

Introduction

This report provides a professional agrologist's assessment regarding a 4.36 ha agricultural property is now continually inundated with water and where up to 11,500 m³ of structural fill had been deposited without permission. This report makes the following recommendations to allow the property to be farmed.

1. The current Agricultural Capability is assessed to be Class 6WI or Class 7WI due to inundation with water during the growing season due to changes in water level management of Hatzic Lake and the lack of dredging in Legace Creek since 2015.
2. 50% of the imported 1.5 m depth of structural fill be relocated to the eastern portion of the property to allow this area to be farmed.
3. The relocation and import of soil will comply with the Water Sustainability Act.
4. Large stones and other debris will be removed from the remaining 0.75 m depth of structural fill on the property.
5. An additional import of 0.5 m depth of topsoil (6500 m³) will be added to the structural fill to improve the soil capability.
6. The completed agricultural property will have an Agricultural Capability of at least Class 2.



Figure 1. Aerial view with yellow rectangle outlining the property at 10940 Stave Lake Road, Mission, BC (Google Earth July 2022).

This report is prepared by John Paul, Ph.D, P.Ag., who has extensive training and experience in all aspects of soil science, including soil chemistry, physics and classification, soil fertility and biochemistry. Dr. Paul has been working with soil deposit permits and other soils related work since 1998.

Property Description

According to information from the Fraser Valley Regional District and the Property Title, the property has a civic address at 10940 Stave Lake Road, Mission, BC, V2V 4J1. It consists of a 4.36 ha parcel in the ALR. The legal description is PID 001-867-211, Lot 12, Section 11, Township 18, New Westminster District Plan 3529.

Agricultural History of Property

This property is located in the Agricultural Land Reserve. According to the owner, there was a history of active agricultural activity consisting of forage production or pasture on much of the property during the summer months.

The current owner purchased the property in 2013 and noted that they were able to farm their land for a few years until the water level of Hatzic Lake was managed during the summer to allow boating and recreation on the lake. Legace Creek has silted up due to logging upstream and has not been dredged since 2015. Both of these management changes outside of the owner's control resulted in water inundation on the property at 10940 Stave Lake Road throughout the year, including the summer months.

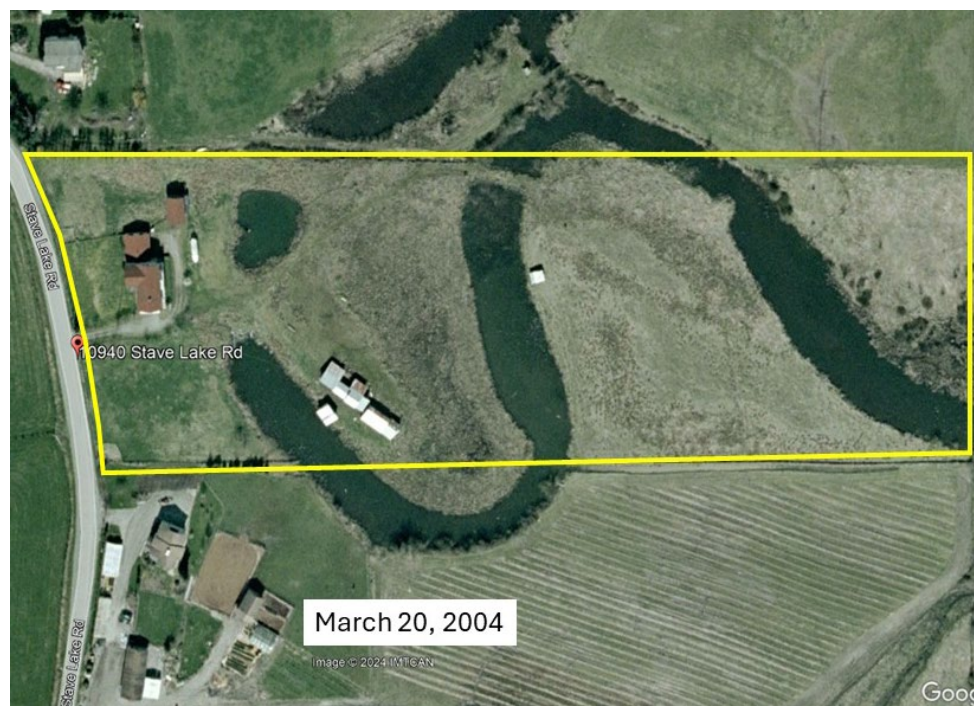


Figure 2. Aerial view of property in 2004, showing what appears to be more defined agricultural areas with some outbuildings (Google Earth)

