Provincial Agricultural Land Commission - Applicant Submission

Application ID: 58053
Application Status: Under LG Review
Applicant: MANRAJ KANDOLA
Local Government: City of Kelowna
Local Government Date of Receipt: 06/22/2020
ALC Date of Receipt: This application has not been submitted to ALC yet.
Proposal Type: Non-Farm Use
Proposal: We are applying for a non farm use as the property was historically utilized as an industrial sawmill operation. The operations seized in 2005 and since then lots of effort has been made to reclaim land back to farm land.
The future proposal for next 6 years is to move towards reclaiming the land to a viable agriculture standard by grinding, screening and composting the remaining wood waste material and introducing fresh wood chips and yard waste adding carbon to the composting process as existing wood debris has no heat value.
Tree service on site (A1 Tree) provides fresh wood chips brought in from off site and working with the composting company processing the materials.
The tree service will work out of the property and provide us with fresh wood chips. Only the equipment required to be used in the business will be parked on the property.
Fresh product being brought on the property for composting will be approximately 15,000 yards. We will have projected volumes and will bring on material as required for the job. Maximum 2000 to 4000 maximum at any one time. We are currently moving 500 to 1000 yards per month and rest depends on the market.
We have a non permanent structure for dry storage of different amendments and sand as well. Covered area will also be utilized for repairs on equipment.
There are approximately 6 employees working.
Since the start of this remediation, equipment such as screener and grinder have been purchased to help with the remediation. We have invested lots of money to make this project a success and have this land reverted back to some form of agriculture status.
Please see the attached Site Plan Map and Detailed Information for Remediation.

Mailing Address:
982 OLD VERNON ROAD
KELOWNA , BC
V1X 6T8
Canada
Primary Phone: (250) 870-3294
Email: manrajkandola@hotmail.com

Parcel Information

Parcel(s) Under Application

1. **Ownership Type:** Fee Simple
   Parcel Identifier: 012-206-687
   Legal Description: Lot 3 Section 1 Township 23 ODYD (Osoyoos Div of Yale) Plan 546
   Parcel Area: 546 ha

Civic Address: 982 Old Vernon Road Kelowna BC V1X6T8
Date of Purchase: 06/01/2005
Farm Classification: Yes
Owners

1. **Name:** MANRAJ KANDOLA
   Address:
   982 OLD VERNON ROAD
   KELOWNA , BC
   V1X 6T8
   Canada
   Phone: (250) 870-3294
   Email: manrajkandola@hotmail.com

Current Use of Parcels Under Application

1. Quantify and describe in detail all agriculture that currently takes place on the parcel(s).
No Agriculture Activity, as it was previously operated as an Industrial Sawmill.

2. Quantify and describe in detail all agricultural improvements made to the parcel(s).
When sawmill operation seized in 2002, wood piles debris on site was approximately estimated at 160,000 cubic meters.
We have diligently been removing the wood waste and now have approximately 30,000 cubic meters of wood left over.

Land improvements made to date in remediating the land towards agriculture standard:
- trench burn to remove oversize debris
- grinding and trucking wood waste to Tolko Cogen Plant, unfortunately not enough heat value in the material
- screening the pile of wood debris and sold directly to market

3. Quantify and describe all non-agricultural uses that currently take place on the parcel(s).
Grinding, Screening, Composting of the wood waste.
Bringing in clean wood chips for composting.

Adjacent Land Uses

North

Land Use Type: Agricultural/Farm
Specify Activity: Residential/Hay Field

East

Land Use Type: Agricultural/Farm
Specify Activity: Residential/Remnant Sawmill

South

Land Use Type: Agricultural/Farm
Specify Activity: Residenitial/Agritourist Accomodation (RV Park)

West

Land Use Type: Agricultural/Farm
Specify Activity: Residential

Proposal

1. How many hectares are proposed for non-farm use?
4 ha

2. What is the purpose of the proposal?
We are applying for a non farm use as the property was historically utilized as an industrial sawmill operation. The operations seized in 2005 and since then lots of effort has been made to reclaim land back to farm land.
The future proposal for next 6 years is to move towards reclaiming the land to a viable agriculture standard by grinding, screening and composting the remaining wood waste material and introducing fresh wood chips and yard waste adding carbon to the composting process as existing wood debris has no heat value.
Tree service on site (A1 Tree) provides fresh wood chips brought in from off site and working with the composting company processing the materials.
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Fresh product being brought on the property for composting will be approximately 15,000 yards. We will have projected volumes and will bring on material as required for the job. Maximum 2000 to 4000 maximum at any one time. We are currently moving 500 to 1000 yards per month and rest depends on the market.
We have a non permanent structure for dry storage of different amendments and sand as well. Covered area will also be utilized for repairs on equipment.
There are approximately 6 employees working.
Since the start of this remediation, equipment such as screener and grinder have been purchased to help with the remediation. We have invested lots of money to make this project a success and have this land reverted back to some form of agriculture status.
Please see the attached Site Plan Map and Detailed Information for Remediation.

3. Could this proposal be accommodated on lands outside of the ALR? Please justify why the proposal cannot be carried out on lands outside the ALR.
This is a unique property where sawmill operations predated the ALC rules and regulations therefore was grandfathered to continue operating as a sawmill operation on ALR land. This orphaned sawmill on ALR land needs to be reclaimed back to agriculture status. Therefore the reason for asking "non-farm" use is to continue reclaiming farmland.

4. Does the proposal support agriculture in the short or long term? Please explain.
In the long run there be will benefits to agriculture use. This project isn't a small undertaking as we have already invested over a decade in trying to reclaim the land back to agriculture use. Any property heavily utilized for Industrial operation for decades is going to have it's challenges. The property wasn't monitored over the years as there are other products other than wood dumped on this property . There will definitely be lots of challenges ahead of us.
Our long term plan for next 6 years is to keep remediating the land and hopefully work towards utilizing this property for agriculture use for non soil based farming. (green houses, animal farming or nursery)

5. Do you need to import any fill to construct or conduct the proposed Non-farm use?
No

Applicant Attachments

- Professional Report - Agrologist Report
- Professional Report - Agrologist Report, Appendix E
- Professional Report - Agrologist Report, Appendix B
- Professional Report - Agrologist Report Addendum
- Professional Report - Agrologist Report, Appendix A
- Professional Report - Agrologist Report, Appendix C
- Professional Report - Agrologist Report, Appendix D
- Professional Report - Plan Map
- Professional Report - Survey Plan
- Other correspondence or file information - Site Map/Plan
- Other correspondence or file information - Site Map/Plan TNT
- Other correspondence or file information - Detailed Remediation Plan TNT
- Site Photo - 2018 sawmill pic1
- Site Photo - 2018 sawmill pic2
- Site Photo - 2018 sawmill pic3
- Site Photo - 2018 sawmill pic4
- Site Photo - 2018 sawmill pic5
- Site Photo - 2018 sawmill pic6
- Site Photo - 2018 sawmill pic7
- Site Photo - 2018 sawmill pic8
- Site Photo - 2018 sawmill pic9
- Site Photo - 2018 sawmill pic10
- Site Photo - 2018 sawmill pic11
- Site Photo - 2018 sawmill pic12
- Site Photo - 2008 sawmill pic1
- Site Photo - 2008 sawmill pic2
- Site Photo - 2008 sawmill pic3
- Site Photo - 2008 sawmill pic4
- Site Photo - 2008 sawmill pic5
- Proposal Sketch - 58053
- Certificate of Title - 012-206-687

ALC Attachments

None.

Decisions

None.

982 Old Vernon Rd
Sawmill Photos
Circa 2008

SAMSUNG

982 Old Vernon Rd
Current Prroperty Photos
2018 and 2019

ATTACHMENT A

This forms part of application

A19-0018

City of Kelowna
DEVELOPMENT PLANNING

Planner Initials BC

ATTACHMENT A

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ATTACHMENT B

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A19-0018

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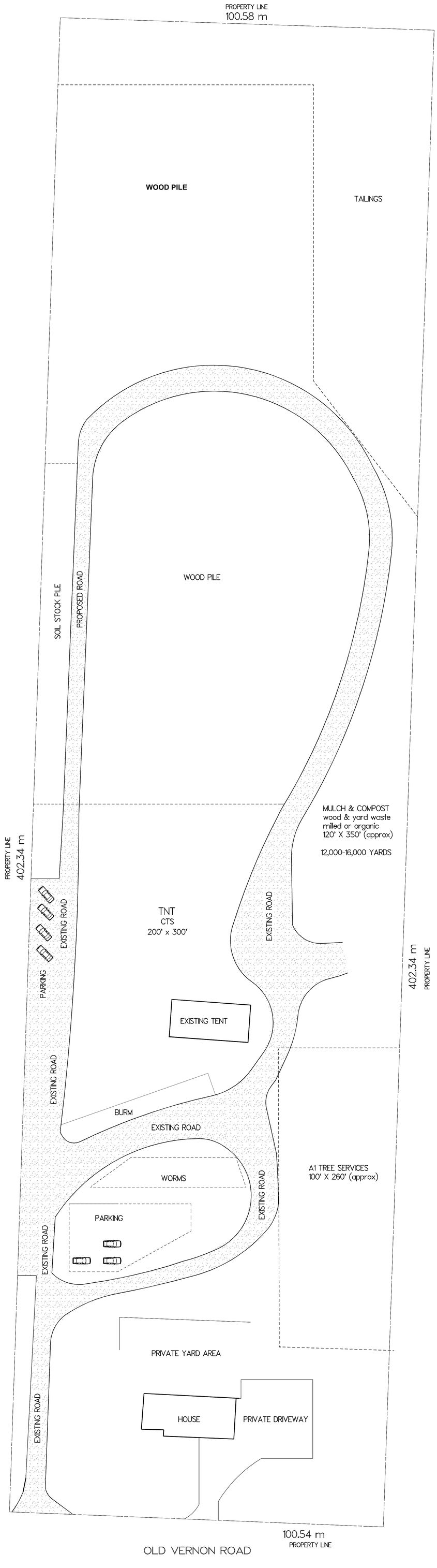
City of Kelowna
DEVELOPMENT PLANNING



NOTES

No.	Date	Description

REVISIONS

982 Old Vernon Rd

SITE PLAN

SCALE	1" = 32'
DRAWN BY	M. Croft
CHECKED BY	
DATE	APRIL 2, 2020
DATE OF PRINT	

PROJECT NO.
SITE PLAN 1
SHEET NO.

Powered by DynaSCAPE®

TNT TRUCKING

982 Old Vernon Rd. Kelowna, BC

ryan@tntkelowna.com
250.826.4130
admin@tntkelowna.com
250-212-7073

Kelowna's TNT Trucking Ltd. Site Plan for the remediation of 982 Old Vernon Road, Kelowna.

