Section 4 Gabriola Island, Nanaimo Region, Plan 16590, located at 1900 Stalker Road Gabriola Island, BC (the Site; Figure 1). The proposed subdivision will comprise three lots, each being serviced by its own dedicated water supply well. Two lots (Lot A and Lot B) at the Site both have a water supply well in place and, therefore, only one additional water supply well is required to service the third lot (Lot C). A survey plan of the Site is provided in Appendix A (Turner and Associates Land Surveying, 2023).

Seward retained Waterline Resources Inc. (Waterline) to conduct a hydrogeological assessment to evaluate the potential of using groundwater to service Lot C. The goal of this assessment is to also characterize potential impacts from groundwater diversion on mapped aquifers, hydraulically-connected streams and/or local registered groundwater users, as stipulated under the servicing policy (Section 7.0) listed in the Islands Trust, Gabriola Island Official Community Plan (OCP) Bylaw No. 166, 1997 (Islands Trust, 2022).

1.2 Scope of Work

To meet the objective of the hydrogeological assessment, Waterline conducted the following scope of work:

- Reviewed publicly available hydrogeological information for the area of the proposed re-zoning, including nearby registered groundwater users (water wells), well construction details, aquifer conditions, surface water features and terrain mapping;
- Reviewed available groundwater chemistry data collected from the existing water supply well located on Lot A, to provide context of the source water quality; and,
- Completed this technical report summarizing the results of the preliminary hydrogeological assessment, including potential hydrogeological impacts from the groundwater development activities for a rezoning application to facilitate subdivision approval.

1.3 Regulatory Considerations for Groundwater Development

1.3.1 Groundwater Development

There are no groundwater supply requirements listed in the OCP (Island Trust, 2022) for proposed subdivisions on Gabriola Island. However, the Ministry of Transportation and Infrastructure (MOTI) requires proof of 2.5 cubic metres per day (m^3/d) of water supply per dwelling unit (single lot) as a condition of subdivision (MOTI, 2018), which is the current standard stipulated by the Islands Trust local planning services team (personal communication, Margot T. [Islands Trust], December 12, 2024).

Groundwater development must be carried out in a way that protects the water source. Regulatory standards listed in the Water Sustainability Act (WSA) *Groundwater Protection Regulation* (GWPR; BC Government, 2022) set out several offset distances and conformance requirements for development of new groundwater wells.

1.3.2 Saltwater Intrusion

According to the *Best Practice for Prevention of Saltwater Intrusion* published by the former BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD, 2016), wells completed in aquifers adjacent to the coast containing groundwater with chloride concentration greater than 150 milligram per liter (mg/L), specific conductivity (EC) greater then 1,000 microsiemens per centimeter (µS/cm), or a total dissolved solids (TDS) concentration greater than 700 mg/L, are considered to be affected by saltwater intrusion.

For coastal BC, these thresholds have been established as operational objectives, and a groundwater well should only be pumped if it can produce a water quality that does not exceed these threshold values (FLNRORD, 2016). Under Section 58 or the WSA (BC Government, 2024), it is prohibited to operate a well in a manner that causes intrusion of saline water into an aquifer. Mitigative measures include completing a new groundwater well in a location that is greater than 50 metres (m) from the coastline and minimizing drawdown below sea level during operation of the water source well (FLNRORD, 2016).

2.0 METHODS

2.1 Desktop Review

Waterline used its proprietary Environmental Web Services (EWS) geodatabase system to obtain local data to support the preliminary hydrogeological assessment. EWS integrates publicly available data including geological, hydrogeological, and hydrological information, among additional datasets, using a Geographic Information Systems (GIS) platform. EWS provides a visual presentation of the searched data relative to the Site and surrounding areas. This allowed for the rapid characterization of the hydrogeological setting and determination of the potential risk of the proposed subdivision on adjacent environmental receptors.

Datasets accessed using EWS included:

- Government of BC - Freshwater Atlas Lakes/Manmade Waterbodies/Rivers (FLNRORD, 2022a);
- Government of BC - Freshwater Atlas Named Watersheds (FLNRORD, 2022b);
- Government of BC - Freshwater Atlas Stream Network (FLNRORD, 2019);
- Ministry of Environment (ENV) - Ground Water Wells and Aquifer Databases (GWELLS, ENV, 2024a);
- Government of BC - Terrain Inventory Mapping (ENV, 2013a); and
- British Columbia Geological Survey – Bedrock Geology Mapping (Cui et al, 2017).

Seward provided Waterline a copy of the Archaeological Impact Assessment of 1900 Stalker Road Gabriola Island, BC, completed by Baseline Archaeological Services Inc. (Baseline, 2023) to help provide context of the site setting and current land use designation.

2.2 Site Visit

Waterline completed a site visit on November 9, 2023, to assess the Lot A and Lot B water supply wells, with Well Tag Numbers (WTN) 26181 and 26180, respectively. The work performed onsite included:

- Photographing and documenting the Site and the wells (Photograph B1 to B4; Appendix B), including verifying the lack of surface water features and riparian areas;
- Measuring the stickup and manual water level for WTN 26181. Waterline was unable to open the wellhead for WTN 26180 without risk of damaging the installed pump (Photograph B5; Appendix B);
- Purging the water from WTN 26181 for 20 minutes using the dedicated pump, while continuously measuring water chemistry parameters. The water was passed through the pressure tank and filter;
- Collecting a water quality sample from WTN 26181 for routine chemistry parameters, total metals and some dissolved metal parameters, in accordance with the *BC Field Sampling Manual* (ENV, 2013b). Waterline was unable to collect a water sample from WTN 26180 as the well was unpowered and the lines were winterized; and
- Submitting the groundwater chemistry samples from WTN 26181 to CARO Analytical Services (CARO) on November 10, 2023, located in Burnaby, BC.

3.0 SETTING

3.1 Current and Planned Land Use

The Site is zoned as Resource land (R) as per Schedule B of Bylaw No. 166, 1997 (Island Trust, 2022), with a total land area of 3.6 hectares (ha). Access to the Site is from Stalker Road (Figure 2). The land parcel to the south of the Site is designated as Park land (P; Drumbeg Provincial Park), with Agricultural land (AG) to the north.

The Client is proposing to subdivide the property into three lots (Lot A, B and C) having an average parcel size greater than 0.5 ha, consisting of 47% of the total land use area (1.7 ha). The remaining space is proposed to be communal land (49%), with some area designated as Park land (4%).

Each lot has an existing dwelling (Photograph B6 to B8, Appendix B). Only Lot C does not have a designated water supply well and currently stores trucked water in a large cistern, located next to the dwelling. If rezoning is approved, the current Resource land designation would be re-designated as Small Rural Residential (SSR).

3.2 Physiography

The Site is situated on the southeast coast of Gabriola Island, approximately 18 km east of downtown Nanaimo, BC (Figure 1). Topography across the Site slopes west to east, ranging from 39 above sea level (masl) to seal level, respectively. Surface water runoff follows topography (Figure 2).

There are no mapped watersheds on Gabriola Island, and very few surface water features (Figure 2). Surface water features are intermittent and tend to dry up during the summer months, making groundwater one of the few sources of reliable freshwater (Agriculture Canada, 1990). The closest freshwater water surface feature to the Site is Belevedere Farm Creek (located 1.3 km to the west), a seasonal stream flowing into Degnen Bay (Figure 2).

Historical climate data, representative of climate conditions near the Site, was obtained from the Nanaimo Airport climate station, having Climate Station ID 1025370 from 1981 to 2016 and replaced with Climate Station ID 1025369 after 2016 (Environment Canada, 2024), located approximately 15.5 km southwest of the Site (Figure 1) at an elevation of 28 masl. Average monthly temperature and total precipitation data is available from 1981 to 2010 (climate normals), and yearly total precipitation data is available from 2011 to 2022; this data is summarized in Table 1.

Table 1: Climate Normals and Recent Climate Data from Airport Climate Station

Climate Normal Data (1981-2010)													
Parameter	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Avg Yr.**
Avg Temp (°C)	3.5	4.3	6.3	9.0	12.5	15.6	18.1	18.2	14.9	9.9	5.6	3.1	10.1
Total Precip (mm)	188	126	113	67	54	43	25	28	36	102	197	184	1165
Precipitation Data (2011-2021)													
Parameter	**2011**	**2012**	**2013**	**2014**	**2015**	**2016[a]**	**2017**	**2018**	**2019**	**2020**	**2021**	**Avg Yr.**	
Total Precip (mm)	1025	1279	756	1156	984	1356	1178	1213	775	1155	1232	1101	

Notes: Avg Temp means average temperature; **Precip** means precipitation; **°C** means degrees Celsius; **mm** means millimetres; **Avg Yr.** means average yearly. **a)** In June 2016, Climate Station No 1025370 was changed to 1025369. **b)** Precipitation data is only to April 19, 2022.

There are two distinct seasonal patterns, including a warmer dried period from April to September (spring to early fall) and a cooler wetter period from October through March (late fall through winter). Recent climate data from 2011 to 2021 (11-years) suggest the average annual precipitation (1101 millimetres) has slightly decreased in comparison to the climate normals, with the lowest recorded precipitation measured in 2013.

3.3 Surficial and Bedrock Geology

Regional mapping indicates the Site is underlain by a veneer or blanket of glaciomarine material, consisting of gravels, sands, silt and clay (ENV, 2013a), which extends across the entire island. Glaciomarine materials are deposited by a combination of glacier and marine-related processes during previous deglaciation events.

The surficial sediments are underlain by Upper Cretaceous sedimentary bedrock of the Nanaimo Group, which consists of interbedded conglomerate, sandstone, siltstone, shale, and occasionally coal (Cui et. al., 2017; Muller and Jeletzky, 1970), extending throughout the Nanaimo area. Sandstone outcrops on the Site are seen along the shoreline and in occasional outcrops through the area where surficial sediments have been eroded. There are no mapped bedrock faults intersecting the Site, but regional scale faulting does exist northwest and southeast of the Site, where faults cut through the islands orthogonally in northeast-southwest trends (Cui et. al., 2017; Figure 1). In these areas of faulting, the frequency of bedrock fractures generally increases, however, fracture patterns are known to be heterogeneous.

While the mapped soil and bedrock boundaries are approximate, in general they agree with the lithology data provided by the available well logs near the Site and observations made by Waterline during the site visit.