Land Uses on Neighbouring Properties

Land uses on the property to the west is a large farm where forage grass appears to be grown. The three properties to the north are currently not used for agriculture and appear to have had fill imported. The property to the east appears to have some forage activity, as well as some imported fill in the southwest corner. The property to the south appears to be planted to blueberries.



Figure 3. Aerial photo of the property (yellow rectangle) showing the surrounding properties. (Google Earth 2022)

Soil Description

The soils on the property are all poorly drained soils, consisting of 100% Elk silt loam, 60% Prest silty clay loam, and 100% SIM silt loam.



Figure 4. Soil type on and near 10940 Stave Lake Road, Mission, BC (BC SIFT)

The soil on the west side of the property consists of Elk silt loam. The parent material is moderately coarse to medium-textured alluvial fan deposits. They are rapidly to moderately pervious (Luttmerding 1983). These soils are where the residence and buildings are located.

The soil in the center of the property where the additional soil had been deposited consists of a Prest soil, which includes medium and moderately fine textured Fraser River floodplain deposits.

“They are moderately to slowly pervious and have high water holding capacity and slow surface runoff. The water table is either near or above the soil surface for most of the winter and during freshet period of the Fraser River, then recedes slightly during the latter part of the summer” (Luttmerding 1983).

The soil on the east side of the property consists of SIM silt loam, which includes medium and moderately fine textured alluvial deposits of local streams. They are generally poorly drained, have high water holding capacity and slow surface runoff. The groundwater table is near the surface for much of the year except for the summer (Luttmerding 1983).

The topography on this site is flat, with a slight increase in elevation on the west side where the road and residence is located.

Soil Capability Classification for Agriculture

According to the online soil mapping system (BC SIFT), the agricultural capability of the soils where the crops can be grown range from 30% Class 3W on the east side of the property to 60% Class 6 WI in the center of the property.