Legend
Black lines outline approximate areas TNT will use for

Tailings Area back right which will turn into a L shape along the back of the property are Tailings that have been screened once then decomposed wood fines are added to a blend of soils, subsoils, rock dusts, sands or gravels for the landscape industry and will need further decomposition to be re screened and or sorted @ a later date.

TNT work area e.g. crushing/screening equipment parking storage and maintenance area The trucking portion/contracting portion of our business does use this area how ever this is necessary as remediating the property is expensive and costs money ,soil sales could and or would not support or pay for this remediation , all activities and site related work pay for the remediation and are used in conjunction to do it essentially you can not have one or the other they work in conjunction with no funding provided this is how we can make an direct positive impact on the community, this area has been mostly remediated , its ideal to have our sand and rock screened separately to add to soil mixtures having the ability to make many different blends for different applications allows us to remove more material annually as well as allows us to dispose of the copious amounts of rock screened out of fill , soils , gravels, in some loads of fill we receive concrete as well as we find buried pockets of concrete, asphalt rock, wood, garbage and or metal on site to minimize costs of disposal crushing of aggregates e.g., rock, concretes, stones, bricks, etc is necessary as it would only add to the piles of material on site once crushed we sell them as backfill products in the construction industry.

Blocked out area on the right of the property is used for grinding mulching and composting of natural/milled wood, yard waste, calcium sulfate, lime, granite, basalts etc rock dusts, papers, cardboard, organics, any and all compostable materials.
The large pile behind our work area will get screened as required as it's the most labour intensive and time consuming, we are currently working along the far left side in-between the onsite road and the property to the left , the large area directly behind the main pile has been screened once an area of 150x150 we got 1500 plus yards for future mixing we will be moving piles closer to the back to allow easier screening and mixing and a broader work area as we sure up the ground with aggregates , approximately by the end of the 6 years tnt will have the mulch area completely remediated ready for new farming such as green houses cattle or new soil for grown what ever they choose. As well as area behind the pile which is 250x300 feet materials were any where from 4-15 feet deep/tall, tnt will do its best to remove metals , garbage , as finances allow , unusable materials either they need further decomposition further screening, TNT anticipates 15000-20000 yards to be removed off site , we use 10-30 percent of mill screenings in our mixtures with our compost/soil/sand/rock blends. TNT foresees increase of flat usable land of 1.5-3 acres within 6 years.

Compost we do in various locations trying to mitigate handling it more then needed and we blend mix and screen as we make room and what's most convenient and easiest.

982 Old Vernon Rd. Kelowna, BC

ATTACHMENT B
This forms part of application
A19-0018
Planner Initials BC
City of Kelowna
DEVELOPMENT PLANNING

ryan@tntkelowna.com
250.826.4130
admin@tntkelowna.com
250-212-7073

Equipment & Temporary Structures

Skid Steers we use for sorting materials and loading small and mid size trucks and for screening etc
Wheel Loader used for loading larger trucks and mixing soils moving materials around and sorting
Excavators use in screening and digging as well as piling and sorting as well
Wood Grinder/Shredder for downsizing wood/ yard waste materials for further composting
Jaw Crusher used for reducing waste sizing for usable applications eg rock dusts for amendments road building , we use it to make fill materials for off site applications and for ground shoring , with out it screening the fill to mix with the woodwaste we would have an over abundance of piles of rock around adding volume to the property.
Dump Trucks for hauling material on and off site, pick ups for refueling, and staff etc.
Office trailer (1), storage containers (3) and Tent (1)

ryan@tntkelowna.com 250.826.4130
admin@tntkelowna.com 250.826.5774
982 Old Vernon Rd. Kelowna, BC
www.tntkelowna.com

Kelowna's TNT Trucking Ltd. Guidelines for Remediation of 982 Old Vernon Road, Kelowna.

Fire Suppression Plan

Long term fire suppression plan is to be hooked up to BMID water supply all year while available.

TNT will regularly water compost piles to avoid ignition.

TNT will separate waste wood piles from green waste/composting piles.

TNT will provide a hose/hard lined plastic or PVC piping along the side of the property from front to back with minimum. 3 connections along its length. Allowing for a fire hose to be connected to reach across the property in the event of a fire. TNT will also regularly water its compost piles to avoid ignition.

Dust Suppression

Broken aggregates and wood mulch have already been installed and will be added to as needed on roadways and around the yard to keep dust to minimum. We will also use water as needed to supress dust.

Noise mitigation

TNT will operate within the allowed business hours of 7am through 6pm Monday to Friday for heavy equipment use and drop off of materials.
TNT would like to clarify this point as it pertains to our winter operations which are critical for funding the entire model; while we understand that the disposal of snow is not approved at any time, there would be a need for trucks and equipment to come and go from the yard at odd hours as the snowfall determines. Equipment would be pre-loaded during regular business hours as much as possible but there would still be some unavoidable engine noise from trucks. Please note this would involve drivers arriving at work and leaving with equipment, not coming and going repeatedly from the site.

Material Rational

Sandy loam/topsoil/clay/fill (eg. dirt and rock) and green landscape waste is used to blend with the fines from the old Russo mill to reduce the volume of material on site. As TNT grinds/shreds/composts material, we use these organic materials to achieve a desired texture/composition/level of enriched organic matter for the soils that are then used in a variety of applications in the local landscape/construction industry. Allowing TNT to haul materials in to collect and process allows us not only to fund the sorting, mixing, and blending of soils that will eventually clean up the site but provides the raw materials required to do so.

Likewise, processing the green waste and chips helps pay for the costs associated with clean up that TNT absorbs. The carbon and nitrogen produced by the compost is critical for the soil blend and given that the ground waste and piles have metal, plastics, and rocks in them that require screening and then separation and sorting before grinding, revenue is required in order to process. This is expensive and time consuming as much of it must be done with a combination of equipment and hand work as well as the unrecyclable debris removed to the landfill.

ryan@tntkelowna.com 250.826.4130
admin@tntkelowna.com 250.826.5774
982 Old Vernon Rd. Kelowna, BC
www.tntkelowna.com

These operations cover costs of labour, equipment, fuel, insurances, and taxes while also providing the raw materials make a product that can be sold in order to remediate the property.

Estimated Projections

Using a maximum mix ratio of approximately 25% mill waste to other material, At our current level of production, TNT estimates the need for roughly 7500 yards of earth material (soils/sands/clay/rock) and compost/woodchips at a pre shred volume of 7500 yards annually, in order to produce a goal of 5000 yards of mill wood waste reduced annually. Of these 5000 yards we would see approximately 20% left over. (Eg. boards too big to be screened/shredded/composted/decomposed, rocks etc.) This material gets further screened and then used as ground shoring/leveling or crushed etc.

These estimates are based on the continuing trend of 10% growth of material reduction for the next few years. These are approximate numbers and could vary based on sales and demand and different products made

2020

7500 yards of granular materials soils sands rocks dirt etc., 7500 yards of green material. 5000 yards of mill waste to be excavated screened mixed and blended.

2021

8250 yards of granular materials soils sands rocks dirt etc., 8250 of green materials and 5500 of mill waste.

2022

9075 yards of granular materials soils sands rocks dirt etc., 9075 of green materials and of 6050 mill waste.

2023

9982.5 yards of granular materials soils sands rocks dirt etc., 9982.5 of green materials and 6655 of mill waste.

2024

10980.75 yards of granular materials soils sands rocks dirt etc., 10980.75 of green materials and 7320.5 of mill waste.

2025

12078.82 yards of granular materials soils sands rocks dirt etc.,.82 of green materials and 8052.55 of mill waste. and

ATTACHMENT C
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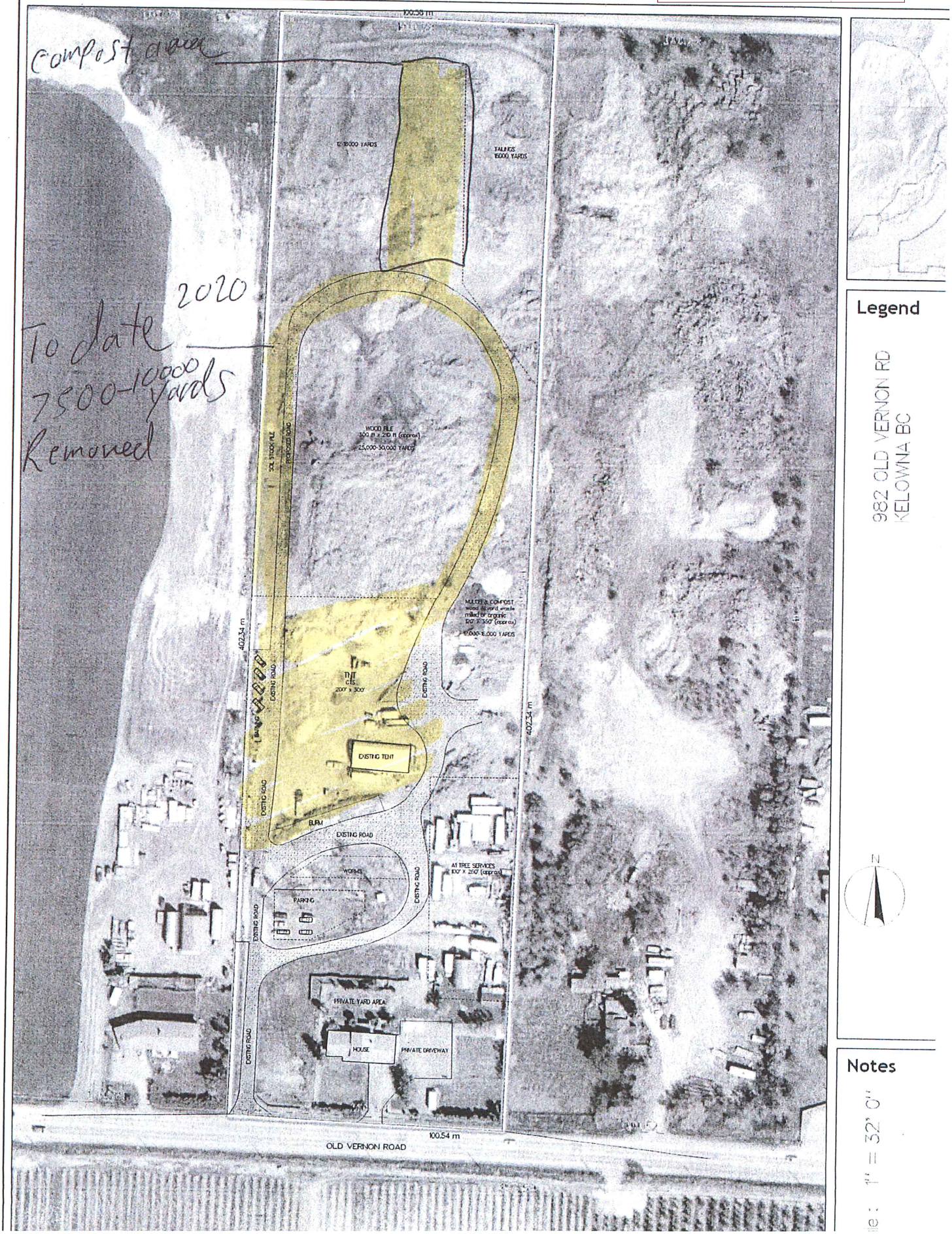
A19-0018
Planner Initials BC
City of Kelowna
DEVELOPMENT PLANNING