3.4 Hydrogeology

3.4.1 Mapped Bedrock Aquifer 709

A provincially mapped fractured bedrock aquifer (Aquifer 709; Figure 1) reportedly underlies the Site. The aquifer extent and description are based on data collected from the driller's logs for registered groundwater wells in the area, referenced from the ENV GWELLS database (ENV, 2024a). Details of Aquifer 709 are summarized in Table 2.

Table 2: Description of Aquifer 709

Aquifer Name	Aquifer 709
Aquifer Type/Material	Fractured Bedrock – Sandstone with minor shale and conglomerate
Aquifer Area (km^2)	46.8
Aquifer Productivity	Low
Aquifer Demand	Moderate
Aquifer Vulnerability	High
Median Depth to Groundwater (mbgl)	6.1
Median Well Completion Depth (mbgl)	33.4
Median Well Yield Estimate (m^3/d)	24
Aquifer Use	Domestic, commercial, industrial, agricultural
Comments	1042 wells are associated with the aquifer, including 6 artesian wells

Notes: mbgl is metres below ground level; m^3/d is cubic metres per day

General observations include:

- The groundwater flow direction within the aquifer is anticipated to be from higher to lower elevations, generally towards the ocean in all areas of the aquifer, however directional permeability of the fractured bedrock is generally unknown.
- Recharge to the aquifer is expected to come from infiltration of precipitation and direct connection with surface water features where bedrock fractures are near surface.
- The vulnerability of Aquifer 709 to surface contamination is classified as 'high' as the permeability of the overburden is moderate to high and discontinuous with bedrock outcropping near surface. Aquifer 709 is also noted to be at risk of sea water intrusion.

3.4.2 Aquifer 709 Groundwater Level Trends

Groundwater levels in Aquifer 709 are monitored at four Provincial Groundwater Observation Wells (OW). OW 316, located 5.4 km west of the Site is most representative of groundwater conditions in the southeastern portion of Gabriola Island (Figure 1). The Groundwater level data from OW 316, compiled by ENV (ENV, 2024b) suggests:

- Groundwater levels fluctuate seasonally, correlating to seasonal precipitation patterns. There is a 3.1 m median annual fluctuation between January and September; and
- Historical groundwater levels for the period of 1992 to 2022 indicate the groundwater has a stable trend, suggesting that water input to the system for recharge matches groundwater output from the system from water use and other environmental factors (evaporation, discharge to the ocean, etc.).

3.4.3 Groundwater Well Records Within a 1 Km Radius of the Site

Waterline searched the provincial Groundwater Wells and Aquifer database (ENV, 2024a) to determine the number of registered water wells within a 1 km radius of the Site. The search results indicated records for 42 water wells including the Lot A (WTN 26181) and Lot B (WTN 26180) wells, as shown on Figure 2 and summarized in Table C1; Appendix C.

Table 3 presents a statistical summary of the groundwater well construction details and well yields for both the unconsolidated and bedrock aquifers within the searched area. It should be noted that the reported well yields are from driller's logs, taken from short duration airlift tests at the time of well drilling. Although they are not considered year-round sustainable well yields, they do provide good insight into the expected water supply potential.

Table 3: Summary of Registered Groundwater Wells within a 1 km Radius of the Site

Water Well Records Statistics	Finished Well Depth (mbgl)	Bedrock Depth (mbgl)	Well Yield (m^3/d)
Minimum	18.3	0.0	0
Maximum	109.7	6.4	109
Average	53.0	1.7	30

Notes: mbgl means metres below ground level; m^3/d means cubic metres per day.

Of the 42 registered water wells:

- None of the wells within the search area are licensed (Table C1);
- All 42 wells are completed in Aquifer 709 and are registered for domestic or unknown use (Table C1);
- The closest bedrock wells to the Site are registered with WTN 13744 and WTN 123454, located 510 m southwest and 440 m west of the Site boundaries, respectively (Figure 2). As there are very few registered groundwater wells near the Site, the aquifer development (balance of water supply vs. water demand) is considered low, thus reducing aquifer vulnerability. It should be noted that:
    - WTN 13744 is completed in sandstone and shale to a depth of 18.3 mbgl and has an estimated yield of 13.6 m^3/d; while,
    - WTN 123454 is also completed in sandstone, to a depth of 51.8 mbgl and has an estimated yield of 27.3 m^3/d.
- Three wells (WTNs 13746, 13913, and 35556) are registered as completed in the surficial unconsolidated sediments above Aquifer 709, but in reviewing the driller's reports, it was confirmed that they are in fact completed in the fractured bedrock of Aquifer 709. As such, there are no known wells in the search area that are completed in an unconsolidated aquifer, and none are expected due to the thin veneer of surficial sediment.

3.5 Existing Site Water Supply Wells

The two existing groundwater wells on the Site, WTN 26181 and WTN 26180, are proposed as the main water supply for Lot A and Lot B, respectively (Appendix A). These wells are both registered and were drilled and completed in Aquifer 709. A summary of the wells' construction details is included in Table 4, borehole logs are included in Appendix D. Three water-bearing fractures were identified in each well. The fractures are near, or below, sea level; however, the wells are over 100 m from the shoreline.

Table 4: Well Construction Details

Well Name	Lot A Water Supply Well	Lot B Water Supply Well
Well Tag Number (WTN)	WTN 26181	WTN 26180
Well Identification Number (WIN)	-	-
Well Construction Date (YYYY-MM-DD)	1972-05-01	
Well Driller	Windecker Water Wells	
Easting (UTM Zone 10)[a]	449396	449400
Northing (UTM Zone 10)[a]	5442806	5442776
Ground Surface Elevation (masl)	18.1	16.1
Casing Inside Diameter (mm)	154	
Casing Stick-up (m)	0.36	0.30
Surface Casing Depth (m)	2.1	1.5
Depth to Water (mbgl)	0.39 (Nov 9, 2024)	-
Screen Interval	Open hole	
Depth to Water Bearing Fracture Zones (mbgl)	• 3.0 • 24.1 • 27.4	• 15.2 • 25.9 • 29.0
Elevation of Water Bearing Fractures (masl)	• 15.1 • -6.0 • -9.3	• 0.9 • -9.8 • -12.9
Well Depth (mbgl)	27.4	29.0
Well Depth Elevation (masl)	-9.3	-12.9
Well Capacity (m^3/d)*	98	11
Aquifer Formation	Nanaimo Group (Fractured Sandstone and Shale)	
Distance to Ocean (m)	103	101

Notes: **a)** UTM Coordinates are based on Waterline's site visit; **masl** means metres above sea level; **mbgl** means metres below ground level; **m^3/d** means cubic metres per day; * The reported well capacity is from short-term airlift testing at the time of drilling

The well completion details for WTN 26180 and WTN 26181 were compared with regulatory standards listed in the GWPR (BC Government, 2022). Using the site plan, Waterline confirmed relevant offset distances to potential sources of contamination as listed in the GWPR and detailed in the BC Ministry of Health (BC MoH), Health Hazards Regulation (2020) and Island Health Subdivision Standards (IH, 2020). The results of the assessment are summarized below in Table 5.

Table 5: Overview of WTN 26180 and WTN 26181 Conformance with Regulatory Standards

Requirement	Meets Requirement?	
	WTN 26180	WTN 26181
Groundwater Protection Regulation		
The well casing extends greater than 0.3 m above ground level	Yes	Yes
The ground around is properly sloped to avoid pooling around the well casing	Yes	Yes
The well has a well identification number	No	No
The well is capped and locked	Yes	Yes
There is a well seal installed around the well casing.	No	No
Health Hazard Regulation		
Setback distance to private dwellings (>6 m)	Yes	Yes
Setback distance to known cemeteries, dumping grounds or contaminated sites (>120 m)	Yes	Yes
Island Health Subdivision Standards		
Setback distance from planned septic fields (>30 m)	Yes	Yes

WTN 26180 and WTN 26181 do not have Well Identification Numbers (WINs) as they were drilled prior to first enforcement of the GWPR in 2005. Furthermore, the minimum requirements for well surface seal as per Section 22 of the GWPR (BC Government, 2022) have not been met for both wells, again, as guidelines had not been defined at the time of well construction.

However, both WTN 26180 and 26181 are constructed with surface casing extending through the surficial material, driven into bedrock, limiting movement of surface water along the casing which could cause cross-contamination of the groundwater source. Also, both wells are located inside pumphouses and have concrete floors (Photograph B2 and B4, Appendix B) that help reduce pooling of water around the well casing, preventing the infiltration of water downward into the underlying surficial material near the well.

3.6 Groundwater Quality

A water quality sample was collected from WTN 26181 during the Site visit. In combination with water chemistry from OW 316, Waterline characterized the water quality for the southeastern portion of Aquifer 709. The data associated with OW 316 was retrieved from the ENV Environmental Monitoring System (ENV, 2024c) database, using the most recent sample entry, from October 8, 2014.

A summary table (Table E1) comparing the general chemistry, major ions and total/dissolved metals concentrations from WTN 26181 and OW 316 is included in Appendix E. The laboratory report for WTN 26181 is included in Appendix E.

The water quality results were compared with the groundwater quality guidelines listed in the *Best Practices for Prevention of Saltwater Intrusion* (FLNRORD; 2016) and with the *Guidelines for Canadian Drinking Water Quality* (GCDWQ; Health Canada, 2024). The GCDWQ set standards based on aesthetic objectives (AO) and on maximum acceptable concentrations (MAC). Some notable observations for the groundwater source include:

- The groundwater hardness for WTN 26181 was 57.8 milligram per liter (mg/L), indicating the groundwater is soft (Hanna et al., 2016);
- WTN 26181 has a TDS of 96.4 mg/L and an EC of 184 µS/cm, both of which are below the respective limits outlined in the Best Practices for Prevention of Saltwater Intrusion (TDS: 700 mg/L; EC: 1,000 µS/cm; FLNRORD; 2016). TDS is below the Canadian Drinking Water Quality AO guideline concentration of 500 mg/L (Health Canada, 2024);
- Despite being only 103 m from the ocean, dissolved chloride values at WTN 26181 are 22.5 mg/L, below the Best Practices for Prevention of Saltwater Intrusion value of 150 mg/L (FLNRORD; 2016);
- Based on the major ion chemistry, the water type for Aquifer 709 varies. The dominant anion for the groundwater sources is bicarbonate, indicating groundwater is recharged primarily from recent precipitation and not likely to be affected by saltwater intrusion. The dominant cation at OW 316 is calcium, whereas WTN 26181 has a mixed (no dominant) cation composition (Figure 3);
- OW 316 has dissolved iron that exceeds the AO and dissolved manganese that exceeds the MAC, while WTN 26181 concentrations are below the guidelines for both metals;
- Turbidity in OW 316 exceeds the AO for untreated water, while turbidity was not measured at WTN 26181;
- No microbiological samples have been collected from OW 316 or WTN 26181; and
- The only measured parameter exceeding the AO for WTN 26181 is aluminum, while pH was below the AO.

