Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

REPORT

Doug Hancock

NOI: Dale Road Placement of Fill Agrologist Report & Reclamation Plan

OCTOBER 2024

TABLE OF CONTENTS

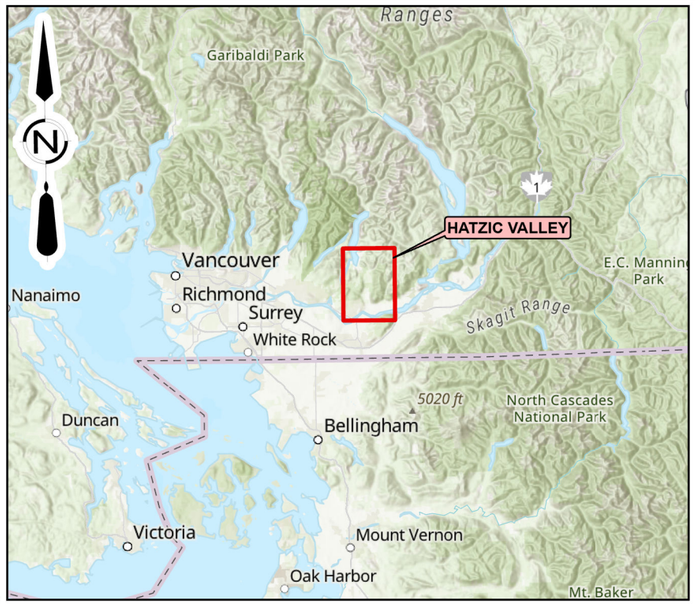
LIST OF TABLES

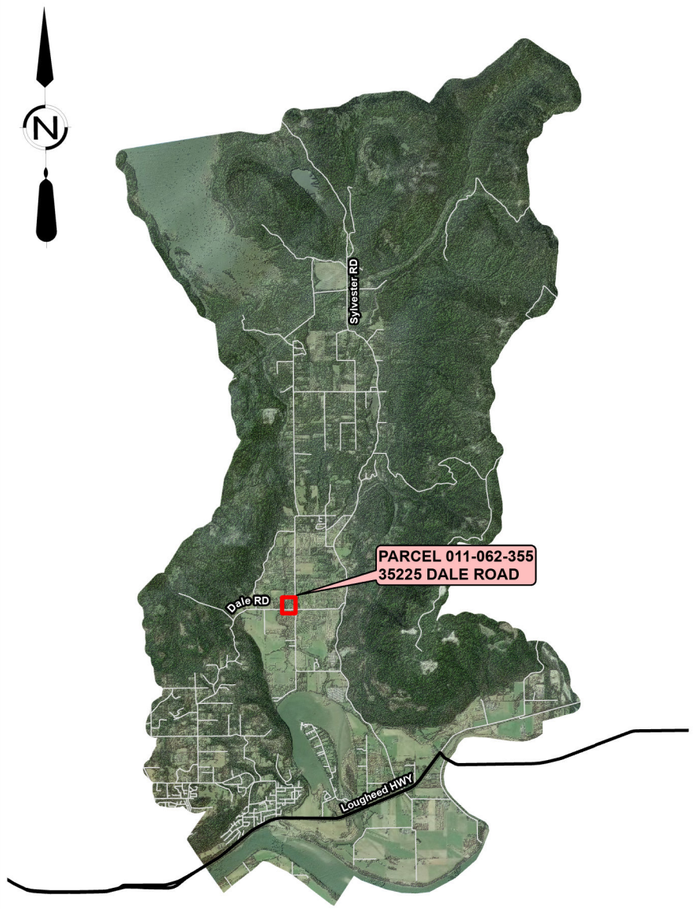
LIST OF FIGURES

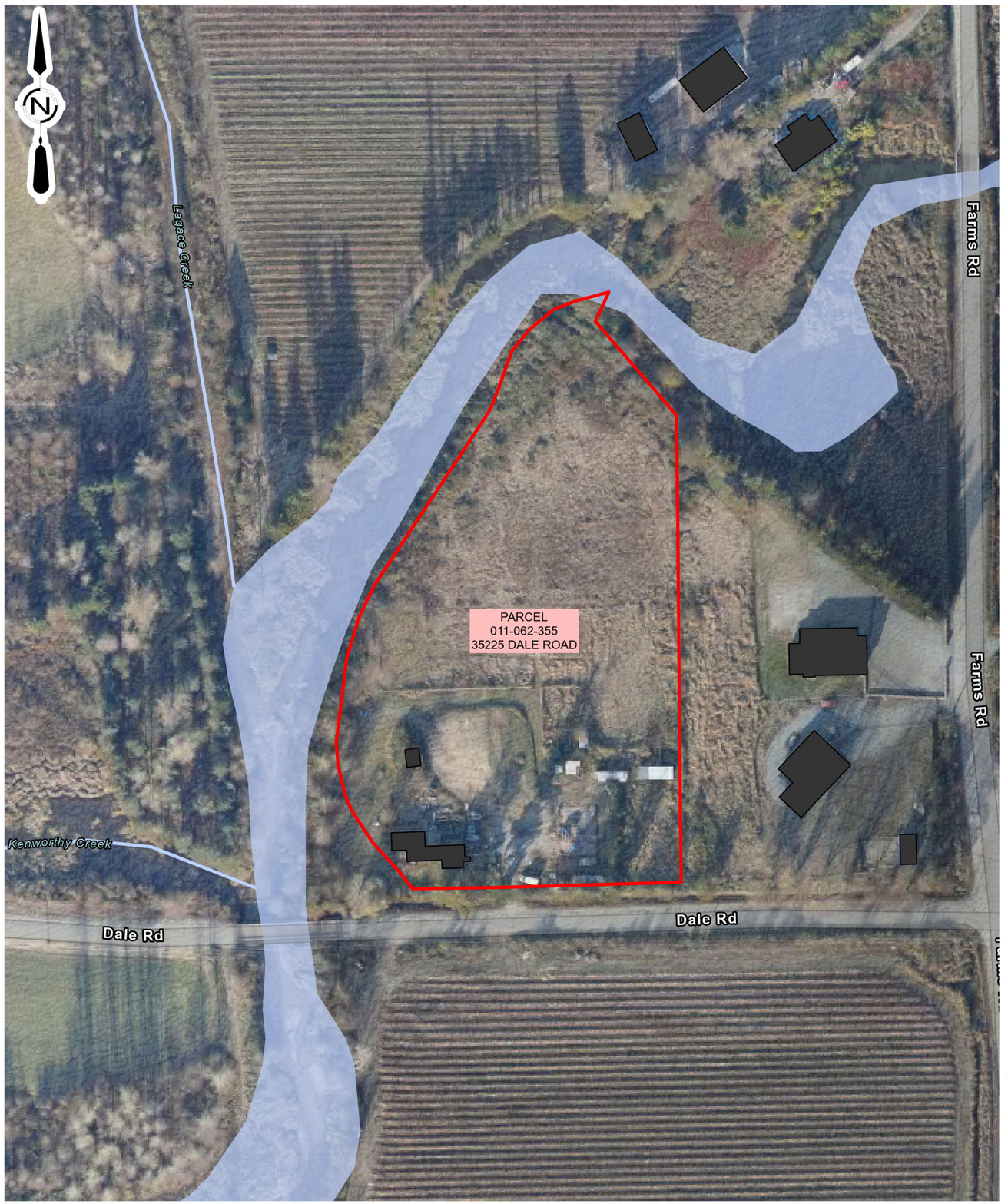
1 INTRODUCTION

Associated Engineering Ltd. (Associated) was retained by Doug Hancock (the Proponent) to review the placement of fill on a 1.9 ha site located on Dale Road in the Fraser Valley, BC (PID 011-062-355), referred to as the receiving site (Figure 1-1). The objective of the fill placement is to regrade the land elevation to minimize flooding of lower lying areas that generally floods in wetter seasons. Mr. Hancock plans to develop a tree farm on the north portion of the parcel. This proposal will directly benefit the agricultural capability as currently frequent inundation prevents the land from being utilized for agriculture. The added soil will improve the agricultural capability and provide the Mr. Hancock with the opportunity to develop the land into a tree farm.

The 1.9 ha receiving site proposed for fill placement is within the Agriculture Land Reserve (ALR), which is subject to regulations set forth by the Agriculture Land Commission (ALC). Specifically, the ALC requires a Notice of Intent (NOI) and reclamation plan for placement of fill on lands located within the ALR. This Agrologist Report and Reclamation Plan was prepared by Associated Environmental Consultants Inc., a subsidiary of Associated Engineering. It includes information required by the ALC prior to a decision regarding the fill placement. It follows the ALC's Criteria for Technical Reports Submitted by Consultants.







Associated Environmental

LEGEND:

- 35225 DALE ROAD - PARCEL 011-062-355
- EXISTING WATERBODY
- STREAM
- STRUCTURE OUTLINE

FIGURE 1-1

DOUG HANCOCK

35225 DALE ROAD
PROJECT LOCATION

AE PROJECT No.	20242071-00
SCALE	1:1,600
APPROVED	R. LARSEN
DATE	2024OCT05
REV	0
DESCRIPTION	ISSUED FOR APPLICATION

IF NOT 25 mm ADJUST SCALES
25 mm

SCALE(S) SHOWN ARE INTENDED FOR TABLOID (11X17) SIZE DRAWINGS UNLESS NOTED OTHERWISE

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2 METHODS

Jordan Fiske, Project Engineer with Associated inspected the receiving site on September 14, 2024. He had guidance for the site inspection from Associated's agrologist, Renée Larsen, A.Ag. Prior to the site inspection, the available agricultural capability and soil mapping was reviewed. On site, two soil pits were advanced on site and the following information documented by horizon:

- depth
- texture
- structure
- consistence
- coarse fragments
- presences and depth of mottles
- drainage class
- rooting depth

To verify the agricultural capability, the following was documented:

- Soil structure (D)
- Erosion (E)
- Inundation (I)
- Stoniness (P)
- Rockiness or depth to bedrock (R)
- Topography or slope (T)
- Excess Water (W)