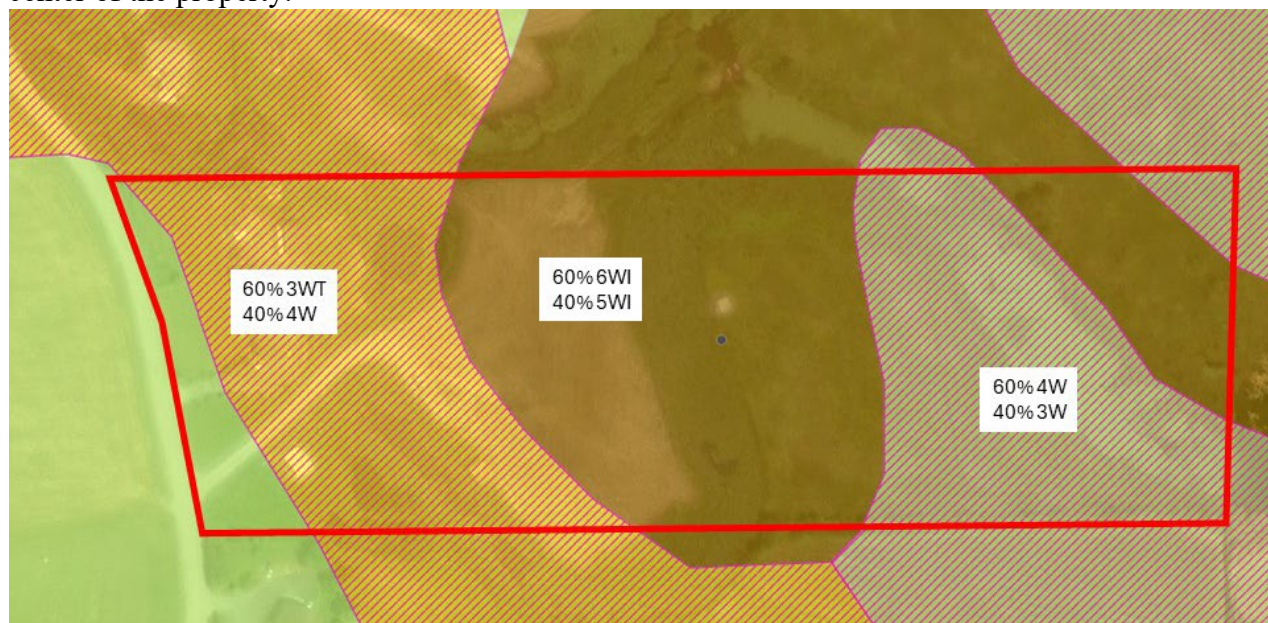


Figure 5. Agricultural capability of the property showing most of the land being wet and flooded for most of the year (BC SIFT)..

Class 3 land is defined as having limitations that require moderately intensive management practices or moderately restrict the range of crops, or both,

Class 6 land is defined as nonarable but is capable of producing native and/or uncultivated perennial forage crops.

The capability subclasses according to the Land Capability Mapping includes excess water (W) and inundation (I).

Class 3W land refers to occasional occurrence of excess water during the growing period and imperfectly drained soils during the growing season. Class 5W land has frequent or continuous occurrence of excess water during the growing period making the land suitable for only perennial forage crops and/or improved pasture.

Class 5I land is subject to frequent overflow of extended duration, but the grazing period is longer than 10 weeks. Class 6I land has a grazing period of 5-10 weeks, and Class 7I land is flooded for most of the growing season, not usable for agriculture.

The land classification appears consistent with historical land use, where there was perennial forage crops during a limited growing period.

Following the change in water management at Hatzic Lake, the land capability is more consistent with Class 6WI or even Class 7 WI in some areas of the property.

The soil deposit will increase the agricultural capability of this property to a Class 2, depending on the quality of the topsoil that can be placed on this property.

Site Inspections

A total of 10 test holes were excavated on August 2, 2023 in the area where structural fill had been imported.

It was not possible to dig test holes on the remainder of the property as the land was still inundated with water despite the lack of precipitation for several months. This verifies the impact of the silt



Figure 6. Aerial photo of the western portion of the property showing where the test holes had been excavated and inspected.

accumulation in Legace Creek due to the lack of dredging since 2015 and the ongoing silt deposits resulting from logging further upstream. It also confirms the impact of the changes in water level management of Hatzic Lake during the summer, which impacts properties upstream.

Figure 6 shows an aerial photo of the western portion of the property, where the fill had been placed.



Figure 7. View of the waterway adjacent to the filled area, indicating how close the water level is to the surface in mid-summer (August 2).

Figure 8 shows the material that had been imported. It is evident that this is structural material.

The 10 excavations indicated that most of the material was clean, however there were some large rocks, some pieces of concrete and a small amount of other debris.



Figure 8. Photo of the east boundary of the fill area showing one of the excavations.



Figure 9. Photo showing some larger rocks and pieces of concrete in the imported fill.



Figure 10. Photo showing fill area with some larger rocks on the surface.



Figure 11. Photo showing some pieces of concrete in the fill material that had been imported.



Figure 12. Photo showing the depth of fill and that most of the fill was free of debris.

Improving the Agricultural Capability of the Property

The water table was at the soil surface during the middle of the summer (August 2), verifying the owner's concern that the water management had changed, and grazing or harvesting forage on the property was no longer possible even during the summer months.

The current agricultural capability of the land on this property is estimated to be Class 6WI and Class 7WI, as indicated by the high-water table during mid summer.

The depth of imported soil was up to 1.5 m and consisted only of structural fill. The estimated volume of imported soil was 11,500 m³.

Relocating 50% of the imported soil to the estimated 7500 m² agricultural area on the east side of the property would increase the elevation on more of the property, allowing more agricultural production.