4.0 ASSESSMENT RESULTS

4.1 Adequacy of Groundwater Supply for New Use Water Supply Well on Lot C

Aquifer 709 is the only known groundwater source on Gabriola Island for development of a new well on Lot C. The Lot A and Lot B wells, both completed in Aquifer 709, have very different reported capacities, ranging from 11 to 98 m^3/d, despite being drilled only 30 m apart and having similar completion depths (Table 4).

Wells completed in Aquifer 709, within 1-km of the Site, have a reported average well yield of 30 m^3/d (Table 3), which is higher than the onsite well capacity. This is comparable to the median well yield (24 m^3/d; Table 2) reported for all wells across Aquifer 709. Considering the minimum reported well yield within 1 km of the Site (2.7 m^3/d; Table 3), it is reasonable to infer that new groundwater development onsite could meet the MOTI requirement of 2.5 m^3/d, to provide adequate supply for a single residential lot.

4.2 Impacts of Additional Groundwater Diversion on Existing Groundwater Users

If groundwater development on Lot C is successful, there could be impacts to groundwater users on the Site (Lot B and Lot A), given the proximity of WTN 26180 and WTN 26181 and potential connectivity of the groundwater fracture system. The next closest registered groundwater user

(WTN 123454) is 440 m northwest of the Site boundary, and negative impacts from groundwater development are not expected.

Groundwater availability during the summer, the period of lowest groundwater recharge, has not been a concern for the current owner (personal communication, David G. [Owner] December 20, 2024). Groundwater level trends for Aquifer 709, measured from OW 316, are stable, suggesting additional groundwater extraction for the southeastern portion of Gabriola Island is sustainable. Nevertheless, local impacts from additional groundwater diversion should be verified through aquifer pumping tests and groundwater monitoring.

4.3 Impacts of Additional Groundwater Diversion on the Receiving Environment

The proposed groundwater extraction for Lot C should not impact surface water features, including Belevedere Farm Creek, the nearest surface water feature. Given the distance (1.3 km) between the surface water source and the groundwater source on the Site, a direct hydraulic connection is unlikely. Furthermore, Belevedere Farm Creek flows intermittently, suggesting creek flow is predominantly from precipitation and surface water runoff (quick flow component), with lesser influence from groundwater discharge (baseflow component).

The groundwater quality reported from WTN 26181 suggests groundwater at the Site is fresh, despite the groundwater fractures encountered during well drilling being documented near or below sea level. Therefore, minimizing groundwater development on Lot C to 2.5 m^3/d and ensuring any new groundwater diversion (e.g., well drilling) is located more than 100 m from the shoreline should mitigate the risk of saltwater intrusion impacts on Aquifer 709.

5.0 CONCLUSION

In conclusion, based on the desktop review completed as part of the preliminary hydrogeological assessment, it is Waterline's opinion that the water requirements (2.5 m^3/d) for Lot C can be met by a new water well completed in Aquifer 709. The proposed water demand is not expected to adversely impact adjacent groundwater users or hydraulically connected streams and freshwater bodies.

Currently, the groundwater quality is fresh; however, Aquifer 709 is vulnerable to surface contamination. To mitigate the potential risk of saltwater intrusion, groundwater development on Lot C should be limited to household use, ensuring any new groundwater diversion (e.g., well drilling) is located more than 100 m from the shoreline.

6.0 RECOMMENDATIONS

The following recommendations are provided for consideration by the Client after re-zoning is complete and as part of potable water supply development:

- Contract a registered well driller to install a new well on Lot C. The well construction and sitting (including setbacks) should meet the regulatory guidelines listed in the GWPR and be greater than 100 m from the shoreline;
- Complete a constant rate pumping test in the new well after drilling. As Islands Trust and MOTI do not provide any guidelines or requirements for well testing, it is Waterline's professional opinion that RDN Policy B1.21 (RDN, 2019) be followed at a minimum to confirming a sustainable well yield of 2.5 m^3/d. Indicator parameters for saltwater intrusion should be monitored during testing to ensure groundwater extraction does not induce saline intrusion or compromise water quality; and
- The water from the new well should be tested for bacteriological and routine chemical parameters as stipulated by IH. A qualified pump installer in the province of British Columbia should be consulted at the time of well commissioning to review the raw water quality results to ensure proper filtration and treatment are provided.

7.0 CERTIFICATION

This document was prepared under the direction of a professional geoscientist registered in the Province of British Columbia.

Waterline Resources Inc. trusts that the information provided in this document is sufficient for your requirements. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

Respectfully submitted,

Waterline Resources Inc.
EGBC Permit No. 1000669

Caleb Isaac, B.Sc., G.I.T.
Junior Hydrogeologist

Reviewed By:

Jolene Hermanson, M.Sc., P.Geo.
Senior Hydrogeologist

PROFESSIONAL
PROVINCE OF
S. T. Y. WING
42572
BRITISH COLUMBIA
GEOSCIENTIST

2025-02-05

Simon Wing, B.Sc., P.Geo.
Senior Hydrogeologist

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FIGURES

References:

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Hydrogeological Assessment in Support of a Re-zoning Application for 1900 Stalker Road Gabriola Island, BC

LOCATION MAP

Waterline

Prepared By:	Waterline Resources Inc.
Project Number:	3330-24-001
Compiled By:	mwine
Date Issued:	2025-Jan-15
Date Revised:	--

FIGURE 1

G:\Projects\Seward Developments\2024_fig5.qgz

References:

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Hydrogeological Assessment in Support of a Re-zoning Application for 1900 Stalker Road Gabriola Island, BC

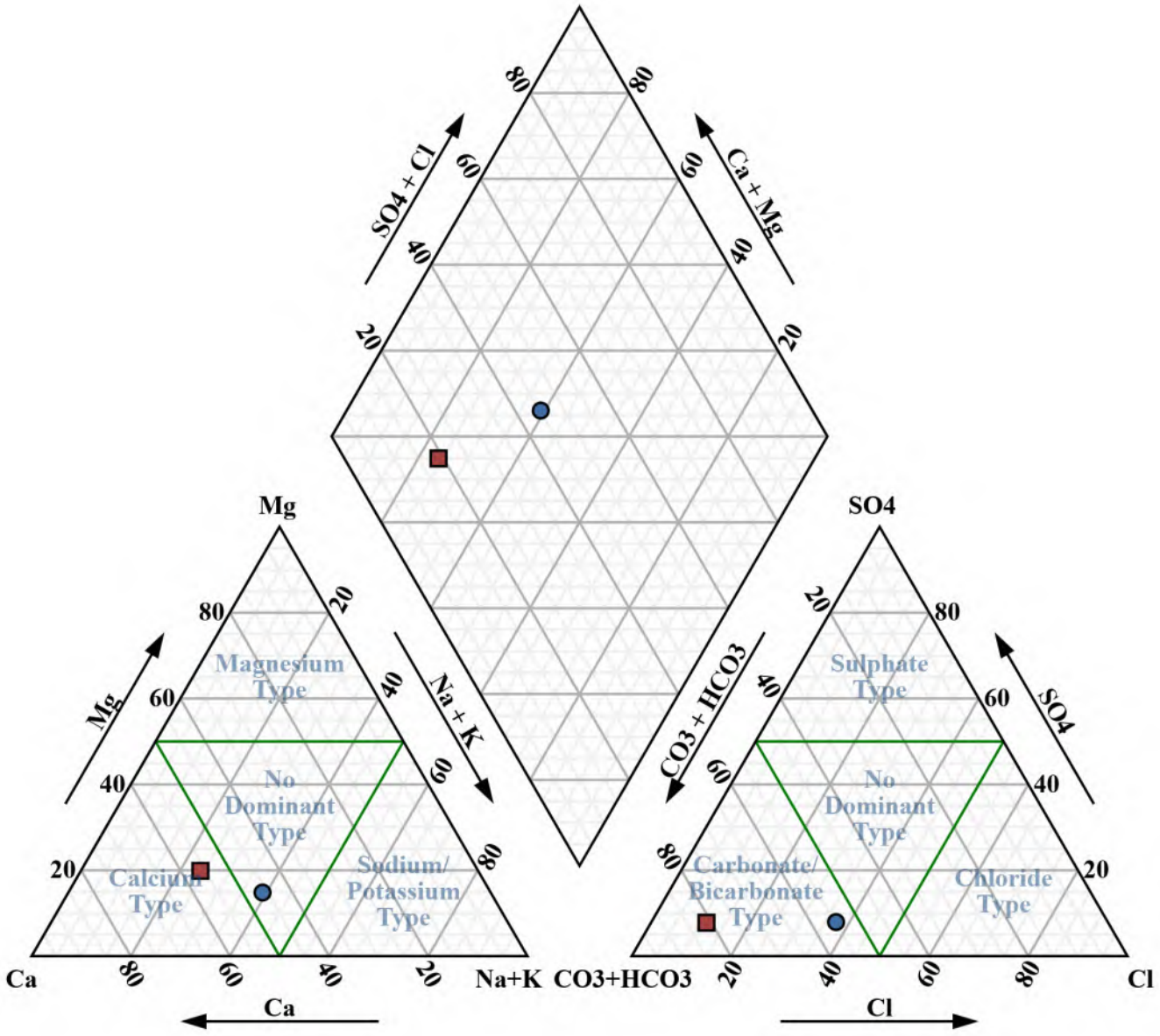
SITE MAP

Waterline

Prepared By:	Waterline Resources Inc.
Project Number:	3330-24-001
Compiled By:	mwine
Date Issued:	2025-Jan-15
Date Revised:	--