The method to determine the agricultural capability is based on the BC system, which entails a classification system known as the Land Capability Classification for Agriculture in British Columbia (MOE 1983). The system describes seven land capability classes for agriculture (Class 1 to Class 7) and is consistent with the system of the Canadian Land Inventory. The highest classification soil (Class 1) has very slight limitations for agriculture; the lowest class (Class 7) has no capability for agriculture (Table 2-1). Along with these classes, the ALC assigns limitations to soils (Table 2-2). In most agricultural regions of BC, two ratings are assigned to a piece of land to reflect the current condition of soils and the condition after management improvements to limitations are implemented (ALC 2013). Improvements typically include drainage systems, irrigation, stone picking, and soil amendments.

Table 2-1
Land Capability Classes

Class	Description
Class 1	Land either has no or only very slight limitations that restrict its use for the production of common agricultural crops.
Class 2	Land has minor limitations that require good ongoing management practices or slightly restricts the range of crops, or both.
Class 3	Land has limitations that require moderately intensive management practices or moderately restricts the range of crops, or both.
Class 4	Land has limitations that require special management practices or severely restricts the range of crops, or both.
Class 5	Land has limitations that restrict its capability to producing perennial forage crops or other specially adapted crops.
Class 6	Land is non-arable but is capable of producing native and/or uncultivated perennial forage crops.
Class 7	Land has no capability for arable or sustained natural grazing.

Source: ALC 2013

Table 2-2
Land Capability Limitations to Agriculture

Symbol	Limitation	Major Improvement
W	Water	Drainage Systems
L	Permeability (organic soils)	Unimprovable
D	Soil Structure/permeability	Organic matter additions
N	Salinity	Unimprovable
I	Inundation	Diking
A	Moisture	Irrigation
F	Fertility	Fertilizer addition
T	Topography	Unimprovable
P	Stoniness	Stone Picking

Source: ALC 2013

3 PROPOSED PLAN

3.1 Development Plan

The fill placement and accompanying regrading is intended to protect low-lying land susceptible to flooding and create healthy soil conditions that can support growing Christmas trees. The proposed plan is to strip the existing topsoil and stockpile on the property. After topsoil stripping, approximately 17,000 m^3 of fill will then be placed across approximately 1.1 ha or 57% of the 1.9 ha site (Figure 3-1). The fill will be placed at an average of 1.2 m depth, to a maximum depth of 2.3 m. The fill will be used to create a raised field with a perimeter gravel drainage swale around all four edges. The proposed height of land is based a 2-D HEC-RAS model that shows when and where the land would be under water during the 1 to 10 year 4-day storm event, and the fill raising the field above that flood level.