City of Kelowna

My Map



Legend

982 OLD VERNON RD
KELOWNA BC

N

Notes

1" = 32' 0"

City of Kelowna

2021

My Map

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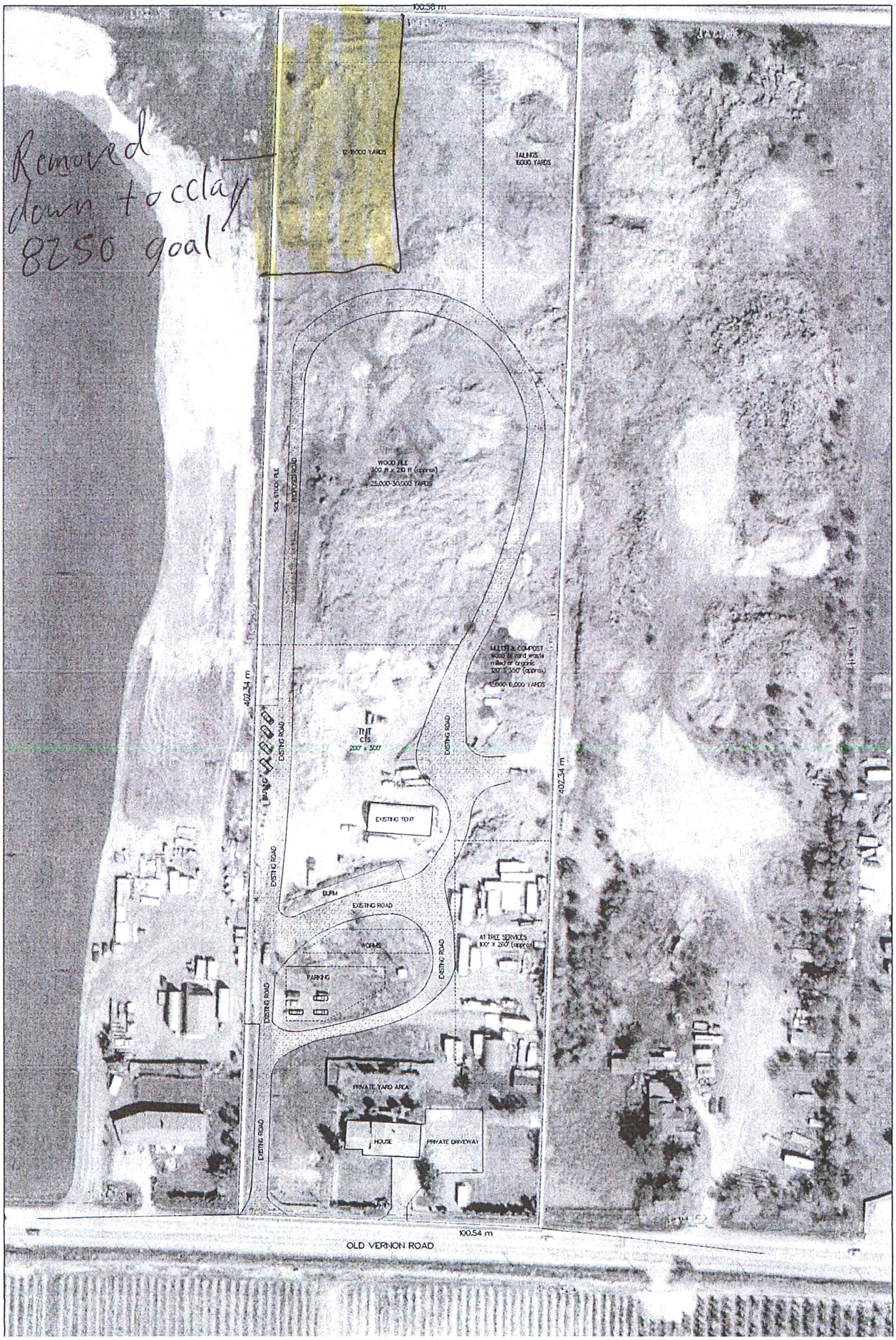

Legend

982 OLD VERNON RD
KELOWNA, BC

N

Notes

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City of Kelowna

2022 Removed to clay My Map

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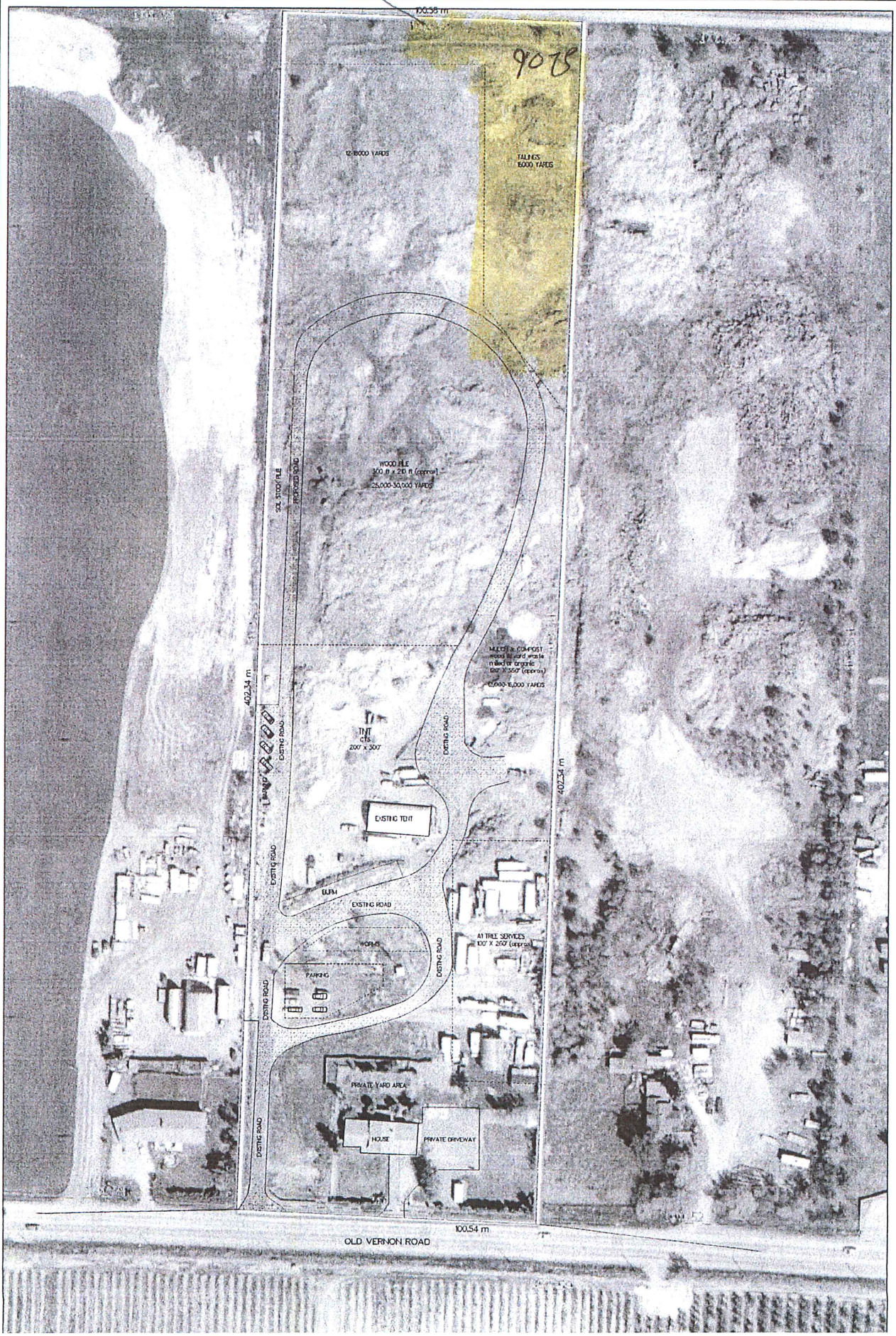