FIGURE 2

G:\Projects\Seward Developments\2024_fig5.qgz



● Lot A (WTN 26181)
■ OW 316

Hydrogeological Assessment in Support of Re-Zoning for Subdivision Approval
1900 Stalker Road, Gabriola Island, British Columbia
Submitted to Toby Seward

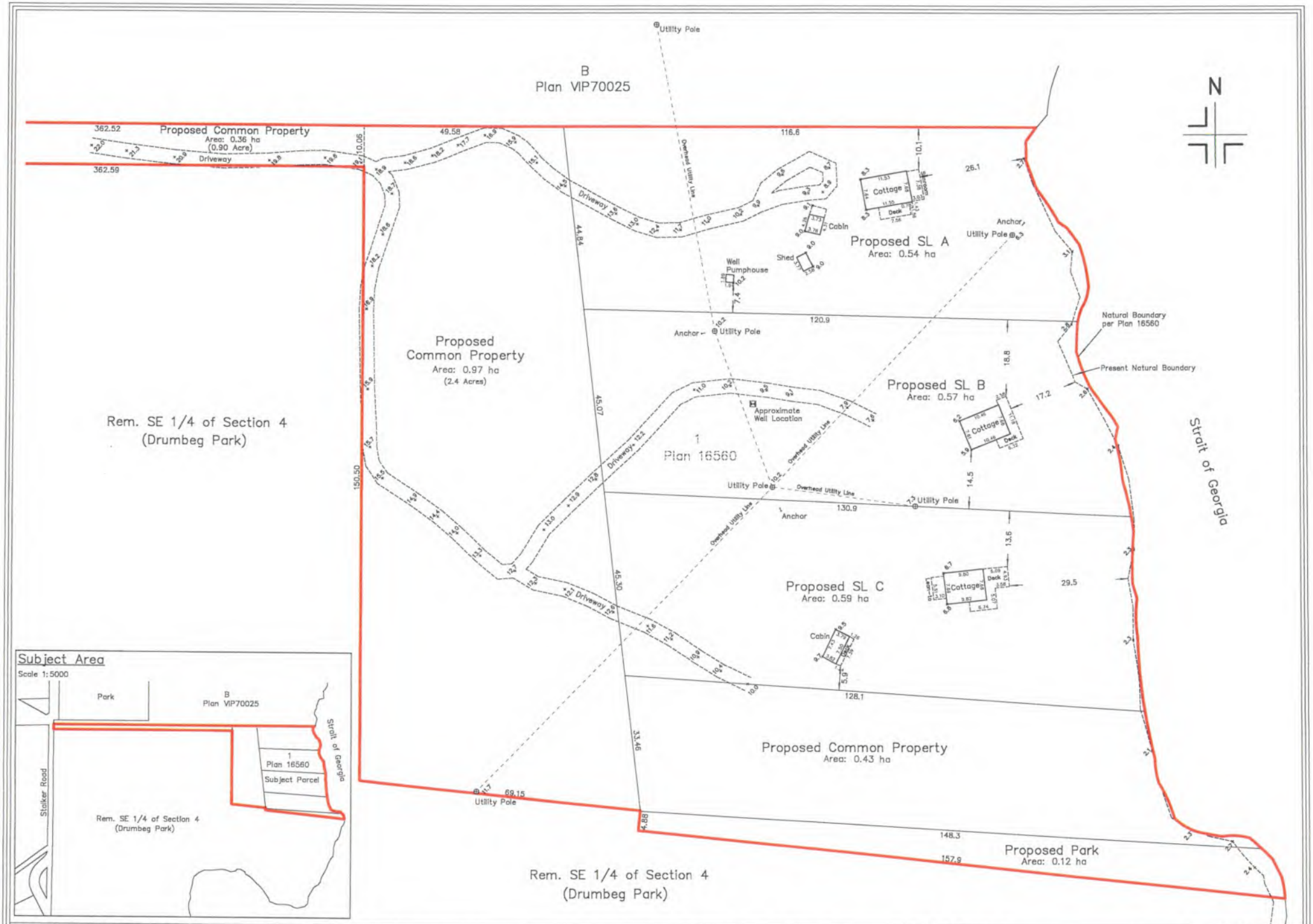
PIPER PLOT

PREPARED BY:	Waterline Resources Inc.
PROJECT:	3330-24-001
COMPILED BY:	Hydrachem
DATE ISSUED:	2025-Jan-16
REVISED:	-

FIGURE 3

Appendix A

Proposed Site Plan



SITE PLAN SHOWING PROPOSED BARE LAND STRATA SUBDIVISION OF:
LOT 1, SECTION 4, GABRIOLA ISLAND,
NANAIMO DISTRICT, PLAN 16560.

Client: GEOFFREY LITHERLAND		Civic Address: 1900 STALKER ROAD		
File: 18-045	Scale: 1:600	Drawn by: DRW	Date: October 12, 2023	Existing Zoning: Resource (R)

NOTE:
THIS PROPERTY IS AFFECTED BY THE FOLLOWING REGISTERED DOCUMENTS:
UNDERSURFACE RIGHTS M76301,
SRW ES25205 & ES25206.

0 25 50
SCALE 1:600
DISTANCES AND ELEVATIONS SHOWN ARE IN METRES.
GEODETIC ELEVATIONS ARE DERIVED FROM GNSS OBSERVATIONS (CVD28BC DATUM).

DATE	REVISION #	DESCRIPTION
March 12, 2020	First Issue	
October 12, 2023	1	REVISE LOT LAYOUT

Turner & Associates
land surveying
435 Terminal Ave North
Nanaimo, BC V9S 4J8
www.turnersurveys.ca

Appendix B

Site Photographs

Photograph B1 (LEFT): Looking north towards the pumphouse on Lot A. **Photograph B2 (RIGHT):** Looking down and inside the pumphouse on Lot A at WTN 26181. The pressure tank, in-line filter and wellhead are shown.

Photograph B3 (LEFT): Looking north towards the pumphouse on Lot B. **Photograph B4 (RIGHT):** Looking down and inside the pumphouse on Lot B at WTN 26180. The pressure tank and wellhead are shown

Photograph B5: Close up of the WTN 26180 wellhead. The wellhead cap could not be lifted without removing the pump, which would require assistance from a pump installer.

Photograph B6: Looking east at Lot A cabin and the coastline. Topography is sloping from west to east towards the ocean.

Photograph B7: Looking east towards the Lot B cabin and the coastline. Topography is sloping from west to east towards the ocean.

Photograph B8: Looking east towards the Lot C cabin and the coastline. Topography is sloping from west to east towards the ocean. There is no groundwater supply well located on Lot C and currently water is trucked to site and stored in a large cistern next to the dwelling.

Appendix C

Summary of Groundwater Well Records Within 1 Km of the Site

Table C1: Water Well Records Within a 1 km Radius of the Site

Well Tag #	Well Owner	UTM Zone	Northing	Easting	Status	Construction Date	Finished Well Depth (m)	Well Yield (m^3/d)	Depth to Bedrock (m)	Intended Water Use	Aquifer ID#
13744	N MCLEARAN	10	5442344	449090	UNLICENSED	1952-01-01	18.3	13.6	2.4	Unknown Well Use	709
13746	DR J S THYHURST	10	5443611	449524	UNLICENSED	1952-01-01	30.5	13.6	0.0	Private Domestic	709
13913	N P MCLEARN	10	5442389	448919	UNLICENSED	1953-01-01	18.3	16.4	-	Private Domestic	709
16090	DR F M BRUNTON	10	5442353	448894	UNLICENSED	1959-08-01	18.3	10.9	1.2	Unknown Well Use	709
19843	LABELL	10	5442524	448890	UNLICENSED	1966-02-09	27.4	54.5	0.9	Unknown Well Use	709
26180[a]	DR B A COOKSON	10	5442720	449379	UNLICENSED	1972-05-01	29.0	10.9	0.9	Unknown Well Use	709
26181[a]	DR G C WINCH	10	5442771	449378	UNLICENSED	1972-05-01	27.4	98.1	1.8	Unknown Well Use	709
28542	G F HICKS	10	5442359	448995	UNLICENSED	1973-08-01	27.4	24.5	1.8	Unknown Well Use	709
30403	HUGH SCHAEFERE	10	5443141	448697	UNLICENSED	1974-05-29	48.8	109.0	0.9	Unknown Well Use	709
33905	ERIC KENNY	10	5442141	448851	UNLICENSED	1975-12-01	45.7	16.4	1.8	Unknown Well Use	709
34949	ERIC KENNY	10	5442280	448673	UNLICENSED	1976-06-01	63.1	5.5	2.1	Not Applicable	709
35556	R J PARKINSON	10	5442392	448864	UNLICENSED	1976-09-01	18.3	81.8	1.5	Unknown Well Use	709
35557	DR BRUNTON	10	5442344	448925	UNLICENSED	1976-09-01	41.1	16.4	2.4	Unknown Well Use	709
47898	R DICKINSON	10	5442379	448623	UNLICENSED	1981-05-08	67.7	2.7	0.3	Private Domestic	709
50634	R DICKINSON	10	5442456	448645	UNLICENSED	1982-07-11	54.9	32.7	1.8	Unknown Well Use	709
56005	P SCHMITT	10	5443091	448442	UNLICENSED	1986-05-16	50.3	43.6	1.2	Unknown Well Use	709
64376	DAVE BAXTER	10	5443148	448478	UNLICENSED	1995-05-26	45.7	10.9	3.7	Unknown Well Use	709
64377	RAY MORFORD	10	5443084	448481	UNLICENSED	1990-05-30	50.3	16.4	2.4	Unknown Well Use	709
65132	PALMER DAVE	10	5442953	448439	UNLICENSED	1987-06-26	97.5	10.9	1.2	Private Domestic	709
65134	PALMER DAVE	10	5442951	448437	UNLICENSED	1987-07-08	30.5	109.0	1.5	Private Domestic	709
65138	PALMER DAVE	10	5442957	448443	UNLICENSED	1987-08-19	80.8	76.3	0.5	Private Domestic	709
68810	WEEKS BRIAN	10	5443354	448697	UNLICENSED	1991-04-23	45.7	32.7	3.7	Unknown Well Use	709
68934	MALCOLM BOS	10	5442251	448577	UNLICENSED	1991-10-23	39.6	27.3	5.5	Not Applicable	709
73042	LEES YETTA	10	5442929	448888	UNLICENSED	1994-11-01	57.9	21.8	0.3	Not Applicable	709
73113	KELIN MRS	10	5443041	448897	UNLICENSED	1994-04-21	48.8	21.8	1.2	Unknown Well Use	709
73219	RICK ANTAL	10	5442299	448498	UNLICENSED	1996-08-01	73.2	5.5	2.1	Unknown Well Use	709
85047	DEREK LYNCH	10	5442505	448436	UNLICENSED	2004-07-01	45.7	54.5	6.4	Private Domestic	709
89853	DAVID BOUVIER	10	5443134	448801	UNLICENSED	1992-12-15	80.5	8.2	2.4	Private Domestic	709
96337	JAMES STEWART TYHURST	10	5443661	449365	UNLICENSED	2008-02-29	109.7	2.7	2.4	Private Domestic	709
106450	DAN & DEBBIE FOLEY	10	5443000	448849	UNLICENSED	2001-10-13	76.2	32.7	2.1	Private Domestic	709
106454	DAN & DEBBIE FOLEY	10	5443006	448829	UNLICENSED	2001-10-06	76.2	21.8	1.5	Private Domestic	709
106464	DAVID MORGAN	10	5443193	448897	UNLICENSED	2001-12-06	54.9	38.2	1.8	Private Domestic	709
106466	DAN & DEB FOLEY	10	5443008	448852	UNLICENSED	2001-10-31	70.1	27.3	0.9	Private Domestic	709
106497	ALICE RICH	10	5442963	448681	UNLICENSED	2003-11-25	76.2	27.3	0.6	Private Domestic	709
106512	THOR SIMROSE	10	5443473	448824	UNLICENSED	2004-06-15	42.7	43.6	1.2	Private Domestic	709
106556	JOHN BISHOP	10	5443240	448712	UNLICENSED	1999-07-20	45.7	16.4	0.9	Private Domestic	709
106606	KEN & JEAN MITCHELL	10	5442277	448780	UNLICENSED	2000-04-01	61.0	5.5	0.0	Private Domestic	709
119418	Potlatch Properties Ltd	10	5442839	448414	UNLICENSED	2019-05-02	80.8	8.2	0.9	Private Domestic	709
123454	LIZ & DILLON WALLINGER	10	5442969	448995	UNLICENSED	2021-04-15	51.8	27.3	0.9	Private Domestic	709
125230	Michael Riedijk	10	5443162	449022	UNLICENSED	2022-03-04	91.4	8.2	0.9	Private Domestic	709