The regraded land will generally slope from east to west, towards the creek, but also slope away from the centre of the site to the north and south, to encourage drainage in every direction towards the perimeter swales. A grade break along the centreline will separate gradual hillslopes of between 0.7 to 0.8% in the east, from between 0.5 to 0.6% in the west. The centreline will have a slightly steeper hillslope of 1.5% to the north and 2.3% to the south. The perimeter swales will tie into existing elevations along the edge of the development, with a 1m wide channel bed, encouraging positive drainage from the site to flow towards the Lagace Slough. There will be shrubby vegetation maintained around the perimeter of the fill area to allow for natural attenuation of any excess surface flow, as the trees are becoming established. Figure 3-2 shows the proposed cross-section of the fill placement.

Once fill is placed and regraded, stockpiled topsoil will be spread evenly across the entire fill area. Following reclamation, the top 30 cm of soil will be tested for fertility. Based on the results of this a qualified professional (QP) will determine if any soil amendments are required.

Access for fill import will be brought in through the gates off Dale Road (Figure 3-1). Fill placement will begin upon approval of the NOI and placement would be expected to be finished in 1 year. Depending on approval date, the proponent would like to start importing fill in spring 2025, and then being planting trees as soon as possible after the fill is placed and topsoil restored. Mr. Hancock plans to irrigate the trees using available water sources, which will initially be with trucking in water. For the long term, water for irrigation is dependant on upgrading his current domestic water use license.

3.2 Proposed Fill

The fill material will be coming from contractor. It will be excavated material accepted at the proponent's discretion. The specifics such as source and fill characteristics are to be confirmed, but the expectation is to take material from a construction site within the valley and be placed on this parcel. The plan is to receive material from a previously undisturbed area, which will likely be a mix glacial/fluvial sands and gravels and rock. Before acceptance of the material and hauling to the site, the fill material will be confirmed as in compliance with the ALR Use Regulation by a QP. Specifically, it will not be contaminated and will not include (ALC 2022):

(a) construction or demolition waste, including masonry rubble, concrete, cement, rebar, drywall and wood waste;
(b) asphalt;
(c) glass;
(d) synthetic polymers (e.g., plastic drainage pipe);
(e) treated wood; or
(f) unchipped lumber.