Legend

982 OLD VERNON RD
KELOWNA BC

N

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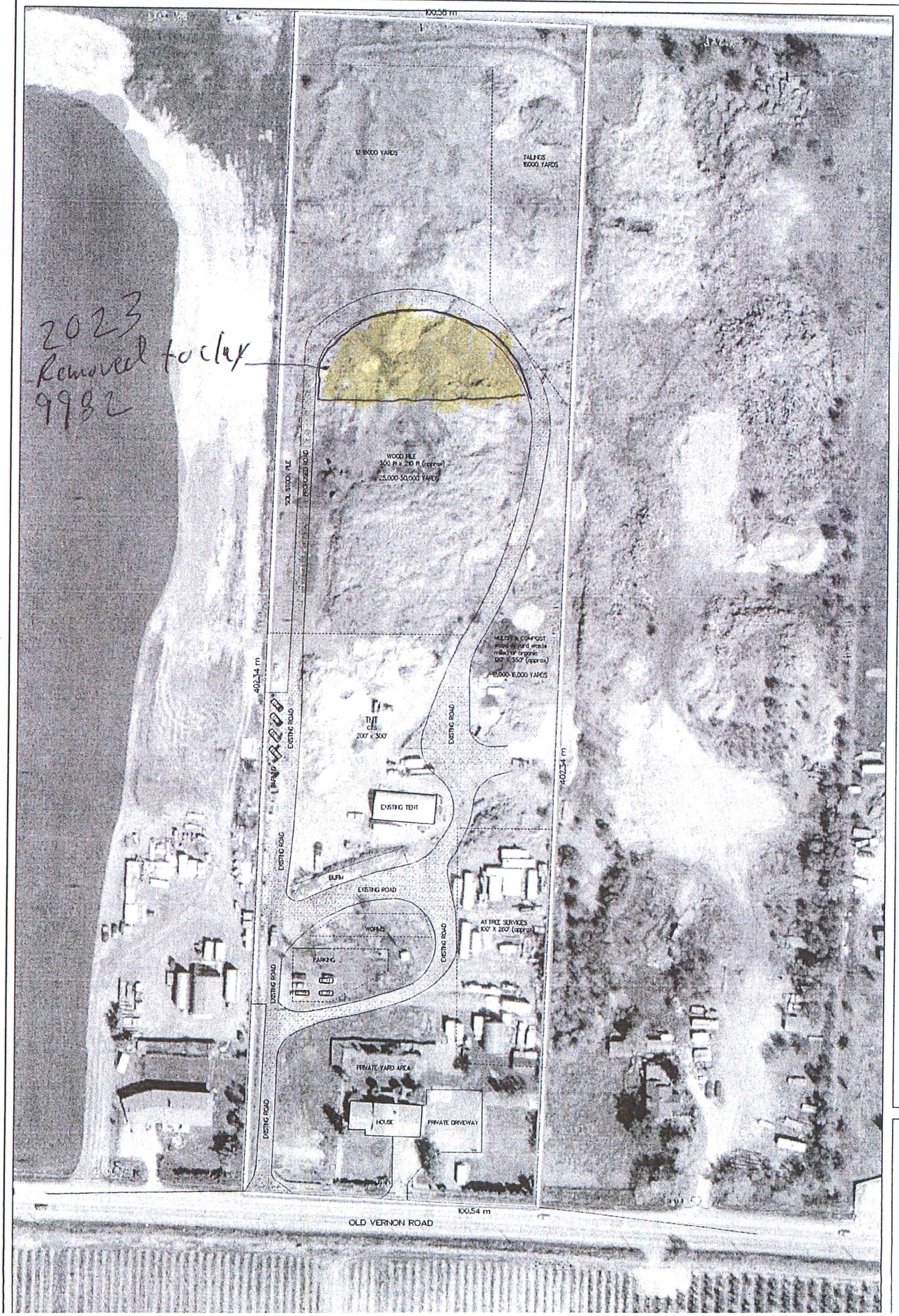
City of Kelowna DEVELOPMENT PLANNING

City of Kelowna

My Map



Legend

982 OLD VERNON RD
KELOWNA BC

Notes

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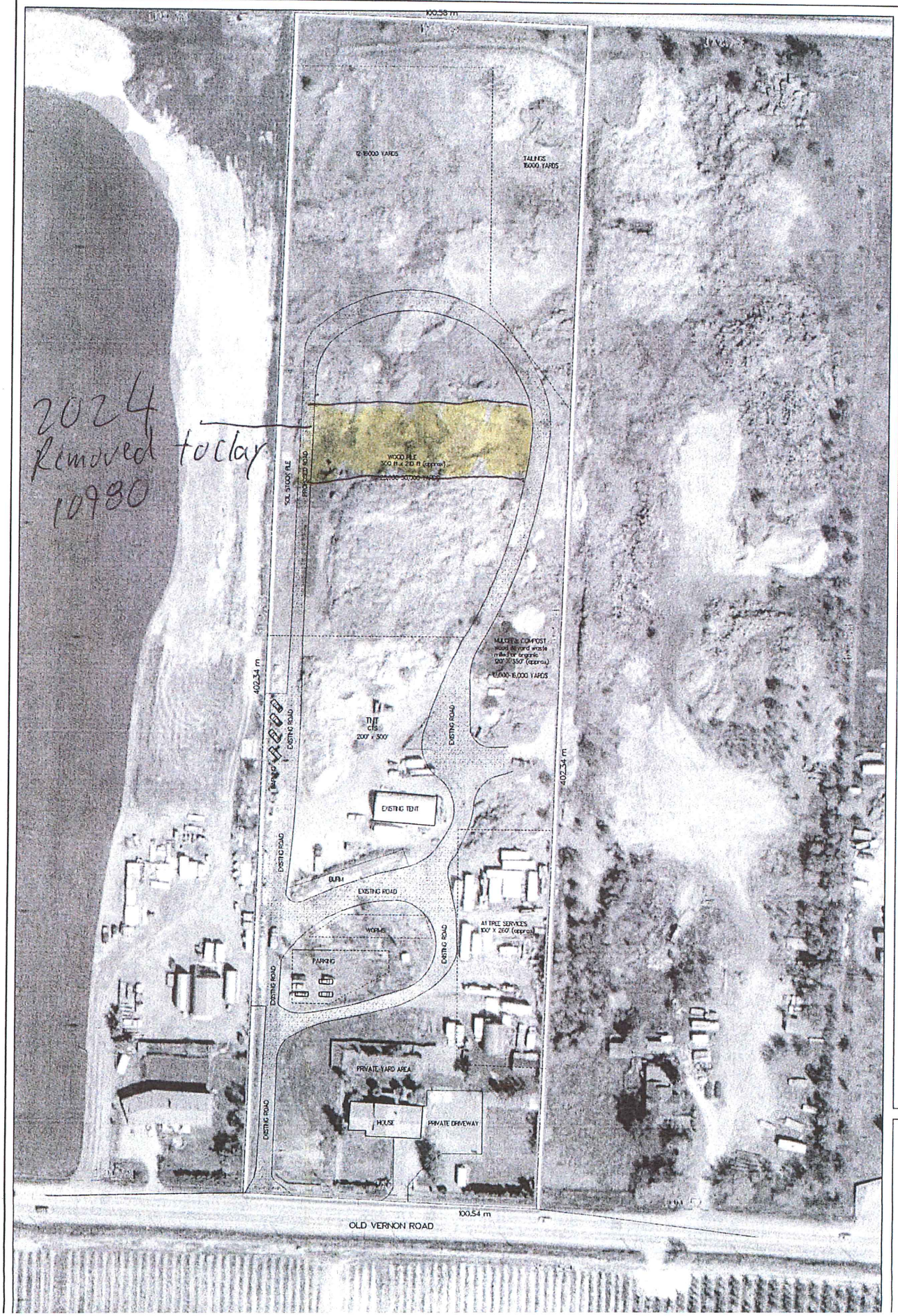
City of Kelowna
DEVELOPMENT PLANNING

City of Kelowna

My Map



Legend

982 OLD VERNON RD
KELOWNA BC

N

Notes

1" = 32' 0"

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A19-0018
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City of Kelowna
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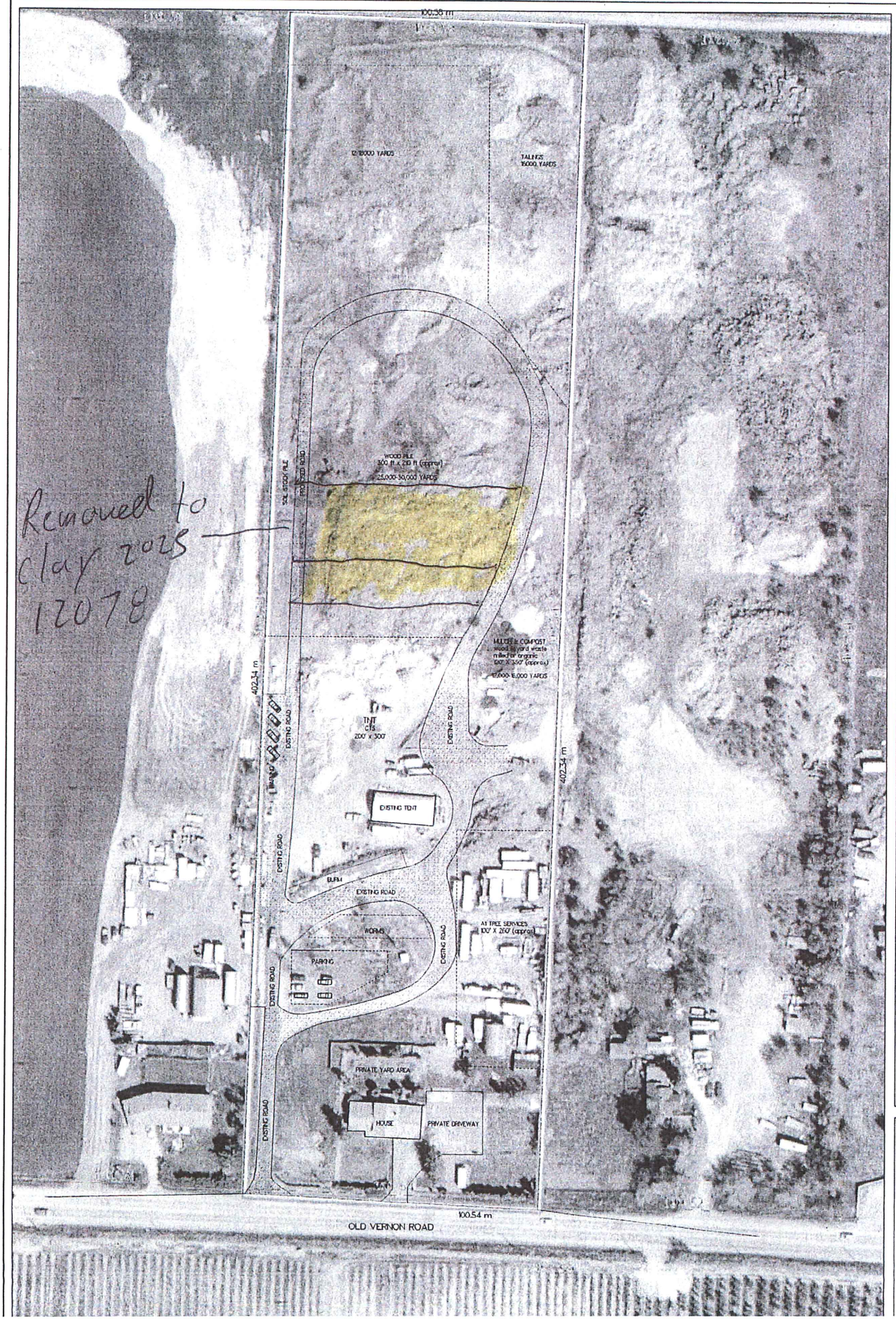
City of Kelowna

My Map



Removed to clay 2025 12078

Legend

982 OLD VERNON RD
KELOWNA BC

N

Notes

Scale: 1" = 32' 0"