Notes: mbgl means metres below ground level; **m^3/d** means cubic meters per day; **"-"** indicates that no data was available. **a)** Blue highlighted wells are located on Site.

Appendix D

Driller's Logs for WTN 26180 and WTN 26181

092G.012.2.3.1

WTN 26180

GROUND — WATER DIVISION, WATER INVESTIGATIONS BRANCH, DEPT. OF LANDS, FORESTS, and WATER RESOURCES, VICTORIA, B.C.

RANGE | SECTION | QUARTER | LAND DISTRICT | MUNICIPALITY

LOCATION LOT 1 PL 16560 SEC 4 NANAIMO
(COMPLETE LEGAL DESCRIPTION)

OWNER'S NAME DR. B.A. COOKSON ADDRESS 607 BARNHAM ROAD, W. VAN. #20

DRILLER'S NAME WINDECKER (146) ADDRESS GABRIOLA IS. DATE OF COMPLETION MAY/72

DEPTH 95' ELEVATION OF COLLAR ____ CASING DIAM. 6" LENGTH 5' TYPE 1' stick-up

METHOD OF DIGGING CABLE-TOOL SCREEN ☐ SIZE ____ LENGTH ____ TYPE ____

LOCATION OF SCREEN ____ DEVELOPED ☐ DESCRIBE ____

PERFORATED CASING ☐ LENGTH ____ LOCATION OF PERFORATIONS ____

GRAVEL PACK ☐ LENGTH ____ DIAM. ____ SIZE GRAVEL, ETC. ____

PUMP ☐ TYPE ____ POWER ____

CAPACITY ____ OTHER DATA PUMPING LEVEL : 85'

COSTS WELL ____ PUMP ____ PUMP HOUSE, ETC. ____

MAINTENANCE ____

DISTANCE TO WATER FROM TOP OF CASING 20' ☐ ESTIMATED ☒ MEASURED ELEVATION ____ FLUCTUATION ____

HIGH WATER ____ MONTH ____ LOW WATER ____ MONTH ____ OBSERVATION DATA ☐ FILE No. ____

WATER USE ____

MAX. RATE WITHDRAWAL ☐ ESTIMATED ☐ MEASURED ____

TEMPERATURE ____ PUMPS SAND ☐ ____

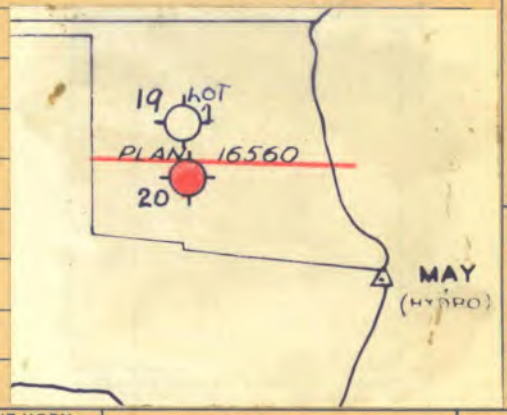
CLOGS SCREEN ☐ TYPE DEPOSIT ____ AQUIFER DATA ____

LICENSE No. ____ DATE LICENSE ____ AMOUNT ____

DATE APPLICATION ____ USE ____

LOCATION: STALKER PT., GABRIOLA IS.

13788



METHOD: DUG, DRIVEN, DRILLED, JETTED, BORED

DEPTH: 0 — 25, 25 — 50, 50 — 100, 100 — 200, 200 — 400, >400

OBSERVATION, ABANDONED, DEVELOPED, SCREEN, PERF. CASING, GRAVEL ENV., PUMP

TYPE WELL: FLOWING, NON-FLOW ARTESIAN, WATER TABLE, PART CONFINED

WATER QUALITY: ANALYSIS, SOFT, HARD, HIGH IRON, HIGH SULPHUR, SALTY, ALKALINE, SALINE, POLLUTED, INADEQUATE QUALITY

CAPACITY GPD: DRY HOLE, INADEQUATE QUANTITY, PUMPING TEST; 0 — 10^3, 10^3 — 10^4, 10^4 — 10^5, 10^5 — 10^6, 10^6

CHARACTER OF SUPPLY AQUIFER: SAND, GRAVEL, TILL

WATER USE: DOMESTIC, GARDEN, STOCK, COOLING, IRRIGATION, INDUSTRIAL, WATERWORKS

RELIABILITY OF DATA: GOOD, FAIR, POOR

ROCK, SPRING

OTHER AQUIFER PRESENT: TENS, UNITS

OTHER AQUIFER PRESENT: TENS, UNITS

SUPPLY AQUIFER: TENS, UNITS

VISIrecord® 12708

LOG

FROM	TO	DESCRIPTION	NAME
0	3	OVERBURDEN	
3	45	SANDSTONE	
45	60	BLUE SHALE	
60	75	BLUE CLAY	
75	90	BLUE SHALE	
90	95	SANDSTONE	
		(B)	
		0.5 gpm @ 50'	
		0.5 gpm @ 85	
		1 gpm @ 95'	

SAMPLE No. _____ DATE _____

LAB. _____

COLIFORM ORGANISMS _____

TOTAL BACTERIA _____

COLOUR _____ ODOUR _____

TASTE _____

PUMPING TEST SUMMARY

TEST BY _____

DATE _____ FILE No _____

SPECIFIC CAPACITY _____ PERMIABILITY _____

STORAGE COEFF _____ TRANSMISSIBILITY _____

REMARKS _____

ANALYSIS

	PPM
Total Hardness	
Carbonate Hard	
Magnesium Hard	
Fe	
SO_2	
Ca	
Mg	
Na	
K	
HCO_3	
CO_3	
Cl	
SO_4	
NO_3	
B	
F	
Total Dis-solids	
Total Alkalinity	
Suspended Solids	
Ph	

OTHER DATA

SIZE ANALYSIS, ETC. _____

EST. YIELD: 2 gpm

CARD BY Bruce Bell DATE AUG/72

SOURCES INFORMATION DRILL LOG

092G.012.2.3.1

WTN 26181

GROUND — WATER DIVISION, WATER INVESTIGATIONS BRANCH, DEPT. OF LANDS, FORESTS, and WATER RESOURCES, VICTORIA, B.C.

LOCATION LOT 1 PL 16560 SEC 4 (9 acres) N/NAIMO
(COMPLETE LEGAL DESCRIPTION)

OWNER'S NAME DR. G.C. WINCH ADDRESS 504 EASTOT, W. VAN.

DRILLER'S NAME WINDECKER (146) ADDRESS GABRIOLA IS. DATE OF COMPLETION MAY/72

DEPTH 90' ELEVATION OF COLLAR ____ CASING DIAM. 6" LENGTH 8' TYPE 1 'stick-up

METHOD OF DIGGING CABLE-TOOL SCREEN ☐ SIZE ____ LENGTH ____ TYPE ____

LOCATION OF SCREEN ____ DEVELOPED ☐ DESCRIBE ____

PERFORATED CASING ☐ LENGTH ____ LOCATION OF PERFORATIONS ____

GRAVEL PACK ☐ LENGTH ____ DIAM. ____ SIZE GRAVEL, ETC. ____

PUMP ☐ TYPE ____ POWER ____

CAPACITY ____ OTHER DATA PUMPING LEVEL: 80'

COSTS WELL ____ PUMP ____ PUMP HOUSE, ETC. ____

MAINTENANCE ____

DISTANCE TO WATER FROM TOP OF CASING 7' ☐ ESTIMATED ☒ MEASURED ELEVATION ____ FLUCTUATION ____

HIGH WATER ____ MONTH ____ LOW WATER ____ MONTH ____ OBSERVATION DATA ☐ FILE No. ____

WATER USE ____

MAX. RATE WITHDRAWAL ☐ ESTIMATED ☐ MEASURED ____

TEMPERATURE ____ PUMPS SAND ☐ ____

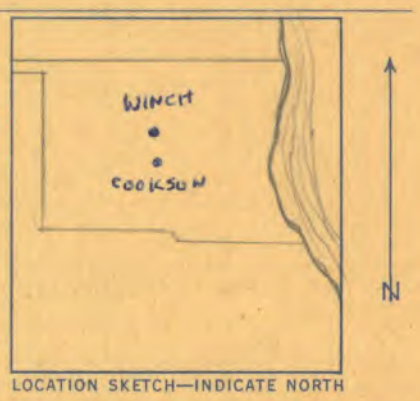
CLOGS SCREEN ☐ TYPE DEPOSIT ____ AQUIFER DATA ____

LICENSE No. ____ DATE LICENSE ____ AMOUNT ____

DATE APPLICATION ____ USE ____

LOCATION: STALKER PT., GABRIOLA IS.