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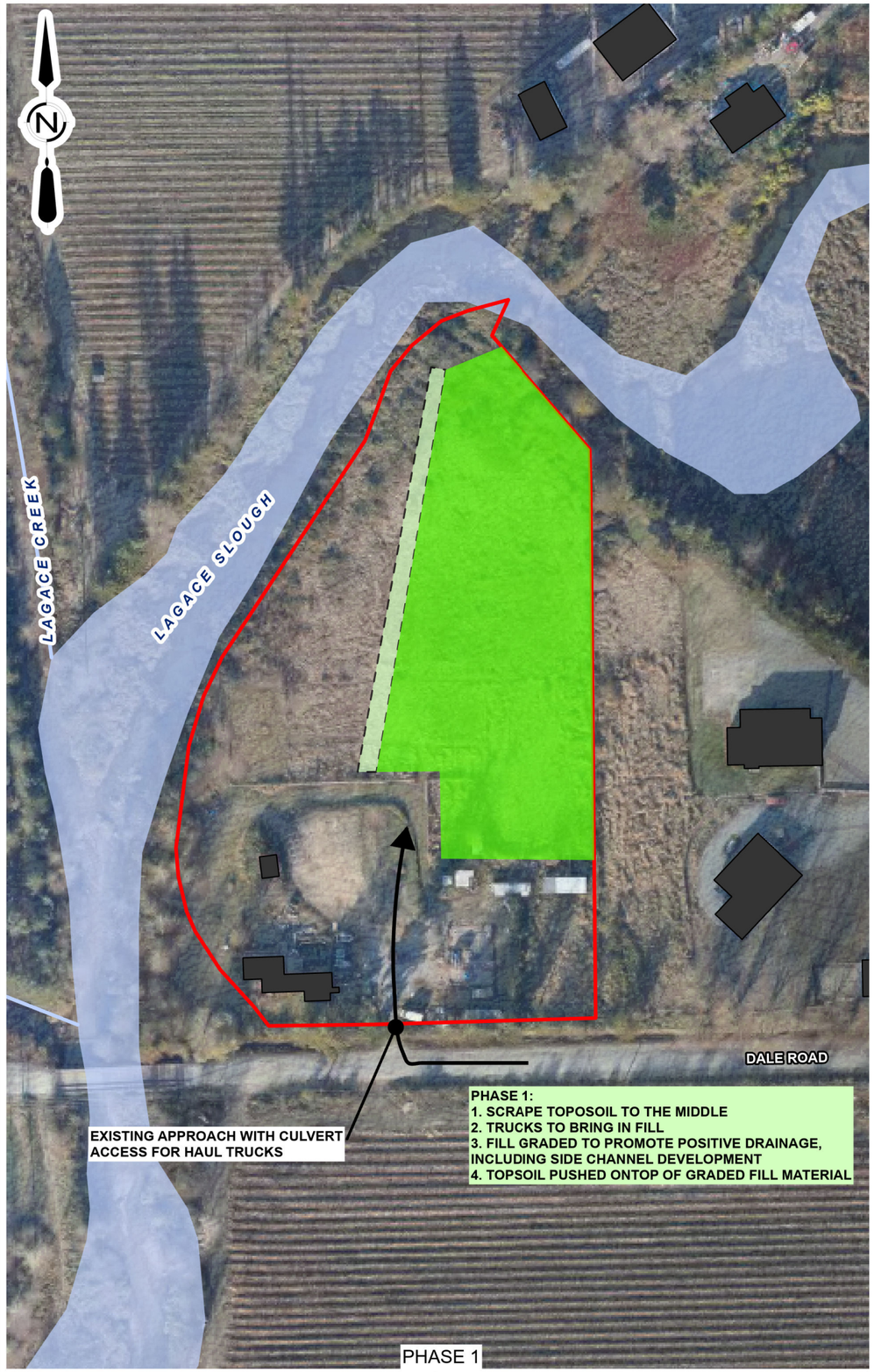
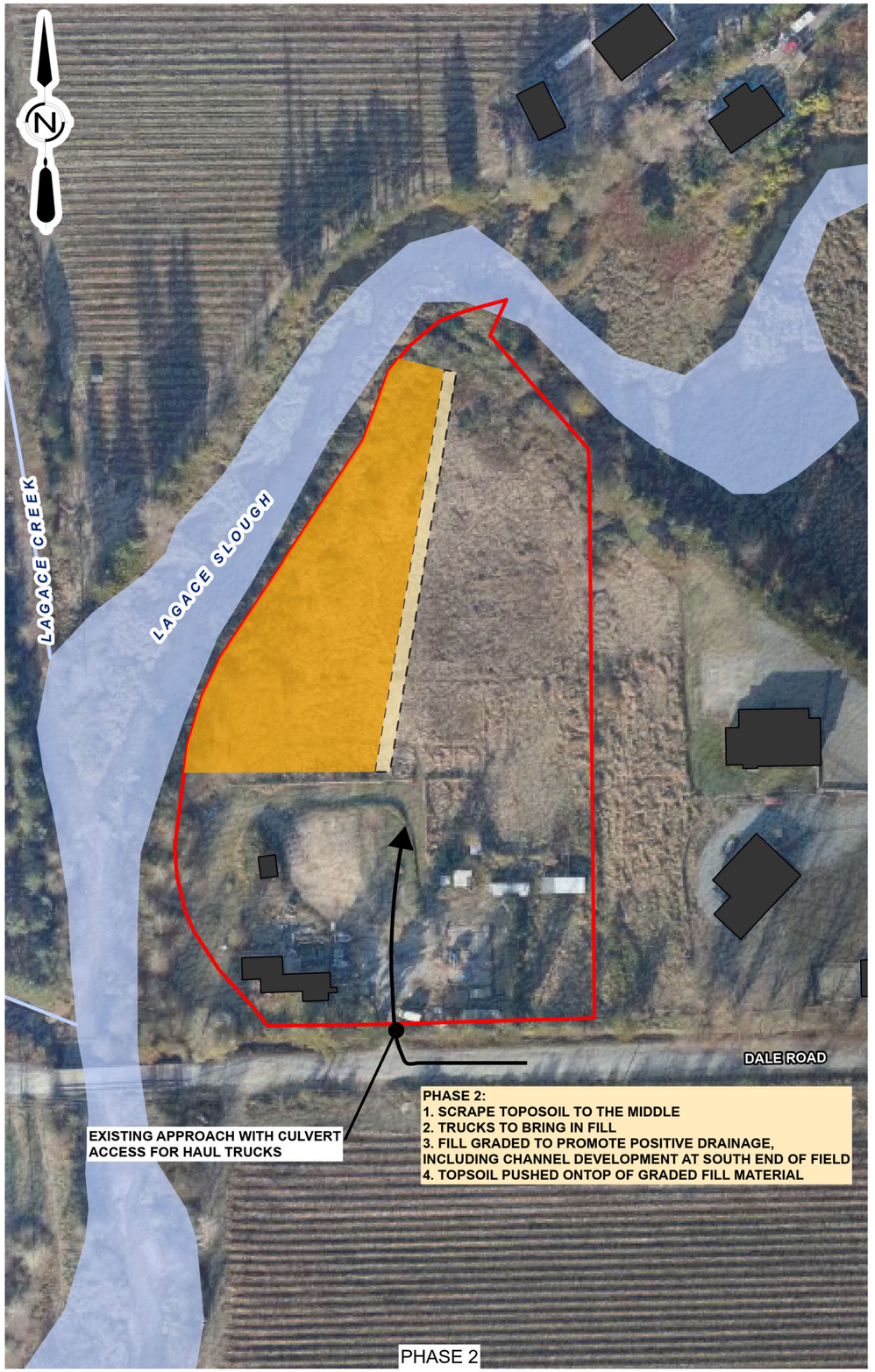
25 mm

SCALE(S) SHOWN ARE INTENDED FOR TABLOID (11X17) SIZE DRAWINGS UNLESS NOTED OTHERWISE



PHASE 1



PHASE 2

Associated Environmental

LEGEND:

PHASE 1
- TOPSOIL
- FILL

PHASE 2
- TOPSOIL
- FILL

- 35225 DALE ROAD - PARCEL 011-062-355
- EXISTING WATERBODY
- STREAM
- STRUCTURE OUTLINE

FIGURE 3-1

DOUG HANCOCK

35225 DALE ROAD
SITE PLAN

AE PROJECT No.	20242071-00
SCALE	1:1,500
APPROVED	R. LARSEN
DATE	2024OCT05
REV	0
DESCRIPTION	ISSUED FOR APPLICATION

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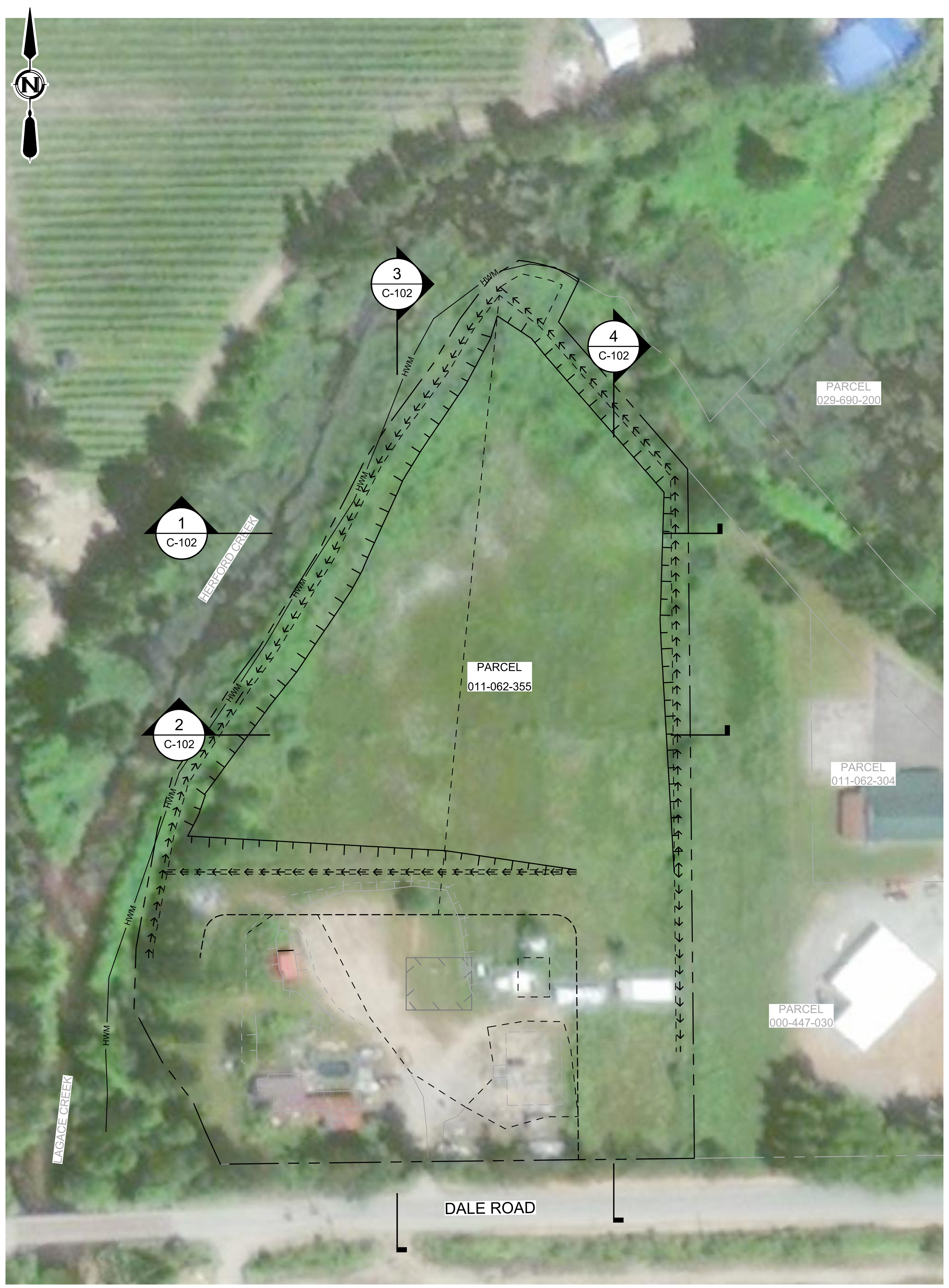
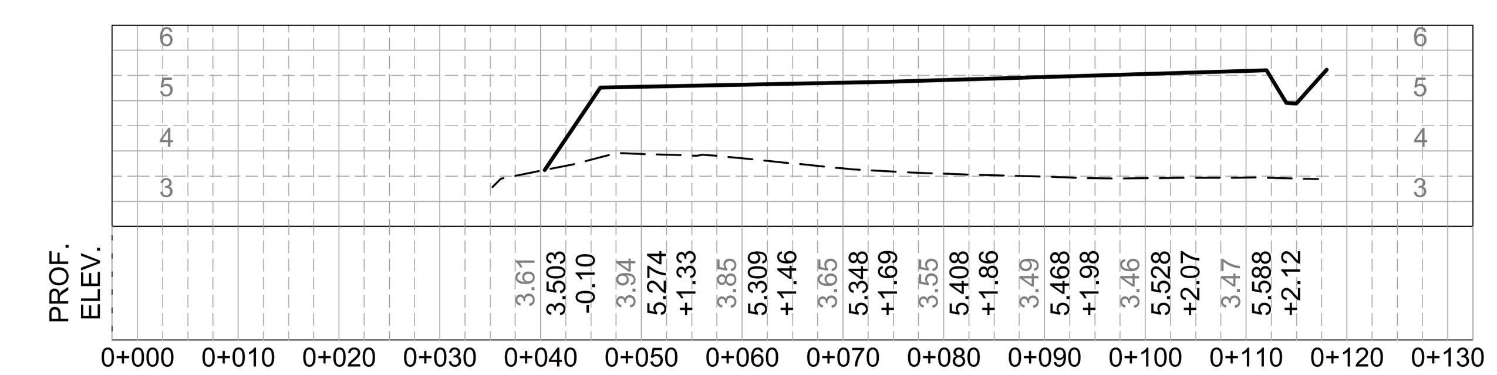