Removing 0.75 m of the imported structural material and relocating it to the area to the east would allow easier removal of larger rocks and other debris that was imported with the fill.

Following the relocation of some of the structural fill, and removal of rocks and other debris, an additional layer of 0.5 m topsoil is required to further improve the agricultural capability of the soil. The total amount of additional topsoil required is 6,500 m³ of topsoil over a total area of 13,000 m².

Adherence with the Water Sustainability Act

There are waterways crisscrossing the property, limiting the amount of land that can be used for agriculture. The soil that had been imported was deposited too close to the streams, which triggered concerns from the Ministry of Forests. A qualified professional was hired to evaluate the fill area and make recommendations for restoration. This report is included in the ALC application.

The buffer area required between the stream and any imported fill was determined to be 10 m. This limits the area on the property that can be used for agriculture.

It appears somewhat intuitive that the stream criss crossing the property should be dredged, as this has not been done since 2015. It is however, beyond the expertise of this qualified professional to make further comments or recommendations regarding this.

Recommended Fill

Topsoil

A minimum of 0.5 m of good quality topsoil must be present on the property for adequate rooting depth. This is important for the agricultural value of the property as well as to provide some drainage and moisture retention.

Soil Deposit Plan

Only fill as approved by the professional agrologist will be accepted on this property.

The property owner is responsible for maintaining a record of the amount of soil being imported. The property owner also takes full responsibility of the quality of the soil being deposited.

Access and Internal Transportation

Access to the work area will be from the existing driveway along Stave Lake Rd. The driveway is not expected to pose any hazards for traffic along Stave Lake Rd.

In order to access the agricultural area on the east side of the property, an improved and approved access may need to be constructed to allow trucks to cross the waterway.

Dust and Mud Control

A coarse gravel pad consisting of a 200 mm depth of 50-90 mm sized rock will be installed if necessary to reduce the risk of soil and mud being deposited on the road.

Existing Topsoil Management

Although there may be some topsoil currently on the property, it will be very difficult to remove it and set it aside when the water level is already at the soil surface. It will be prudent and beneficial to import topsoil from another agricultural property that is being transitioned to residential or commercial.

Drainage

The owner/contractor will ensure at all times that adequate drainage is maintained on the property, including drainage of the surface water. Adequate erosion control will be maintained along fill edges, particularly near the stream.

Vegetative Cover

The work area will be vegetated as soon as possible after the soil is deposited, particularly along the buffer zones beside the waterways.

Operational Conditions

The buffer zones as prepared by the qualified professional, the recommendations, and the estimated soil quantities as provided in this report will govern the work. The work will be carried out in phases within the work area, which will be confirmed in consultation with the professional agrologist.

The time period for the work will be two years, depending on the availability of soil and time of year.

The professional agrologist will preapprove all soil that will enter the property. All imported soil will be from pre-approved sites. The professional agrologist retains the right to order any imported soil to be removed from the property if it is deemed unsuitable.

The contractor/landowner will be responsible for maintaining an accurate record of the quantity of soil entering the property.

The contractor will be responsible for submitting load counts and soil volumes to the local municipality as well as any applicable fees.

Any water runoff from the work areas will be controlled to ensure that there are no negative effects on the environment or on neighbouring properties.

Professional Agrologist Reporting Requirements

A professional agrologist will be required to inspect the site weekly when the site is active and submit a progress report to the ALC monthly when work is actively underway.

A professional agrologist will be required to submit a final inspection report indicating that the property has been improved for agriculture as per plan.

This report has been prepared by John Paul, Ph.D, P.Ag



I certify that I have conducted the field observations and confirmed the information provided.

References

British Columbia Ministry of the Environment. 1983. Land Capability Classification for Agriculture in British Columbia. MOE Manual 1. Surveys and Resource Mapping Branch and Ministry of Agriculture and Food – Soils Branch.

BC SIFT – Soil Information Finder Tool

Luttmerding, H.A. 1980. Soils of the Langley-Vancouver Map Area. Volume 1. British Columbia Soil Survey Report No. 15

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