12788 LITHERLAND



LOCATION SKETCH—INDICATE NORTH

VISIrecord® 12708

#19

5

245

LOG

FROM	TO	DESCRIPTION	NAME
0	6'	OVERBURDEN	
6'	30	SANDSTONE	
30	60	BLUE CLAY	
60	85	BLUE SHALE	
85	90	SANDSTONE	
(15)			
		5 gpm @ 10'	
		8 gpm @ 79'	
		5 gpm @ 90'	

SAMPLE No. _____ DATE _____

LAB _____

COLIFORM ORGANISMS _____

TOTAL BACTERIA _____

COLOUR _____ ODOUR _____

TASTE _____

PUMPING TEST SUMMARY

TEST BY _____

DATE _____ FILE No. _____

SPECIFIC CAPACITY _____ PERMIABILITY _____

STORAGE COEFF _____ TRANSMISSIBILITY _____

REMARKS _____

ANALYSIS

	PPM
Total Hardness	
Carbonate Hard	
Magnesium Hard	
Fe	
SO_2	
Ca	
Mg	
Na	
K	
HCO_3	
CO_3	
Cl	
SO_4	
NO_3	
B	
E	
Total Dis-solids	
Total Alkalinity	
Suspended Solids	
Ph	

OTHER DATA

SIZE ANALYSIS. ETC. _____

EST. YIELD: 18 gpm

CARD BY Bruce D. Beal DATE AUG/72

SOURCES INFORMATION DRILL LOG

Appendix E

Groundwater Quality Results and Laboratory Report

Table E1: Summary of Water Quality Results from WTN 26181 (Lot A) and OW 316

Sample Location	Units	Guidelines			WTN 26181 (Lot A)	OW 316
Sample Date		Best Practices for Prevention of Saltwater Intrusion	AO	MAC	2023-Nov-09	2014-Oct-08
Lab ID					23K1368-01	-
General Chemistry						
Alkalinity, Total (as $CaCO_3$)	mg/L	-	-	-	46.7	92.8
Alkalinity, pp (as $CaCO_3$)	mg/L	-	-	-	-	0.5
Conductivity (EC)	µS/cm	**1000**	-	-	184	-
Hardness (as $CaCO_3$)	mg/L	-	-	-	57.8	89
Total Dissolved Solids-Calculated	mg/L	**700**	500	-	96.4	-
Turbidity	NTU	-	0.1	-	-	74.1
pH	-	-	7-10.5	-	6.47	7.46
Major Ions						
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	-	-	-	46.7	112
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	-	-	-	<1.0	0.5
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	-	-	-	<1.0	0.5
Ammonia (N)-Dissolved	mg/L	-	-	-	-	0.005
Ammonia-Total (as N)	mg/L	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	-	-	-	57	136.6
Calcium (Ca)-Dissolved	mg/L	-	-	-	17.5	26.3
Carbonate (CO_3)	mg/L	-	-	-	<0.600	0.3
Chloride (Cl)	mg/L	**150**	250	-	22.5	11
Dissolved Kjeldahl Nitrogen	mg/L	-	-	-	-	0.034
Fluoride (F)	mg/L	-	-	1.5	<0.10	0.065
Hydroxide (OH)	mg/L	-	-	-	<0.340	-
Ion Balance	%	-	-	-	110	-
Iron (Fe)-Dissolved	mg/L	-	0.3	-	0.069	0.566
Magnesium (Mg)-Dissolved	mg/L	-	-	-	3.42	5.66
Manganese (Mn)-Dissolved	mg/L	-	0.02	0.12	0.0037	0.249
Nitrate (NO_3)	mg/L	-	-	45	-	0.0696
Nitrate+Nitrite-N	mg/L	-	-	-	0.213	-
Nitrate-N	mg/L	-	-	10	0.213	-
Nitrite (NO_2)	mg/L	-	-	3	-	0.0072
Nitrite-N	mg/L	-	-	1	<0.010	-
Nitrogen-Total (as N)	mg/L	-	-	-	-	-
Organic Nitrogen-Total (as N)	mg/L	-	-	-	-	0.034
Phenolphthalein	mg/L	-	-	-	<1.0	-
Potassium (K)-Dissolved	mg/L	-	-	-	0.14	0.642
Sodium (Na)-Dissolved	mg/L	-	200	-	17	12.6
Sulphate (SO_4)	mg/L	-	500	-	6.5	10.4
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-
Dissolved Metals						
Aluminum (Al)-Dissolved	mg/L	-	0.1	2.9	-	0.00054
Antimony (Sb)-Dissolved	mg/L	-	-	0.006	-	0.000072
Arsenic (As)-Dissolved	mg/L	-	-	0.01	-	0.000126
Barium (Ba)-Dissolved	mg/L	-	-	2	-	0.0684
Beryllium (Be)-Dissolved	mg/L	-	-	-	-	0.00001
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-	0.000005
Boron (B)-Dissolved	mg/L	-	-	5	-	0.031
Cadmium (Cd)-Dissolved	mg/L	-	-	0.007	-	0.000005
Chromium (Cr)-Dissolved	mg/L	-	-	0.05	-	0.0001
Cobalt (Co)-Dissolved	mg/L	-	-	-	-	0.000176
Copper (Cu)-Dissolved	mg/L	-	1	2	-	0.000373
Lead (Pb)-Dissolved	mg/L	-	-	0.005	-	0.000006
Lithium (Li)-Dissolved	mg/L	-	-	-	-	0.00503
Molybdenum (Mo)-Dissolved	mg/L	-	-	-	-	0.000367
Nickel (Ni)-Dissolved	mg/L	-	-	-	-	0.00129
Selenium (Se)-Dissolved	mg/L	-	-	0.05	-	0.000147
Silicon (Si)-Dissolved	mg/L	-	-	-	-	9.6
Silver (Ag)-Dissolved	mg/L	-	-	-	-	0.000005
Strontium (Sr)-Dissolved	mg/L	-	-	7	-	0.193
Sulphur (S)-Dissolved	mg/L	-	-	-	-	3.7
Thallium (Tl)-Dissolved	mg/L	-	-	-	-	0.0
Tin (Sn)-Dissolved	mg/L	-	-	-	-	0.0
Titanium (Ti)-Dissolved	mg/L	-	-	-	-	0.0005
Uranium (U)-Dissolved	mg/L	-	-	0.02	-	0.000008
Vanadium (V)-Dissolved	mg/L	-	-	-	-	0.0002
Zinc (Zn)-Dissolved	mg/L	-	5	-	-	0.00274
Zirconium (Zr)-Dissolved	mg/L	-	-	-	-	0.0001

Table E1: Summary of Water Quality Results from WTN 26181 (Lot A) and OW 316

Sample Location	Units	Guidelines			WTN 26181 (Lot A)	OW 316
Sample Date		Best Practices for Prevention of Saltwater Intrusion	AO	MAC	2023-Nov-09	2014-Oct-08
Lab ID					23K1368-01	-
Total Metals						
Aluminum (Al)-Total	mg/L	-	0.1	2.9	0.353	-
Antimony (Sb)-Total	mg/L	-	-	0.006	<0.00020	-
Arsenic (As)-Total	mg/L	-	-	0.01	<0.00050	-
Barium (Ba)-Total	mg/L	-	-	2	<0.0050	-
Beryllium (Be)-Total	mg/L	-	-	-	<0.00010	-
Bismuth (Bi)-Total	mg/L	-	-	-	<0.00010	-
Boron (B)-Total	mg/L	-	-	5	<0.0500	-
Cadmium (Cd)-Total	mg/L	-	-	0.007	<0.000010	-
Calcium (Ca)-Total	mg/L	-	-	-	16.7	-
Chromium (Cr)-Total	mg/L	-	-	0.05	<0.00050	-
Cobalt (Co)-Total	mg/L	-	-	-	<0.00010	-
Copper (Cu)-Total	mg/L	-	1	2	0.00692	-
Iron (Fe)-Total	mg/L	-	0.3	-	0.11	-
Lead (Pb)-Total	mg/L	-	-	0.005	0.00139	-
Lithium (Li)-Total	mg/L	-	-	-	0.00044	-
Magnesium (Mg)-Total	mg/L	-	-	-	3.12	-
Manganese (Mn)-Total	mg/L	-	0.02	0.12	0.00569	-
Molybdenum (Mo)-Total	mg/L	-	-	-	<0.00010	-
Nickel (Ni)-Total	mg/L	-	-	-	<0.00040	-
Phosphorus (P)-Total	mg/L	-	-	-	<0.050	-
Potassium (K)-Total	mg/L	-	-	-	0.12	-
Selenium (Se)-Total	mg/L	-	-	0.05	<0.00050	-
Silicon (Si)-Total	mg/L	-	-	-	8.6	-
Silver (Ag)-Total	mg/L	-	-	-	<0.000050	-
Sodium (Na)-Total	mg/L	-	200	-	16.5	-
Strontium (Sr)-Total	mg/L	-	-	7	0.0442	-
Sulphur (S)-Total	mg/L	-	-	-	<3.0	-
Tellurium (Te)-Total	mg/L	-	-	-	<0.00050	-
Thallium (Tl)-Total	mg/L	-	-	-	<0.000020	-
Thorium (Th)-Total	mg/L	-	-	-	<0.00010	-
Tin (Sn)-Total	mg/L	-	-	-	<0.00020	-
Titanium (Ti)-Total	mg/L	-	-	-	<0.0050	-
Tungsten (W)-Total	mg/L	-	-	-	<0.0010	-
Uranium (U)-Total	mg/L	-	-	0.02	0.000183	-
Vanadium (V)-Total	mg/L	-	-	-	<0.0050	-
Zinc (Zn)-Total	mg/L	-	5	-	0.0146	-
Zirconium (Zr)-Total	mg/L	-	-	-	0.00062	-
Phosphorus (P) - Total Dissolved	mg/L	-	-	-	-	0.0028

Notes:

mg/L means milligrams per litre; **µS/cm** means micro Siemens per centimetre; **NTU** means Nephelometric Turbidity Units

MAC and AO guidelines represents the Guidelines for Canadian Drinking Water Quality, Summary Table (Health Canada, October 2024). Guidelines are health based and listed as maximum acceptable concentrations (MAC), or based on aesthetic considerations and listed as aesthetic objectives (AO).