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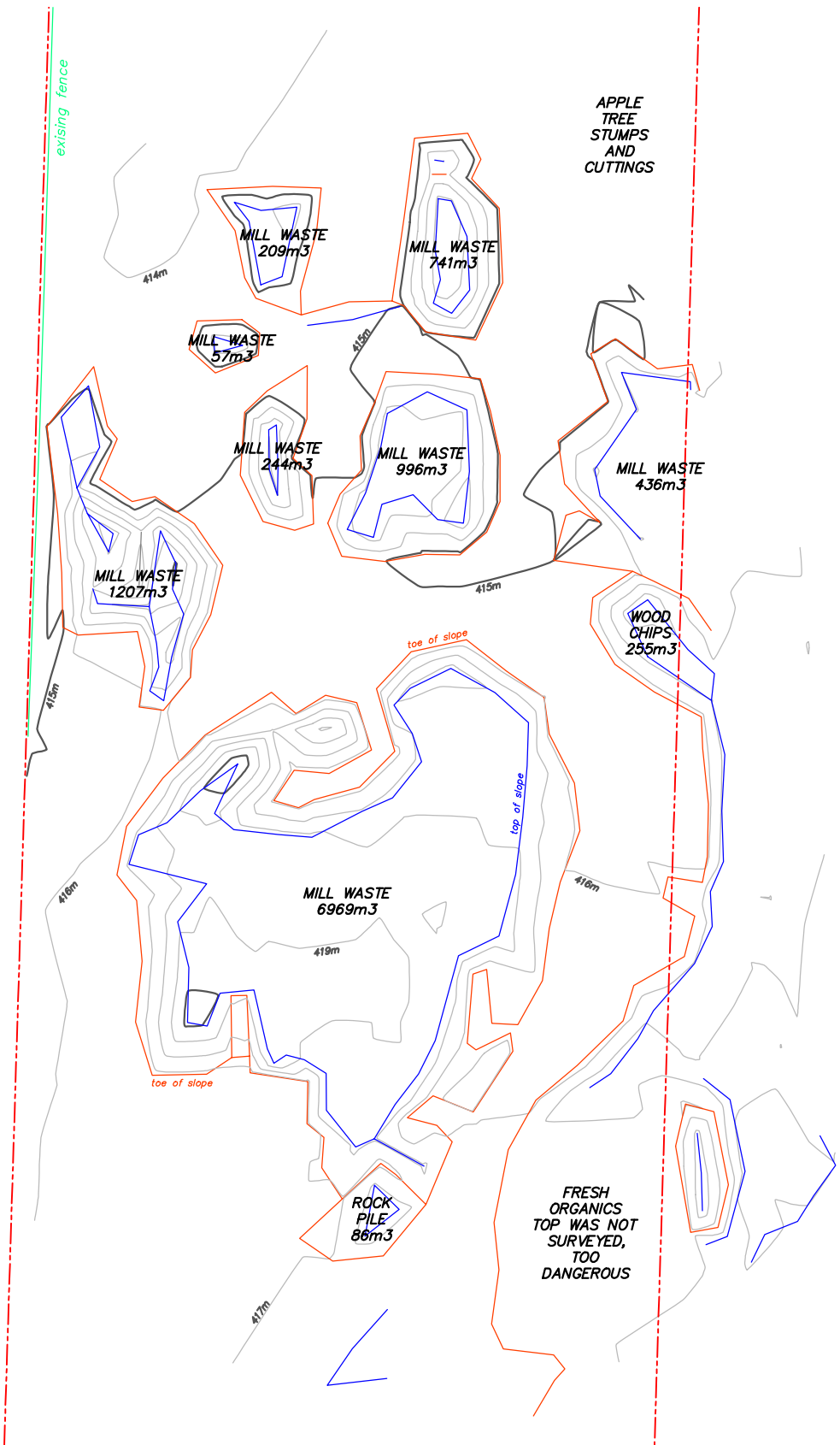
City of Kelowna
DEVELOPMENT PLANNING



LOT 4
PLAN 546

LOT 3
PLAN 546

LOT 2
PLAN 546

PID: 012-206-687

Old Vernon Road

TITLE:
TOPO PLAN OF LOT 3, SECTION 1, TOWNSHIP 23, O.D.Y.D., PLAN 546
982 Old Vernon Road, Kelowna, B.C.

DRAWN: BC SURVEYORS
1858 Klondike Court
Lake Country, BC
V4V 1P2
(250) 859-4653
bcsurveyors@gmail.com

CLIENT: TNT Services

SCALE: 1:1000 on 11"x17"
DATE: June 19, 2020
DWG: 20-142 Topo Plan
FILE No: 20-142 Rev. 1

ATTACHMENT D
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A19-0018
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City of Kelowna
DEVELOPMENT PLANNING

GROUND IS AT NATURAL CLAY

exising fence

APPLE TREE STUMPS AND CUTTINGS

MILL WASTE 209m3

MILL WASTE 741m3

MILL WASTE 57m3

MILL WASTE 244m3

MILL WASTE 996m3

MILL WASTE 436m3

MILL WASTE 1207m3

WOOD CHIPS 255m3

MILL WASTE 6969m3

ROCK PILE 86m3

FRESH ORGANICS TOP WAS NOT SURVEYED, TOO DANGEROUS

toe of slope

top of slope

414m

415m

416m

419m

417m

LOT 4
PLAN 546

LOT 3
PLAN 546

LOT 2
PLAN 546

PID: 012-206-687

TITLE:
TOPO PLAN OF LOT 3, SECTION 1, TOWNSHIP 23, O.D.Y.D., PLAN 546
982 Old Vernon Road, Kelowna, B.C.

DRAWN: BC SURVEYORS
1858 Klondike Court
Lake Country, BC
V4V 1P2
(250) 859-4653
bcsurveyors@gmail.com

CLIENT: TNT Services

SCALE: 1:750 on 11"x17"
DATE: June 19, 2020
DWG: 20-142 Topo Plan
FILE No: 20-142 Rev. 1

Land Capability Assessment
982 Old Vernon Rd., Kelowna, BC
Lot 3, Plan 546, Section 1, Township 23, ODYD
PID 012-206-687

For: Kandola
982 Old Vernon Rd.,
Kelowna, BC V1X 6T8

File: 12E043

January 9, 2013

Executive Summary

Valhalla Environmental Consulting Inc. (VEC) was retained by Manraj and Jeetender Kandola (Landowners) of 982 Old Vernon Rd., Kelowna, BC to complete a Land Capability Assessment for agriculture on a parcel in the City of Kelowna, BC. The purpose of this inspection was to assess the agricultural capability and suitability of the Subject Property. The Clients requested this inspection to explore their land use options on the Subject Property that is wholly within the Agricultural Land Reserve (ALR).

The Subject Property is 982 Old Vernon Rd., Kelowna, BC and is legally described as Lot 3, Plan 546, Section 1, Township 23, ODYD, PID 012-206-687. The site is a 4 hectare (10 acre) parcel and is entirely contained within the ALR. The site was used as a wood mill from the 1950s to the 2000s.

This assessment determined that +/-91% (3.65 ha) of the property area has an unimproved rating of Class 5 agricultural capability due to a soil moisture deficit in the summer, and excess water conditions in the spring, fall and winter. This area is improvable to Class 3 with the addition of irrigation in the warm months and water control such as ditching and/or artificial drainage for the spring, fall and winter months. A root restricting layer and low perviousness were consistent across the property and represented a soil structure limitation of Class 3. The soil structure limitation is less severe than the soil moisture limitations and may be improvable by an intensive and costly process of removal of poor quality admixed fill, decompaction of the underlying clay layer, and replacement of top soil to a depth of at least 0.75m.

The Subject Property was included in the ALR when the reserve was established (1974-1976), but apparently was permitted to continue with the industrial non-farm use (sawmill) that pre-dated the ALR. As the mill operated into the mid 2000's cumulative impacts have occurred over 35+ years since the inclusion of the Subject Property into the ALR. The Landowners report that to the best of their knowledge, the Subject Property has not been used for agricultural purposes since the 1950's. Site improvements have been done by the current Landowners to remediate some of the impacts of the historic use and rehabilitate the site. Though significant, these improvements have not been completed as they have proved to be economically non-feasible for an end-use of agricultural purposes. The recovery of the rehabilitation and improvement expenses by an agricultural production operation would be unlikely and may prove to be economically prohibitive.

While the landowners are exploring several options for future land uses of the Subject Property, they have not decided upon a specific activity at this time. However, due to the significant amount of site rehabilitation yet required, it may be difficult for them to recover their total investment costs.

The Subject Property does not contribute to regional and local Agricultural Capacity. The Subject Property has not been farmed since the 1950's, during which time it

appears that the agricultural capability has continued to deteriorate. Continued industrial use on the Subject Property will not adversely affect the local Agricultural Capacity.

APPENDICES

1 Introduction

1.1 Report Description

Valhalla Environmental Consulting Inc. (VEC) was retained by Manraj and Jeetender Kandola, land owners of 982 Old Vernon Rd. Kelowna, BC, to complete a Land Capability Assessment for agriculture on a parcel in the City of Kelowna, BC. The purpose of this inspection was to assess the agricultural capability and suitability of the Subject Property. The Client requested this inspection to explore their land use options on the Subject Property that is wholly within the Agricultural Land Reserve (ALR).

1.2 Proposed Land Use & Agricultural Development Plan

The purpose of the assessment is to classify the land capability for agriculture of the site to explore land use options for the Subject Property. The proposed future land use is industrial.

1.3 Statement of Qualifications

Matthew Davidson, P.Ag., Senior Environmental Scientist, Assessor
Matthew is an Environmental Scientist and consulting Professional Agrologist with 11 years experience in environmental assessments, impact assessments, soil surveys, land remediation, reclamation and ecological restoration. Matthew has been a registered professional agrologist (PAg) in British Columbia since 2008.

Catherine Orban, P.Ag., Senior Agrologist, Report Review
Catherine Orban has a Master of Science Degree in Geography, specializing in Soil Science. She has been conducting soils assessments since 1985. She has been a registered professional agrologist (PAg) since 1999, first in Alberta, and later in British Columbia. Catherine has worked on a variety of soils assessment, management, remediation and reclamation projects in the agricultural, oil and gas, and environmental sectors in both provinces.

2 Site Conditions & Land Use

2.1 Site Conditions

The Subject Property is 982 Old Vernon Rd., Kelowna, BC and is legally described as Lot 3, Plan 546, Section 1, Township 23, ODYD, PID 012-206-687. The site is a 4 hectare (10 acre) parcel and is entirely contained within the ALR. The site is approximately level and was used as a wood mill from the 1950s to the 2000s. See Appendix A Figures 1 & 2 for more detail on site size and location.

2.2 Land Use: Subject Property and Surrounding Area

Approximately 0.36 ha of the property is built upon and used for the residential purposes at this location. Buildings on the Subject Property include one house and storage shed. Outside of the buildings is residential yard and parking area. The remaining area 3.64 ha has been used historically as the mill site. Wood waste, equipment parking and gravel roads encompass this area. Past agricultural uses were unknown to the landowner as the site has operated as a mill from the 1950's to 2005.