PLAN 1:750

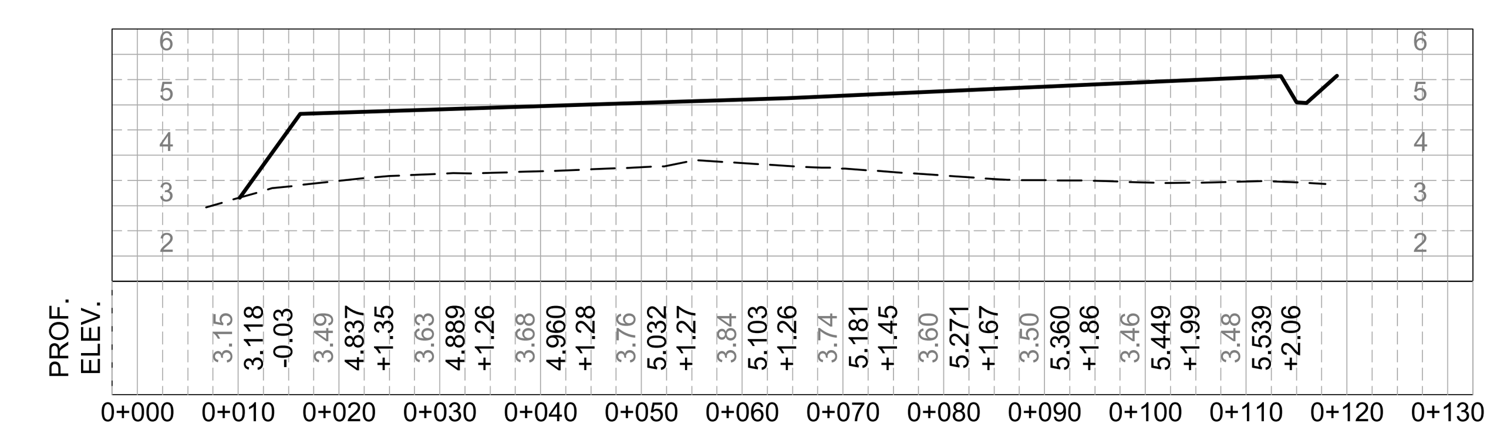
SECTION VIEW LEGEND EXISTING PROPOSED

GROUND

NOTE:
SURVEY OF THE EXISTING GROUND COMPLETED BY AXIS LAND SURVEYING LTD JUNE 27 OF 2024. ELEVATIONS ARE IN METRES GEODETIC AND ARE DERIVED FROM GNSS OBSERVATIONS (CVD28GVRD2018).



1 C-102 SECTION H 1:750, V 1:150



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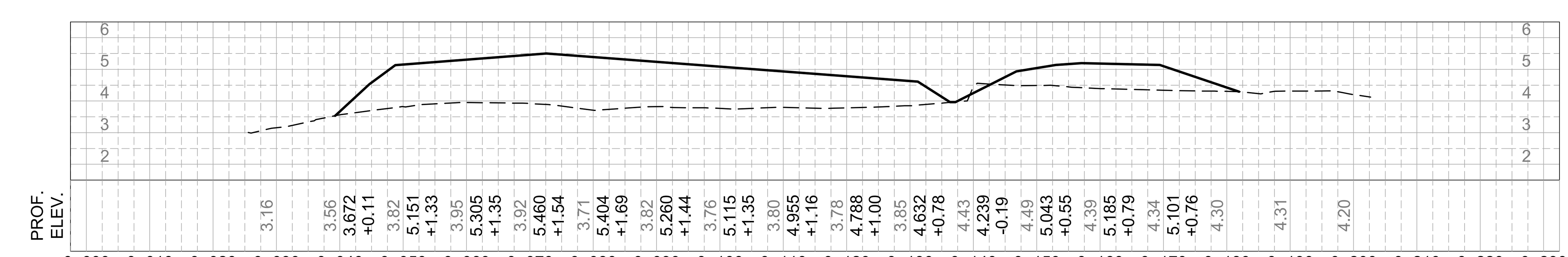

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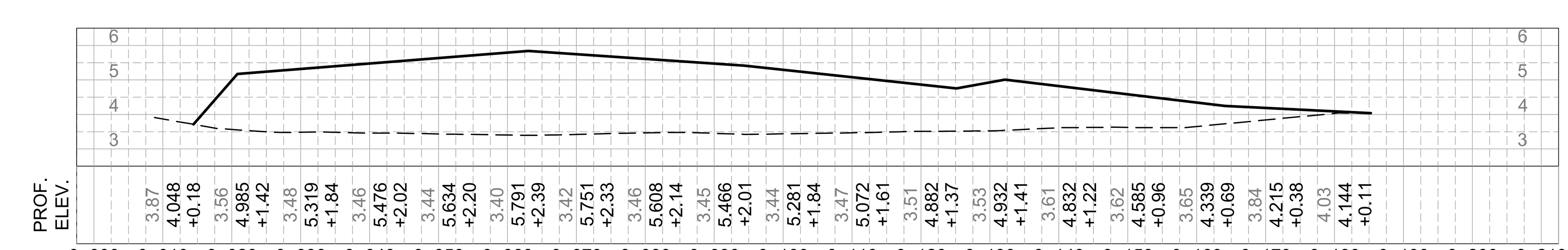