Bold - Value exceeds the Best Practices for Prevention of Saltwater Intrusion

Underline - Value exceeds the Aesthetic Objectives (AO).

Orange highlight - Value exceeds the Maximum Acceptable Concentration (MAC).

CERTIFICATE OF ANALYSIS

REPORTED TO	Waterline Resources Inc. - Nanaimo 2430 Jingle Pot Road Nanaimo, BC V9R 6W2		
ATTENTION	Colin McKenzie	**WORK ORDER**	23K1368
PO NUMBER		**RECEIVED / TEMP**	2023-11-10 08:50 / 8.1°C
PROJECT	3330-23-001	**REPORTED**	2023-11-17 13:38
PROJECT INFO			

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: https://www.caro.ca/terms-conditions

If you have any questions or concerns, please contact me at bwhitehead@caro.ca

Authorized By:

Brent Whitehead
Account Manager

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Waterline Resources Inc. - Nanaimo	**WORK ORDER**	23K1368
PROJECT	3330-23-001	**REPORTED**	2023-11-17 13:38

Analyte	Result	RL	Units	Analyzed	Qualifier
Lot A (23K1368-01) | Matrix: Water | Sampled: 2023-11-09 13:00					
Anions					
Chloride	**22.5**	0.10	mg/L	2023-11-13	
Fluoride	< 0.10	0.10	mg/L	2023-11-13	
Nitrate (as N)	**0.213**	0.010	mg/L	2023-11-13	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2023-11-13	HT1
Sulfate	**6.5**	1.0	mg/L	2023-11-13	
Calculated Parameters					
Hardness, Total (as CaCO3)	**57.8**	0.500	mg/L	N/A	
Ion Balance	**110**		%	N/A	
Nitrate+Nitrite (as N)	**0.213**	0.0100	mg/L	N/A	
Solids, Total Dissolved	**96.4**	1.00	mg/L	N/A	
Dissolved Metals					
Calcium, dissolved	**17.5**	0.20	mg/L	2023-11-12	
Iron, dissolved	**0.069**	0.010	mg/L	2023-11-12	
Magnesium, dissolved	**3.42**	0.010	mg/L	2023-11-12	
Manganese, dissolved	**0.00370**	0.00020	mg/L	2023-11-12	
Potassium, dissolved	**0.14**	0.10	mg/L	2023-11-12	
Sodium, dissolved	**17.0**	0.10	mg/L	2023-11-12	
General Parameters					
Alkalinity, Total (as CaCO3)	**46.7**	1.0	mg/L	2023-11-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2023-11-16	
Alkalinity, Bicarbonate (as CaCO3)	**46.7**	1.0	mg/L	2023-11-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2023-11-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2023-11-16	
Bicarbonate (HCO3)	**57.0**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Conductivity (EC)	**184**	2.0	µS/cm	2023-11-16	
pH	**6.47**	0.10	pH units	2023-11-16	HT2
Total Metals					
Aluminum, total	**0.353**	0.0050	mg/L	2023-11-11	
Antimony, total	< 0.00020	0.00020	mg/L	2023-11-11	
Arsenic, total	< 0.00050	0.00050	mg/L	2023-11-11	
Barium, total	< 0.0050	0.0050	mg/L	2023-11-11	
Beryllium, total	< 0.00010	0.00010	mg/L	2023-11-11	
Bismuth, total	< 0.00010	0.00010	mg/L	2023-11-11	
Boron, total	< 0.0500	0.0500	mg/L	2023-11-11	
Cadmium, total	< 0.000010	0.000010	mg/L	2023-11-11	
Calcium, total	**16.7**	0.20	mg/L	2023-11-11	
Chromium, total	< 0.00050	0.00050	mg/L	2023-11-11	
Cobalt, total	< 0.00010	0.00010	mg/L	2023-11-11	

TEST RESULTS

REPORTED TO	Waterline Resources Inc. - Nanaimo	**WORK ORDER**	23K1368
PROJECT	3330-23-001	**REPORTED**	2023-11-17 13:38

Analyte	Result	RL	Units	Analyzed	Qualifier
Lot A (23K1368-01) | Matrix: Water | Sampled: 2023-11-09 13:00, Continued					
Total Metals, Continued					
Copper, total	**0.00692**	0.00040	mg/L	2023-11-11	
Iron, total	**0.110**	0.010	mg/L	2023-11-11	
Lead, total	**0.00139**	0.00020	mg/L	2023-11-11	
Lithium, total	**0.00044**	0.00010	mg/L	2023-11-11	
Magnesium, total	**3.12**	0.010	mg/L	2023-11-11	
Manganese, total	**0.00569**	0.00020	mg/L	2023-11-11	
Molybdenum, total	< 0.00010	0.00010	mg/L	2023-11-11	
Nickel, total	< 0.00040	0.00040	mg/L	2023-11-11	
Phosphorus, total	< 0.050	0.050	mg/L	2023-11-11	
Potassium, total	**0.12**	0.10	mg/L	2023-11-11	
Selenium, total	< 0.00050	0.00050	mg/L	2023-11-11	
Silicon, total	**8.6**	1.0	mg/L	2023-11-11	
Silver, total	< 0.000050	0.000050	mg/L	2023-11-11	
Sodium, total	**16.5**	0.10	mg/L	2023-11-11	
Strontium, total	**0.0442**	0.0010	mg/L	2023-11-11	
Sulfur, total	< 3.0	3.0	mg/L	2023-11-11	
Tellurium, total	< 0.00050	0.00050	mg/L	2023-11-11	
Thallium, total	< 0.000020	0.000020	mg/L	2023-11-11	
Thorium, total	< 0.00010	0.00010	mg/L	2023-11-11	
Tin, total	< 0.00020	0.00020	mg/L	2023-11-11	
Titanium, total	< 0.0050	0.0050	mg/L	2023-11-11	
Tungsten, total	< 0.0010	0.0010	mg/L	2023-11-11	
Uranium, total	**0.000183**	0.000020	mg/L	2023-11-11	
Vanadium, total	< 0.0050	0.0050	mg/L	2023-11-11	
Zinc, total	**0.0146**	0.0040	mg/L	2023-11-11	
Zirconium, total	**0.00062**	0.00010	mg/L	2023-11-11	

Sample Qualifiers:

HT1 The sample was prepared and/or analyzed past the recommended holding time.

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Waterline Resources Inc. - Nanaimo	**WORK ORDER**	23K1368
PROJECT	3330-23-001	**REPORTED**	2023-11-17 13:38

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Bicarbonate in Water	SM 2340 B (2021)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]		N/A
Carbonate in Water	SM 2340 B (2021)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]		N/A
Conductivity in Water	SM 2510 B (2021)	Conductivity Meter	✓	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Hardness in Water	SM 2340 B (2021)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	✓	N/A
Hydroxide in Water	SM 2340 B (2021)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]		N/A
Ion Balance in Water	SM 1030 E (2021)	SM 1030 E		N/A
pH in Water	SM 4500-H+ B (2021)	Electrometry	✓	Kelowna
Solids, Total Dissolved in Water	SM 1030 E (2021)	SM 1030 E		N/A
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
%	Percent
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/L	Milligrams per litre
pH units	pH < 7 = acidic, ph > 7 = basic
µS/cm	Microsiemens per centimetre
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:bwhitehead@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Waterline Resources Inc. - Nanaimo	**WORK ORDER**	23K1368
PROJECT	3330-23-001	**REPORTED**	2023-11-17 13:38

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in “batches” and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B3K1285										
Blank (B3K1285-BLK1)				Prepared: 2023-11-13, Analyzed: 2023-11-13						
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B3K1285-BLK2)				Prepared: 2023-11-13, Analyzed: 2023-11-13						
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B3K1285-BLK3)				Prepared: 2023-11-13, Analyzed: 2023-11-13						
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B3K1285-BS1)				Prepared: 2023-11-13, Analyzed: 2023-11-13						
Chloride	16.1	0.10	mg/L	16.0		100	90-110			
Fluoride	4.18	0.10	mg/L	4.00		104	88-108			
Nitrate (as N)	4.01	0.010	mg/L	4.00		100	90-110			
Nitrite (as N)	2.00	0.010	mg/L	2.00		100	85-115			
Sulfate	16.0	1.0	mg/L	16.0		100	90-110			
LCS (B3K1285-BS2)				Prepared: 2023-11-13, Analyzed: 2023-11-13						
Chloride	16.0	0.10	mg/L	16.0		100	90-110			
Fluoride	4.07	0.10	mg/L	4.00		102	88-108			
Nitrate (as N)	4.01	0.010	mg/L	4.00		100	90-110			
Nitrite (as N)	2.03	0.010	mg/L	2.00		101	85-115			
Sulfate	16.0	1.0	mg/L	16.0		100	90-110			
LCS (B3K1285-BS3)				Prepared: 2023-11-13, Analyzed: 2023-11-13						
Chloride	16.0	0.10	mg/L	16.0		100	90-110			
Fluoride	4.11	0.10	mg/L	4.00		103	88-108			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Waterline Resources Inc. - Nanaimo	**WORK ORDER**	23K1368
PROJECT	3330-23-001	**REPORTED**	2023-11-17 13:38