The zoning for the subject property is Agriculture 1 (A1) which permits 4 ha lots, except when in the ALR where 2 ha lots are permitted. A1 zoning also allows one detached home, one mobile home and one accessory building home per lot.

Adjacent properties to the south, east and west have Agriculture 1 (A1) zoning. Southeast of the property is a subdivision (outside of the ALR) that has been constructed with a combination of Rural Residential 3 (RR3) (this zoning permits 1 ha lots un-serviced and fully serviced lots at 0.16ha) and Two Dwelling Housing (RU6) (allowing lot sizes down to 0.04 ha). West southwest of the property is a property with Parks and Open Spaces (P3) zoning which remains in the ALR and is used as a golf driving range. The properties adjacent to north are cultivated fields and are in the RDCO.

Table 1: 982 Old Vernon Rd., Kelowna, BC – Surrounding Land Use

Location	Land Use	ALR Status	Approximate Lot Size ha
Subject Site	old mill / residential	In	4
North	residential / hay field	In	8
Northwest	golf course	Out	43
West	hayfield / commercial lot	In	4
South	hayfield / residential / RV parking	In	8
Southeast	subdivision	out	18
East	old mill / residential / commercial	In	4

2.2.1 Historic Land Use

The Subject Property was included in the ALR when the reserve was established (1974-1976), but apparently was permitted to continue with the industrial non-farm use (sawmill) that pre-dated the ALR. As the mill operated into the mid 2000's cumulative impacts occurred over 35+ years from the inclusion of the Subject Property into the ALR. The Landowners report that to the best of their knowledge, the Subject Property has not been used for agricultural purposes since the 1950's. To date, a number of site improvements have been completed to remediate some of the impacts of the historic industrial use and rehabilitate the site. Though significant, these improvements and rehabilitation have not been completed as they have proved to be economically non-feasible for an end-use of agricultural purposes. A summary of the remediation work to date and estimated costs of remaining agricultural rehabilitation can be viewed in below, sections 2.2.2 and 2.2.3.

2.2.2 Improvements to Date

The current Landowners obtained the Subject Property in 2005. Since 2005 the Landowners have undertaken the following improvements to remediate some of the impacts from historic land uses. The information for improvements to date has been provided by the Landowner, Manraj Kandola through personal communication (pers.comm. – MK). All costs are approximate.

2005

- Land purchased by current owners 4.01 ha (10 acres) at 982 Old Vernon Rd metric is generally used for volume and area calculations – eg.0.75 m topsoil
- Upon purchase Landowners shut the sawmill down, as it was outdated and hazardous.
- ~122,330 m^3 (160,000 $yards^3$) of wood waste was stockpiled on the Subject Property at this time

2006

- Controlled curtain burner set up for 3 months to eliminate wood waste
- Approximately $100,000 was spent to reduce total wood waste volume

2007

- Numerous fires caused by spontaneous combustion of the wood waste
- City of Kelowna, Fire Department attended the site numerous times
- Largest fire attended by City of Kelowna fire department required them on site for 3 days to containing the fires, which cost the City of Kelowna approximately $80,000.
- Private water tankers and excavators were employed full time by the Landowners to control the fires
- Landowners purchased fire equipment for the site at a cost of $50,000

2008-2011

- Contractor hired to screen and truck the wood waste to a cogeneration plant in Armstrong, BC (Tolko)

- $25,000 in additional costs incurred
- Wood waste screening (~75% of volume remaining) was done to mitigate fire risks and facilitate further site rehabilitation
- An oversized pile of wood waste remains which requires grinding
- As of 2012, approximately 100,000 m^3 (130,000 yd^3) of the original 122,330m^3 (160,000 yd3) of wood waste have been processed and/or removed from Subject Property. Currently, approximately 23,000m^3 (30,000 yd^3) of wood waste remains on the Subject Property.

Approximate costs incurred to date for rehabilitation by property owners: $175,000; and
Cost to City of Kelowna for Fire Protection: $80,000

2.2.3 Future Improvements

To be suitable for intensive soil bound agriculture, the Subject Property requires additional rehabilitation and improvements including:

- Wood waste grinding of oversized materials, approximate costs provided by a grind9ng contractor $150,000 (pers.comm. – MK)
- Import and spread clean topsoil to a depth of 0.75m for 3.65 hectares (27,375m^3 or 35,805 yd^3)

Soil Cost Estimate

- 27,375m^3 needed at \$26/m^3 = $711,698
- Soil costs were determined by an average of quoted prices from 4 suppliers in the Kelowna area for large volume sales.

Trucking Cost Estimate

- Assume trucking cost of \$ 119.5/hr
- Assume 18m^3 (24yd^3) truck & pup = 1520 truck loads for
- Assume 1hr trip per load = 1520 hrs
- Trucking cost of 1520 x 117.66/hr = $ 178,941

  Trucking costs were determined by an average of quoted prices from 4 service providers in the Kelowna area.

  *Costs for spreading and grading were not included in this estimate

The estimated remaining cost for remediation of this site for agricultural purposes is approximately $1,040,639

2.2.4 Brownfield Concerns

Due to the historic uses of the subject lot and current uses on neighbouring lots, there is potential for contamination of soils and, or groundwater on the Subject Property. Site investigations with respect to contamination and land remediation are outside the scope of this assessment, but may be required prior to returning this property to agricultural or alternative uses. The cost of such investigations and land remediation has not been included in this assessment but should not be overlooked in consideration of future uses on the Subject Property. Such assessments are costly

as are any soil or groundwater remediation projects. Site investigation costs may be required and would therefore add to the cost of total remediation before the site may be used for future purposes (for example: industrial, residential, agricultural).

3 Soils Information

Soil conditions are a key factor in determining the overall agricultural capability and suitability of any given site. The soil conditions on the Subject Property are described in this section including; published government survey information and a description of the existing soil conditions, based on the lab data and observations made during the on-site inspection, conducted on October 24, 2012.

3.1 Government of British Columbia – Soil survey

Baseline soils information was obtained from the BC Ministry of Environment (MOE) Soils of the Okanagan and Similkameen Valleys, which comprises Report No. 52 of the BC Soil Survey (1986); and the accompanying mapping at 1:20,000 scale. The Subject Property is found on Mapsheet 82E.094 (Appendix A, Figure 5), which indicates that three soil complexes are found on the parcel. The general characteristics of these soils are summarized in Table 2, below:

Table 2: 982 Old Vernon Rd. Kelowna BC – Surrounding Land Use

Site Map Polygon	80% Westbank (WK) / 20% Summerland (SR)	100% Westbank (WK)	100% Glenmore (GL)
Location	The northwestern corner	Northeast / Central portion	Southern Portion of the property
Landform	Nearly level to strongly sloping stratified glaciolacustrine sediments / Nearly level to moderately sloping stratified glaciolacustrine sediments	Nearly level to strongly sloping stratified glaciolacustrine sediments	Nearly level to moderately sloping stratified glaciolacustrine sediments
Description	100 or more cm of clay, clay loam or silty clay / 100 cm or more of silt loam, silty clay loam or clay loam	100 or more cm of clay, clay loam or silty clay	100 cm or more of silt loam, silty clay loam or clay loam
Soil Profile Drainage	Moderately well / Well to Moderately Well	Moderately well	Well to moderately well
Stone Content	non-stoney	non-stoney	non-stoney
Agricultural Suitability	(WK) Tree fruits, Vineyards, Hay production, Pasture / (SK) Poorly suited for arable agriculture	(WK) Tree fruits, Vineyards, Hay production, Pasture	(GL) Pasture, Hay, Tree Fruits
Soils	Othic Grey Luvisol / Eluviated Dark Brown	Othic Grey Luvisol	Eluviated Dark Brown

Source: MoE, Technical Report 52, Soils of the Okanagan and Similkameen Valleys, which comprises Report No. 52 of the BC Soil Survey (1986)

3.2 Soils on Site Inspection – Methods

Three soil test pits (TP1 to TP3) were excavated to depths of 130 cm by a small tracked excavator on October 24, 2012. All test pits were located on sites that represented variations in topography, vegetation, land use and, or mapped soil characteristics. The soil test pits and site features were mapped and photographed (Appendix A, Figures 7 & 8; and Appendix B). The soil profiles were examined and described according to conventions from the Canadian System of Soil Classification, Third Edition (Soil Classification Working Group, 1998). It was not within the scope of this assessment to examine the soils for the purposes of classification at the Series level. A total of 8 representative soil samples were taken from all of the test pits and submitted for laboratory analysis of one or more of the following parameters: various soil nutrients, pH, electrical conductivity, available water storage capacity, and soil particle sizes/textures. (Appendix D).

Four soil units were identified on the Subject Property (as indicated by Roman numerals I - IV) through the detailed soils assessment at a mapping scale intensity of +/- 1:3,000 (Appendix A, Figure 9; and Table 3, below). Information obtained

during the site inspection was combined with the lab results to provide site-specific details that were used to fine-tune the soils data presented in Soil Report No. 52 (1986), which was based on mapping at 1:20,000. The soil units were primarily defined by soil physical and morphological properties. The profiles at each test pit within each unit shared a number of similarities including horizon properties, depths and sequences. Detailed test pit logs and photographs have been included with this report (Appendix B, Photos 3-9). The soil units as mapped for the Subject Properties at a scale of +/-1:3,000 are described in Table 3, below

TABLE 3: 982 Old Vernon Rd., Kelowna, BC - Site Inspection : Soil Unit Summary

Soil Unit	Test Pits	Top Soil Depth (cm) / Colour	Soil Profile Texture [1]	Stone Content [2]	Soil Profile Drainage	Topography	Land Use	Area (ha)	%Total Area	Notes
I	1	54 / Br	Sandy Loam / Clay / Heavy Clay	10% / 0% / 0%	Poorly Drained	Nearly Level Slope 1%	Former Mill Yard	0.59	15%	Mixed soil in top layer with wood waste
II	2	15 / DkBr	Clay / Clay / Heavy Clay	10% Gravel 0% Gravel 0% Gravel	Poorly Drained	Nearly Level Slope 1%	Former Mill Yard	2.02	50%	Mixed soil in top layer with wood waste, rooting depth 30cm
III	3	35 / Br	Loam / Heavy Clay / Heavy Clay	non-stoney	Poorly Drained	Nearly Level Slope 2%	Former Mill Yard	1.04	26%	Mixed soil in top layer with wood waste, rooting depth 30cm
VI	NA	NA	NA	NA	NA	Gentle slope 5%	House, shed, yard	0.36	9%	Residential portion of the lot

[1] based by laboritory testing

[2] visual observation

3.3 Comparison to BC Government Soil Survey & Mapping

With the exception of the extensively disturbed upper, admixed fill-soil horizon, the distribution of soil types as identified in the site inspection was generally consistent with the information presented in Soil Survey Report No. 52. In general, the minor differences in soil mapping have been attributed to the different scale intensities as they applied to the site. The BC Soil Survey is based on generalized mapping at a scale of 1:20,000, which is too broad to capture all the subtle variations in site conditions that were identified during the site inspection which was conducted at a detailed mapping scale intensity of +/- 1:3,000.