4 C-102 SECTION H 1:750, V 1:150

Associated Engineering

CANADA BEST MANAGED COMPANIES Platinum member

PRELIMINARY/ FOR DISCUSSION
NOT FOR CONSTRUCTION
DRAFT

REV	DATE	DESIGN	DRAWN	DESCRIPTION
A	2024OCT05	R. KARSGAARD	K. FISHER	ISSUED FOR REVIEW

DOUG HANCOCK

35225 DALE ROAD
REM 2 / PLAN 4333 / 011-062-355

2024-2071-00

SCALE: AS SHOWN

CIVIL
SECTIONS

DRAWING	REVISION	SHEET
FIGURE 3-2	A	2

IF NOT 50 mm ADJUST SCALES

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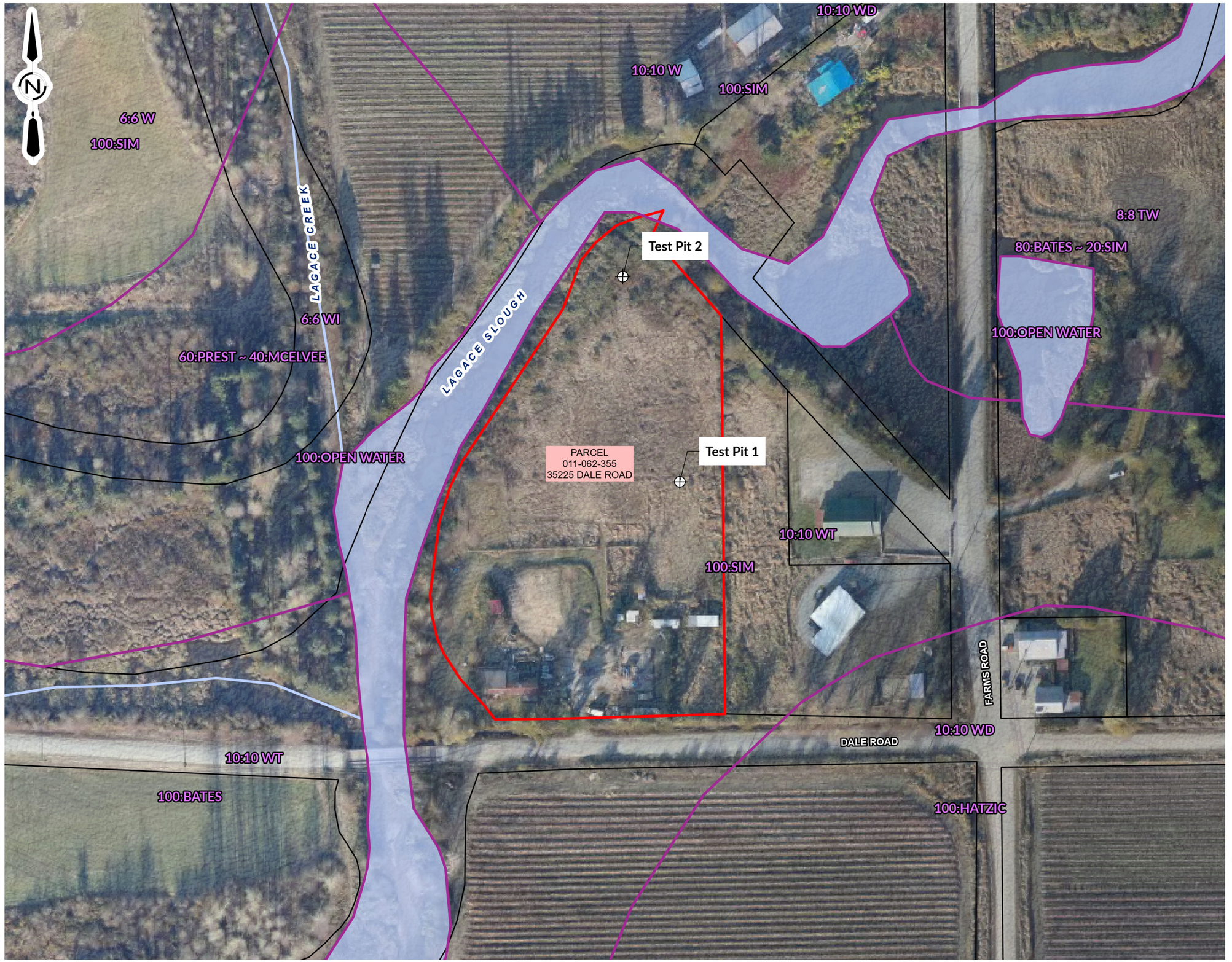
4 EXISTING SOILS AND AGRICULTURAL CAPABILITY

4.1 Mapped Soils

The mapped soil series for the receiving site is SIM, which are composed of poorly draining, moderate to fine silt loams (SIFT 2024; Bertrand, Hugh-Games, and Nikkel 1991). These soils develop from flood plain deposits and typically remove water slowly resulting in a high groundwater table during periods of heavy rain. (Figure 4-1). (Government of Canada 2024; Bertrand, Hugh-Games, and Nikkel 1991). In addition to a high-water holding capacity, SIM soils typically also have a high nutrient holding capacity. The subsoils are generally composed of sands or clays and may restrict root penetration depending on texture.

4.2 Mapped Agricultural Capacity

The mapped agricultural capability for the receiving site is classified as 3WT, with primary limitations from wetness and topography (SIFT 2024). This means that excess water may occasionally cause minor crop damage but won't normally result in crop loss (MOE 1983). The occurrence of excess water during winter months can adversely affect the success of perennial crops. Late seeding can be an issue when the water level is near the soil surface until mid-spring, or the soil is poorly drained. The limitation of topography indicates that simple slopes of 11 to 15% may be present and complex slopes of 6 to 10%. (MOE 1983).



Associated Environmental

LEGEND:

- MAPPED SOIL
- TEST PIT LOCATIONS
- 35225 DALE ROAD - PARCEL 011-062-355
- EXISTING WATERBODY
- STREAM
- STRUCTURE OUTLINE

FIGURE 4-1

DOUG HANCOCK

35225 DALE ROAD
AGRICULTURAL CAPABILITY

AE PROJECT No.	20242071-00
SCALE	1:1,500
APPROVED	R. LARSEN
DATE	2024OCT05
REV	0
DESCRIPTION	ISSUED FOR APPLICATION

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5 FIELD ASSESSMENT

5.1 Current and Historical Land Use

As Mr. Hancock recently purchased the property, the historical land use is not fully understood in this location; though, a review of satellite imagery (Google Earth 2024) suggested that the land has previously supported horse pasture and potato growing.

The current land use is residential with no agricultural practices currently taking place on the parcel The land is well vegetated and currently supports grasses and clovers, with shrubs and trees along the perimeters. No invasive species were noted in the field by Associated; however, Knotweed is present in the area and could potentially be found along the banks of the nearby Lagace Creek. No weed management practices are currently used but will be used as required during the tree farming.

5.2 Soil Survey and Agricultural Capability Assessment

Our observations of the soils in the two test pits, were similar to mapping with slight variations. The soil was textured as a silty loam to silty clay with some mottling present in the B horizon (Photo 1 in Appendix-A). The agricultural capability was assessed as 3W with the primary limitation occurring from excess water where there is up to 20 cm during the winter and early spring. Standing water is also present after high intensity rainfall events. Results from the test pits are provided in Table 5-1. Photos of each pit are provided in Appendix A (Photo 2 & 3).