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B3K1285, Continued										
LCS (B3K1285-BS3), Continued				Prepared: 2023-11-13, Analyzed: 2023-11-13						
Nitrate (as N)	4.01	0.010	mg/L	4.00		100	90-110			
Nitrite (as N)	2.01	0.010	mg/L	2.00		100	85-115			
Sulfate	16.0	1.0	mg/L	16.0		100	90-110			
Dissolved Metals, Batch B3K1267										
Blank (B3K1267-BLK1)				Prepared: 2023-11-12, Analyzed: 2023-11-12						
Calcium, dissolved	< 0.20	0.20	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
LCS (B3K1267-BS1)				Prepared: 2023-11-12, Analyzed: 2023-11-12						
Calcium, dissolved	4.11	0.20	mg/L	4.00		103	80-120			
Iron, dissolved	4.17	0.010	mg/L	4.00		104	80-120			
Magnesium, dissolved	4.26	0.010	mg/L	4.00		107	80-120			
Manganese, dissolved	0.0420	0.00020	mg/L	0.0400		105	80-120			
Potassium, dissolved	4.14	0.10	mg/L	4.00		103	80-120			
Sodium, dissolved	4.09	0.10	mg/L	4.00		102	80-120			
General Parameters, Batch B3K1664										
Blank (B3K1664-BLK1)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B3K1664-BLK2)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B3K1664-BLK3)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B3K1664-BS1)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	108	1.0	mg/L	100		108	80-120			
Alkalinity, Phenolphthalein (as CaCO3)	31.4	1.0	mg/L	50.0		63	0-200			
LCS (B3K1664-BS2)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	108	1.0	mg/L	100		108	80-120			
Alkalinity, Phenolphthalein (as CaCO3)	32.8	1.0	mg/L	50.0		66	0-200			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Waterline Resources Inc. - Nanaimo	**WORK ORDER**	23K1368
PROJECT	3330-23-001	**REPORTED**	2023-11-17 13:38

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B3K1664, Continued										
LCS (B3K1664-BS3)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	90.8	1.0	mg/L	100		91	80-120			
Alkalinity, Phenolphthalein (as CaCO3)	4.7	1.0	mg/L	50.0		9	0-200			
LCS (B3K1664-BS4)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Conductivity (EC)	1360	2.0	µS/cm	1410		96	95-105			
LCS (B3K1664-BS5)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Conductivity (EC)	1410	2.0	µS/cm	1410		100	95-105			
LCS (B3K1664-BS6)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Conductivity (EC)	1410	2.0	µS/cm	1410		100	95-105			
Reference (B3K1664-SRM1)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
pH	7.03	0.10	pH units	7.01		100	98-102			
Reference (B3K1664-SRM2)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
pH	7.03	0.10	pH units	7.01		100	98-102			
Reference (B3K1664-SRM3)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
pH	7.02	0.10	pH units	7.01		100	98-102			
Total Metals, Batch B3K1230										
Blank (B3K1230-BLK1)				Prepared: 2023-11-10, Analyzed: 2023-11-11						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0500	0.0500	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Waterline Resources Inc. - Nanaimo	**WORK ORDER**	23K1368
PROJECT	3330-23-001	**REPORTED**	2023-11-17 13:38

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B3K1230, Continued										
Blank (B3K1230-BLK1), Continued				Prepared: 2023-11-10, Analyzed: 2023-11-11						
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0050	0.0050	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
LCS (B3K1230-BS1)				Prepared: 2023-11-10, Analyzed: 2023-11-11						
Aluminum, total	3.88	0.0050	mg/L	4.00		97	80-120			
Antimony, total	0.0386	0.00020	mg/L	0.0400		96	80-120			
Arsenic, total	0.388	0.00050	mg/L	0.400		97	80-120			
Barium, total	0.0389	0.0050	mg/L	0.0400		97	80-120			
Beryllium, total	0.0404	0.00010	mg/L	0.0400		101	80-120			
Bismuth, total	0.0390	0.00010	mg/L	0.0400		97	80-120			
Boron, total	0.416	0.0500	mg/L	0.400		104	80-120			
Cadmium, total	0.0399	0.000010	mg/L	0.0400		100	80-120			
Calcium, total	4.04	0.20	mg/L	4.00		101	80-120			
Chromium, total	0.0388	0.00050	mg/L	0.0400		97	80-120			
Cobalt, total	0.0392	0.00010	mg/L	0.0400		98	80-120			
Copper, total	0.0390	0.00040	mg/L	0.0400		98	80-120			
Iron, total	4.03	0.010	mg/L	4.00		101	80-120			
Lead, total	0.0393	0.00020	mg/L	0.0400		98	80-120			
Lithium, total	0.0400	0.00010	mg/L	0.0400		100	80-120			
Magnesium, total	3.75	0.010	mg/L	4.00		94	80-120			
Manganese, total	0.0392	0.00020	mg/L	0.0400		98	80-120			
Molybdenum, total	0.0399	0.00010	mg/L	0.0400		100	80-120			
Nickel, total	0.0390	0.00040	mg/L	0.0400		98	80-120			
Phosphorus, total	3.87	0.050	mg/L	4.00		97	80-120			
Potassium, total	3.88	0.10	mg/L	4.00		97	80-120			
Selenium, total	0.390	0.00050	mg/L	0.400		97	80-120			
Silicon, total	4.0	1.0	mg/L	4.00		99	80-120			
Silver, total	0.0400	0.000050	mg/L	0.0400		100	80-120			
Sodium, total	4.05	0.10	mg/L	4.00		101	80-120			
Strontium, total	0.0385	0.0010	mg/L	0.0400		96	80-120			
Sulfur, total	39.5	3.0	mg/L	40.0		99	80-120			
Tellurium, total	0.0383	0.00050	mg/L	0.0400		96	80-120			
Thallium, total	0.0391	0.000020	mg/L	0.0400		98	80-120			
Thorium, total	0.0403	0.00010	mg/L	0.0400		101	80-120			
Tin, total	0.0391	0.00020	mg/L	0.0400		98	80-120			
Titanium, total	0.0389	0.0050	mg/L	0.0400		97	80-120			
Tungsten, total	0.0398	0.0010	mg/L	0.0400		99	80-120			
Uranium, total	0.0404	0.000020	mg/L	0.0400		101	80-120			
Vanadium, total	0.0393	0.0050	mg/L	0.0400		98	80-120			
Zinc, total	0.384	0.0040	mg/L	0.400		96	80-120			
Zirconium, total	0.0398	0.00010	mg/L	0.0400		100	80-120			
Matrix Spike (B3K1230-MS1)	**Source: 23K1368-01**			Prepared: 2023-11-10, Analyzed: 2023-11-11						
Aluminum, total	4.83	0.0050	mg/L	4.00	0.353	112	70-130			
Antimony, total	0.0438	0.00020	mg/L	0.0400	< 0.00020	109	70-130			
Arsenic, total	0.455	0.00050	mg/L	0.400	< 0.00050	114	70-130			
Barium, total	0.0475	0.0050	mg/L	0.0400	< 0.0050	114	70-130			
Beryllium, total	0.0477	0.00010	mg/L	0.0400	< 0.00010	119	70-130			
Bismuth, total	0.0447	0.00010	mg/L	0.0400	< 0.00010	112	70-130			
Boron, total	0.495	0.0500	mg/L	0.400	< 0.0500	117	70-130			
Cadmium, total	0.0463	0.000010	mg/L	0.0400	< 0.000010	116	70-130			
Calcium, total	21.4	0.20	mg/L	4.00	16.7	117	70-130			
Chromium, total	0.0445	0.00050	mg/L	0.0400	< 0.00050	110	70-130			
Cobalt, total	0.0452	0.00010	mg/L	0.0400	< 0.00010	113	70-130			
Copper, total	0.0524	0.00040	mg/L	0.0400	0.00692	114	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Waterline Resources Inc. - Nanaimo	**WORK ORDER**	23K1368
PROJECT	3330-23-001	**REPORTED**	2023-11-17 13:38

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B3K1230, Continued										
Matrix Spike (B3K1230-MS1), Continued	**Source: 23K1368-01**			Prepared: 2023-11-10, Analyzed: 2023-11-11						
Iron, total	4.67	0.010	mg/L	4.00	0.110	114	70-130			
Lead, total	0.0466	0.00020	mg/L	0.0400	0.00139	113	70-130			
Lithium, total	0.0473	0.00010	mg/L	0.0400	0.00044	117	70-130			
Magnesium, total	7.28	0.010	mg/L	4.00	3.12	104	70-130			
Manganese, total	0.0510	0.00020	mg/L	0.0400	0.00569	113	70-130			
Molybdenum, total	0.0460	0.00010	mg/L	0.0400	< 0.00010	115	70-130			
Nickel, total	0.0455	0.00040	mg/L	0.0400	< 0.00040	113	70-130			
Phosphorus, total	4.51	0.050	mg/L	4.00	< 0.050	113	70-130			
Potassium, total	4.58	0.10	mg/L	4.00	0.12	111	70-130			
Selenium, total	0.447	0.00050	mg/L	0.400	< 0.00050	112	70-130			
Silicon, total	12.7	1.0	mg/L	4.00	8.6	104	70-130			
Silver, total	0.0455	0.000050	mg/L	0.0400	< 0.000050	114	70-130			
Sodium, total	20.2	0.10	mg/L	4.00	16.5	94	70-130			
Strontium, total	0.0882	0.0010	mg/L	0.0400	0.0442	110	70-130			
Sulfur, total	47.7	3.0	mg/L	40.0	< 3.0	114	70-130			
Tellurium, total	0.0452	0.00050	mg/L	0.0400	< 0.00050	113	70-130			
Thallium, total	0.0453	0.000020	mg/L	0.0400	< 0.000020	113	70-130			
Thorium, total	0.0476	0.00010	mg/L	0.0400	< 0.00010	119	70-130			
Tin, total	0.0466	0.00020	mg/L	0.0400	< 0.00020	116	70-130			
Titanium, total	0.0484	0.0050	mg/L	0.0400	< 0.0050	115	70-130			
Tungsten, total	0.0472	0.0010	mg/L	0.0400	< 0.0010	118	70-130			
Uranium, total	0.0467	0.000020	mg/L	0.0400	0.000183	116	70-130			
Vanadium, total	0.0458	0.0050	mg/L	0.0400	< 0.0050	112	70-130			
Zinc, total	0.457	0.0040	mg/L	0.400	0.0146	111	70-130			
Zirconium, total	0.0486	0.00010	mg/L	0.0400	0.00062	120	70-130			