4 Climatic Capability for Agriculture

Climatic capability for agriculture is based on the limitations associated with the combined influence of the climate and soil moisture regimes as well as the thermal limitations for any given location. Climatic capability is a modifying component used in determining the overall agricultural capability and suitability of a given site. The climatic capability for agriculture of the Subject Property is described in this section; beginning with published government information, followed by that obtained during the on-site inspection.

4.1 Government of British Columbia – Climatic Capability

General reference information as well as baseline climatic data for the Kelowna area was found in Climatic Capability for Agriculture (BC Ministry of Environment, 1981), and Land Capability Classification for Agriculture in British Columbia, Manual 1 (BC Ministry of Agriculture and Food and Ministry of Environment, 1983).

It is important to note that the climatic capability ratings are based entirely on climatic conditions (primarily precipitation and temperature) at a given site. Soil characteristics and other site conditions are not considered in these ratings. The overall agricultural capability of the Subject Property is addressed in Section 5 of this report.

The MOE Technical Paper 4; Climate Capability Classification for Agriculture in British Columbia and accompanying mapping 82E/NW indicates the area of the Subject Property sits on a boundary between Class 5 (west portion) or 6 (east portion) improvable to Class 1bF / 1cG respectively, which indicates an estimated annual climatic moisture deficit (CMD) of 350 mm (BC MOE, 1981, Table 1). Class 5 land has restricted use for perennial forage and specially adapted crops. Class 6 land is considered non-arable but capable of producing native or uncultivated perennial forage crops. Soil moisture deficiency (A) is indicated as a primary limitation. Areas in Class 1aF have occurrences of minimum temperature near freezing that adversely affect plant growth during the growing season. Areas in Class 1cG have insufficient heat units during the growing season. See Appendix A Figure 7 for more detail.

4.2 Site Inspection

Site-specific climatic capability for agriculture was determined using data from TP1-TP3 which are located in, and representative of, different soil units throughout the Subject Property. Lab data obtained for the soil samples was used in conjunction with published regional data to calculate the available water storage capacity (AWSC) and soil moisture deficit (SMD) values for the upper 50 cm of the soil profiles. The results were used to determine site-specific climatic and soil capability ratings for agriculture on the Subject Property which have been summarized in Table 4, below. A description of agricultural/climatic capability classifications is found in Appendix C.

TABLE 4: 982 Old Vernon Rd., Kelowna BC - Soil Moisture Balance & Climatic Capability Ratings

	Soil Moisture Balance								Climate Capabiltiy Rating			
Site & Soil Horizon	Total Depth	Matrix Texture	Matrix AWSC[1]	Matrix Fraction	CF Adjsuted AWSC	Interval AWSC	Climate H_2O Deficit[2]	Soil H_2O Balance[3]	Unimproved H_2O Subclass[4]	Improved H_2O Subclass[4]	Thermal Rating[2]	Improved Overall Subclass
	cm	lab	mm/cm	lab	mm/cm	mm	mm	mm				
TP1/SU-I												
Fill*	50	SL	0.75	0.89	0.67	33.53						
Interval	**50**					**33.53**	**350**	**-316.48**	**5A**	**3A**	**1aF**	**3A**
TP2/SU-II												
Fill	15	C	2.22	0.89	1.98	29.77						
B	20	C	1.33	1.00	1.33	26.57						
C**	15	HC	1.37	1.00	1.37	20.53						
Interval	**50**					**76.87**	**350**	**-273.13**	**5A**	**1**	**1aF**	**1**
TP3/SU-III												
Fill	35	L	1.99	0.79	1.58	55.16						
B	15	HC	1.48	1.00	1.48	22.13						
Interval	**50**					**77.30**	**350**	**-272.70**	**5A**	**1**	**1aF**	**1**

* Used Ap data for TP2 as top horizon was similar in texture and coarse fragment content

** Used Ap data for TP1 as top horizon was similar in texture and coarse fragment content

[1] From Lab Data

[2] Technical Paper 4, 1981, MoE Climatic Capability Classification for Agriculture in British Columbia

[3] (Interval AWSC) - (Climate H_2O Deficit) = Deficit (negitive) or Surplus (positive)

[4] Based on - MoE Manual 1 (BC Ministry of Environment, 1983)

4.3 Comparison of BC Government and On-Site Inspection Ratings

In general the site inspection finding showed that the climatic capability for this location corresponds with the provincial climatic capability mapping. Approximately 76% of the Subject Property was rated at Class 5 improvable to Class 1. Approximately 15% of the Subject Property was rated at Class 5 improvable to Class 3. The remaining 9% of the Subject Property was not assessed as it was deemed unavailable for agricultural use. The differences between the site inspection findings and provincial mapping are in part due to the different scale intensities as they applied to the Subject Property. The MOE ratings were based on mapping at a scales of 1:100,000, which are not intended to account for the all the subtle variations in site-specific conditions (eg. soil texture, coarse fragment content, topography, slope angle and aspect) that were identified during the on-site inspection, at a detailed mapping scale intensity of +/- 1:3,000.

Please see Section 5.3 for a comparison between the overall agricultural capability mapping by MOE (including climatic capability) and the capability as determined by this assessment.

5 Agricultural Capability

Agricultural capability ratings are site-specific and based primarily on the influence of soils and climate, as modified by topography for any given location. The Canada Land Inventory (CLI) rating system uses a variety of measurable parameters (some of which are listed below) to provide objective classifications of agricultural capability:

- Slope angle and complexity;
- Depth to bedrock;
- Soil moisture deficits;
- Excess soil moisture;
- Coarse fragment content (stoniness);
- Soil texture;
- Depth to groundwater;
- Soil fertility; and
- Soil salinity

This interpretive system groups soils into seven classes according to potentials and limitations for agriculture (See Appendix C for capability class and limitation descriptions). Lands in Classes 1 to 4 inclusive are considered capable of sustained production of common cultivated field crops. Class 5 lands are capable of use only for producing perennial forage crops or specially adapted crops. Class 6 lands are capable of only providing sustained natural grazing for domestic livestock. Class 7 lands are incapable of use for either arable culture or grazing. (BC Ministry of Agriculture and Food, and Ministry of Environment, April 1983).

In most cases, both “unimproved” and “improved” agricultural capability ratings are determined for the area that is under consideration. The unimproved rating reflects the capability of the property in its natural or current state. The improved rating is theoretical and represents the anticipated agricultural capability of the property after improvements (eg. irrigation, enhanced drainage, soil amendments, fill placement, stone-picking, and/or subsoil decompaction) are made to mitigate the limitations. Some limitations, such as shallow bedrock, slope complexity and slope angle, are not considered to be improvable under “typical farming practices”.

5.1 Government of British Columbia – Agricultural Capability

General reference information for agricultural capability was provided by Land Capability Classification for Agriculture in British Columbia, Manual 1 (BC Ministry of Agriculture and Food and Ministry of Environment, 1983; Appendix C). Site-specific agricultural capability mapping for the Subject Property was found on Mapsheet 82E.094 @1:20,000 (BC Ministry of Environment, 1987). (Appendix A, Figure 6).

The MOE agricultural capability polygons corresponded directly to the soil polygons mapped in Soil Survey Report No. 52, and are summarized in Table 5, below:

TABLE 5: 982 Old Vernon Rd., Kelowna BC- MOE Agricultural Capability Mapping @ 20,000

Location	Agricultural Capabilty Rating	
	Unimproved	Improved
Northwestern Area	8:8AD 2:6WN	8:3D 2:4WD
Northeastern and Central Area	4AD	3D
Southern Area	3AD	7:3D 3*3D

A - Soil Moisture Deficit

D - Soil Structure

N - Salinity

W - Excess Water

Soils on Site Inspection

The overall agricultural capability ratings for the Subject Property were mapped and then compared to the soil unit polygons as defined by the site inspection (Section 3.2, above). In this case, the boundaries for the agricultural capability (AC) Units as determined by the field investigation (indicated by numbers 1-3) do not entirely correspond to those mapped for the soil units (Appendix A, Figures 9 and 10). AC unit 1 corresponds with SU 1. AC unit 2 is comprised of SU 2 and 3. Information obtained from the field inspection was combined with published soils, topography and climate data (as described in Sections 3.0 and 4.0) then applied to the criteria presented in MOE Manual 1 to determine the site-specific agricultural capability ratings at a mapping scale intensity of +/-1:3,000. The agricultural capability ratings for the Subject Property, based on the site inspection are summarized in Table 6, below:

TABLE 6: 982 Old Vernon Rd., Kelowna BC- Site Inspection: Agricultural Capability Ratings

Soil Unit	Ag Capability Unit	TP	Unimproved Ag Capabitly[2]	Improved Overall Ag Capability[2]	Area (ha)	% Total Area[3]
I	1	1	5AW	3WAD	0.59	15%
II	2	2	5AW	3WD	2.02	50%
III		3	5AW	3WD	1.04	26%
IV	3	NA	NA	NA	0.36	9%
Total					4.01	100%

[1] Ratings based on lab results & field investigation. See Table 7 for class descriptions

[2] See appendix C for Capability descriptions

[3] Estimates based on lab results, field investigatons and aerial photography

Excess water during the wet months, and soil moisture deficits in the growing season were identified as the most extensive and severe limitations to agricultural capability on the Subject Property. Undesirable soil structure was considered to be an extensive, but less severe limitation.

AC Unit 1 (including Soil Unit I) accounts for +/- 15% (0.59 ha) of land on the Subject Property. This area was rated at Class 5 (unimproved) due to a soil

moisture deficit in the summer, and excess water conditions in the spring, fall and winter. This area is improvable to Class 3 with the addition of irrigation in the warm months and water control such as ditching and/or artificial drainage for the spring, fall and winter months. Irrigation is expected to raise the soil moisture deficit ("A") limitations to Class 1 throughout this agricultural capability unit. A root restricting layer and low perviousness were consistent across the property and represent a soil structure limitation of Class 3 that may be improvable by removal of poor quality admixed fill, decompaction of the underlying clay layer and replacement of top soil to a depth of at least 0.75m.