Table 5-1 Soil Pit #1 Survey Results

	A Horizon	B Horizon
Horizon depth (cm bgl)	20	20 to 40 cm
Texture	Silt Loam	Silty Clay
Structure	Moderate	Strong
Consistence	Sticky	Very Sticky
Coarse Fragment	None	None
Presence and depth of mottles	No	20 cm +
Drainage Class	Poor	Poor
Rooting depth/root restricting layer	No	Compact clay could restrict root depth
Agricultural Capability	3W	

Table 5-2 Soil Pit #2 Survey Results

	A Horizon	B Horizon
Horizon depth (cm bgl)	20	20 to 40 cm
Texture	Silty Clay	Silty Clay
Structure	Moderate	Strong
Consistence	Sticky	Very Sticky
Coarse Fragment	None	None
Presence and depth of mottles	No	20 cm +
Drainage Class	Poor	Poor
Rooting depth/root restricting layer	No	Compact clay could restrict root depth
Agricultural Capability	3W	

6 DRAINAGE

6.1 Current Conditions

The land is susceptible to flooding via overland flow from Lagace Creek, primarily in winter to late spring. Ponding can also occur during high rainfall events During the winter and early spring, there can be 4 to 8 inches of standing water on the property, which can remain for weeks if weather conditions are not conducive to evaporation (e.g. rain or overcast; D. Hancock, personal communication, September 2024)

The field assessment revealed a clay-rich subsoil, which will encourage ponding due to poor drainage. Additionally, as the parcel slopes west to east, the receiving site can become further inundated with water from Lagace Creek under flood conditions. Flood mapping conducted by AE shows in a 1:10 year winter storm event over a 4-day period, the Hatzic valley is susceptible mass flooding, with Doug Hancock's parcel flooding up to 1.5 m to 2 m above the existing ground for this storm event. The prominent location for flooding on this parcel occurs on the West side near Lagace creek and on the East side where the parcel is lower.

6.2 Potential Improvements without Fill Placement

The field inspection revealed that without improvements, the issues of flooding from the creek combined with very clay-rich soils and high groundwater table during the winter and early spring across the receiving site could significantly limit agricultural production. Without raising the land profile to encourage adequate drainage and prevent recurring flooding, the existing land is unlikely to be productive for farming practices or infrastructure due to the amount of standing water that ponds seasonally.

7 RECLAMATION PLAN

7.1 Proposed Plan

As summarised in Section 3, the proponent is planning to regrade the land towards the slough and elevate the field by increasing the amount of material in the field in order to reduce flooding issues. A sample cross-section demonstrating the proposed fill placement and regrading is provided in Figure 3-2.

7.2 Fill Certification

The fill material source is not yet known (Section 3.2). Inspections will be conducted to ensure that fill is considered to be clean and free of contaminants and foreign material before placement. The property will be inspected by at the frequency required by the ALC, which will be to ensure that the proponent is continuing to bring in appropriate soils and is following the Agrologist's recommendations outlined in this report.

7.3 Erosion Control

During fill placement operations, the existing topsoil will be stockpiled on site at the high point of land (the northwest corner). Stockpile erosion will be controlled by limiting the stockpile height to 3 m or less. It will be seeded with a quick germinating cover or covered with a tarp to prevent loss.

Once fill is placed, silt fencing will be placed along the boundary of the parcel to avoid sediment entering the creek. Best management practices will also be followed before tree planting is underway to limit potential erosion.

7.4 Weed Management

Fill material will be sourced, as much as possible, from weed free sites. The fill will be buried under the topsoil, which will reduce the potential for weed propagation and spread on site. Once topsoil is placed, a cover crop will be seeded to reduce the potential for weed establishment.

7.5 Crop/Vegetation Establishment

The proponent will be planting Christmas trees once fill placement and regrading activities are completed. The trees will be managed through fertilizing, irrigation and weed management.

7.6 Drainage Plan Post Fill Placement

Both existing and proposed site drainage has been modelled to create a site drainage plan. This was the basis for designing the ditching and is driven by determining how to get water off the raised site, and where it will go. This will entail a perimeter gravel drainage swale around all four edges of the fill site and will tie into existing elevations along the perimeter of the development, encouraging positive drainage of any runoff from the site towards the Lagace Slough and ultimately into Lagace Creek and the Dale Road ditch. Regrading of the parcel has also considered drainage pathways as to avoid any unnecessary pooling on surrounding parcels. To avoid sediment entering the creek, silt fencing will be placed along the boundary of the parcel. The proposed fill is expected to be a mix of glacial/fluvial sands and gravels and rock. This coarse material will provide a more rapidly draining environment than the current clay-rich soil underlying the topsoil, therefore, some water may even infiltrate to ground.

7.7 Monitoring

Fill placement activities will be monitored by Associated or another Qualified Professional. Site visits will be performed based on the Regional District of Fraser Valley and ALC requirements. Summary memos of observations can be provided upon request.

7.8 Closure and Procedure

After the fill is placed, Associated will visit the site and determine if the recommendations in the Agrologist's report were followed. Agricultural capability will be assessed, and a closure report can be provided to the ALC.

8 POTENTIAL EFFECTS

8.1 Agricultural Effects

The placement of fill is expected to improve the agricultural capability from Class 3 to Class 2, reducing the soil wetness for better drainage, and creating a more level site. Fill and accompanying regrading will create soil conditions that can support a tree farm by raising low-lying land susceptible to flooding, as well as encouraging positive drainage from the site during heavy rainfall events. Currently the site is under utilised and, therefore, these proposed improvements will greatly improve the agricultural productivity of the land.

8.2 Environmental Effects

There are no mapped sensitive features identified on or adjacent to the receiving site. Hatzic slough and Legace Creek have both been observed to be fish bearing, the source waters largely originate from surrounding ditches which are fed by Hereford Creek. To mitigate potential negative impacts from erosion during fill placement silt fencing will be install along the boundary of the receiving area to avoid sediment entering the creek, along with following best management practices to limit potential erosion. No other negative impacts on the environment are expected if the recommendations in this report are followed.

CLOSURE

This report was prepared for the Doug Hancock to support his Notice of Intent for fill placement.

The services provided by Associated Environmental Consultants Inc. in the preparation of this report were conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practising under similar conditions. No other warranty expressed or implied is made.

Respectfully submitted,

Associated Environmental Consultants Inc.

Dianna Christopoulos
Project Manager

Signed on behalf of Melanie Piorecky, P.Ag.
Technical Specialist, Reclamation and Restoration

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APPENDIX A - SITE PHOTOS

Photo A-1 Mottling present in subsoil

Photo A-2 Test Pit #1

Photo A-3 Test Pit #2