AC Unit 2 (including Soil Units II & III) accounts for +/-76% (3.06 ha) of land on the property. This area was rated at Class 5 (unimproved) due to a soil moisture deficit in the summer, and excess water conditions in the spring, fall and winter. This area is improvable to Class 3 with the addition of irrigation in the warm months and water control such as ditching and/or artificial drainage for the spring, fall and winter months. Because of the coarse texture of the soils in this agricultural capability unit, irrigation is only expected to raise the "A" limitation to Class 3

The remaining +/-9% (0.36 ha) of the Site, which has been mapped as AC Unit 3, occupies land in the southern area. This area has been rated at Class "AN" for anthropogenic alterations and is not considered to be available for agriculture due to the existence of a home, yard, driveway and outbuildings.

5.2 Comparison of BC Government and On-Site Inspection Ratings

The unimproved and improved agricultural capability ratings applied to the Subject Properties based on the on-site inspection were somewhat consistent with the ratings ascribed by the MOE mapping, as summarized below (See also Tables 5 and 6; and Appendix A, Figure 9).

The on-site agricultural capability ratings revealed a greater extent of excess water limitation ("W") on the property although it was not as severe as depicted by the MOE mapping. As well, the published mapping showed that all areas of the Subject Property had an unimproved rating of 3A to 4A. By contrast, the on-site assessment identified persistent soil moisture deficiencies with an unimproved rating of 5A across the property. The improved ratings increased to Class 1 (northwest corner) to 3A (south and central area) with irrigation.

In summary, the on-site inspection agricultural capability ratings were somewhat consistent with both MOE climatic and overall agricultural capability ratings. There was a greater variability in the unimproved ratings mapped by the MoE, while the on-site inspection results were more homogeneous ascribing the same unimproved and improved ratings to 76% of the Subject Property. The homogeneity noted is likely due to the significant modification that has occurred to the surface soils across the site.

5.3 Feasibility of Improvements

All improvements provided are theoretical in nature and based on best management practices as outlined the MOE Manual 1. These improvements are based on an assumption of land that is generally free of waste and contaminants. This assumed condition is not represented on the Subject Property.

The Subject Property has undergone historic improvements (see section 2.2.2). However, significant remaining rehabilitation is needed for the property to be suitable for agriculture (see section 2.2.3). The cost of the remaining improvements and rehabilitation that are necessary to prepare this property for agricultural use are not likely to be feasible. Furthermore, the required improvements (ie. Removal of wood waste material and replacement of the topsoil layer across 91% of the Subject Property) greatly exceed what would be considered "typical farm improvement practices", both in terms of the scope and costs for this work. The recovery of the improvement expenses by an agricultural production operation would be unlikely and is expected to be economically prohibitive.

The proposed future improvements based on MoE Manual 1 BMPs include supplemental moisture (irrigation) during the dry months and water control/drainage enhancements for excess moisture (ditching and/or artificial drainage). The results of this assessment suggest that these improvements would be feasible for AC Unit 1 and 2 which accounts for +/-91% (3.65 ha) of the Subject Property. The agricultural capability rating on AC 1 which accounts for +/-15% (0.59 ha) of the Subject Property is expected to improve from Class 5AW to Class 3WAD. The agricultural capability rating on AC 2 which accounts for +/-76% (3.06 ha) of the Subject Property is expected to improve from Class 5AW to Class 3WD. Improvements are not considered to be feasible for the remaining +/-6% (0.6 ha) of the Subject Property. This area is in AC Unit 3 which is unavailable due to existing residential structure and out buildings.

6 Agricultural Suitability

Agricultural suitability is related to agricultural capability, but involves the interpretation of a wider variety of factors as they relate to the potential for specific uses on a given property. While agricultural capability is based on physical features and measurable parameters, agricultural suitability assessments include a range of site conditions and external influences. The following factors were considered in assessing the agricultural suitability of the Subject Property:

- Feasibility of improvements;
- Availability of additional good quality topsoil;
- Overall size of the Subject Property;
- Location and context of the Subject Property (proximity to urban/suburban/rural land use and zoning);
- Land use on subject property – historical, current and future plans;
- Land use in surrounding area – historical, current and future plans;
- Diversifications, innovations and improvements to date;
- MoE agricultural capability ratings (at 1:20,000 mapping scale); and
- Agricultural capability ratings as determined by this assessment (at +/- 1:3,000 mapping scale).

The suitability of the Subject Property for various agricultural purposes has been evaluated In terms of the factors listed above and has been summarized in Table 7, below:

TABLE 7: 982 Old Vernon Rd., Kelowna BC – Site Inspection: Agricultural Suitability

AC Unit	Area (ha)	% Total Area	Ag Capability Unimproved (Improved)	Suitability for Agriculture Activities
Soil Bound Agriculture				
1&2	3.65	91%	Class 5 (Class 3)	These Agricultural Capability Units represent all of the property outside of the home site. The topsoil layer on this portion of the property has been completely admixed by the mill practices and would require significant remediation to be used for soil bound agriculture (section 2.2.3 for more detail). If rehabilitation was feasible, this area would potentially be suitable for perennial forage and select crops. The nearby Kelowna Airport, Environment Canada weather station data indicates that this area of Kelowna is a frost pocket which has on average 34 more days per year with minimum temperatures below 0C, when compared with East Kelowna and Kelowna weather stations. The risk of crop damage or failure may be increased due to the excess water and fewer frost free days. However, it would not be feasible to rehabilitate this area for soil bound agriculture due to the prohibitive costs of such improvements.
3	0.36	9%	NA	NA
Intensive Soil Bound Livestock - Operations which depend, in whole, or in part, on growing their own feed for livestock production				
(eg. Beef cattle (cow, calf or feeder), dairy cows, sheep, goats, and other livestock at a commercial scale)				
1&2	3.65	91%	Class 5 (Class 3)	These Agricultural Capability Units represent all of the property outside of the home site. The topsoil layer on this portion of the property has been completely admixed by the mill practices and would require significant remediation to be used for the production of livestock feed. If rehabilitation was feasible, this area would potentially be suitable for perennial forage. However, it would not be feasible to rehabilitate this area for livestock feed/production due to the prohibitive costs of such improvements.
3	0.36	9%	NA	NA
Intensive Non-Soil Bound Livestock - Uses which do not rely on growing crops in soil to support the enterprise				
(eg. Beef feedlots, hog production and poultry ie. Eggs and meat birds)				
1&2	3.65	91%	Class 5 (Class 3)	The property is located in a rural/residential area and near to a residential subdivision. Conflicts regarding the odours, noise and traffic associated with an intensive feedlot operation may be an issue with neighbouring rural residential property owners. For access reasons and potential conflict with neighbouring property owners this site is not suitable for intensive non-soil bound livestock. However, it would not be feasible to rehabilitate this area for non-soil bound livestock due to the prohibitive costs of such improvements.
3	0.36	9%	NA	NA
Intensive Non-soil bound Horticultural Agriculture				
(eg. green houses and container nursery)				
1&2	3.65	91%	Class 5 (Class 3)	The site is largely level. After remediation this property could be made suitable for Non-soil bound Horticultural Agriculture operation. However, it would not be feasible to rehabilitate this area for non-soil bound horticulture due to the prohibitive costs of such improvements.
3	0.36	9%	NA	NA

7 Impact Analysis

The potential impacts associated with the industrial land use on the Subject Property on the local and regional agricultural context have been summarized in Table 8, below. One of the advantages of having the Subject Property rehabilitated for industrial use would be the opportunity to install buffers between the site and surrounding properties that are being used for agricultural activities.

TABLE 8: 982 Old Vernon Rd., Kelowna BC – Potential Impacts of Continuing Industrial Land Use

Area of Concern	Anticipated Impacts from Proposed Land Use	Comments
Industrial Land Use of Subject Property on Surrounding Lands	The Subject Property was the site of a saw mill operation for over 50 years (35+ years since inclusion in the ALR). Further industrial land use would require extensive rehabilitation and improvements to the property. Such improvements can be expected to have a positive impact on the surrounding properties.	The Subject Property is located in a rural/residential area and is generally surrounded by agricultural properties with apparent light commercial/industrial uses on the neighbouring property to the east. There is a nearby small lot residential subdivision.
Regional and Local Agricultural Capacity	The Subject Property is not contributing to regional or local Agricultural Capacity. The property has not been used for agriculture since the 1950's. A non agricultural use on this property will not negatively impact the local Agricultural Capacity.	The site has not been used for agricultural purposes for over 50 years. There will be no impacts on local capacity if non-agricultural uses are permitted at this site.
Surrounding Agricultural Operations	Nearby agricultural operations include intensive soil bound agriculture to the north and south and hay fields to the west. A remediated industrial site including perimeter buffers would be an improvement for all neighbouring properties.	The property operated as an industrial site for about 50 years (35+ years since inclusion in the ALR) at this location. Clean up and redevelopment for further industrial use will require removal of unsightly and potentially deleterious wood waste and allow for the inclusion of buffers to be added to the site to ALC specifications. The buffering measures to be implemented will mitigate the negative impacts of future land uses on the neighbouring agricultural operations and properties.
Precedent of Industrial Land Use for Triggering Future Applications	The Subject Property shares commonalities with the neighbouring site to the east, as both were part of the original sawmill operation. The Subject Property was included in the ALR as an operating mill and operated for another 30 years at this location. Permitted non-farm land-use on the subject property may serve as a precedent for application on the property directly adjacent to the east (the remainder of the mill site). Beyond those sites there is no clear, likely precedent as all remaining surrounding lands are apparently used primarily for agriculture, or are not in the ALR	

8 Summary and Conclusions

8.1 Subject Property

The Subject Property has been used as a saw mill for over 50 years (35+ years since inclusion in the ALR). There has been no agricultural land use on the Subject Property in that time. Despite significant and costly rehabilitation efforts to the property, it remains in a state that is not suitable for agriculture. The estimated costs to complete the rehabilitation and make the Subject Property suitable for agricultural production are economically unfeasible when compared to the expected returns from an agricultural production business. In addition, such rehabilitation would fall well beyond the scope and cost of typical farm improvements.

Land use in the vicinity of the Subject Property is primarily rural / residential with agriculture being actively practised on the adjacent properties to the north, south and west of the property. The remainder of the original saw mill operation is located on the property directly adjacent to the east and is apparently being used for industrial activities, with no apparent agricultural use. While the majority of the property directly adjacent to the west is being used for hay, it is also being used to park heavy equipment. Across Old Vernon Rd. to the south is an agricultural property, approximately half of which is used to produce specialty market items (eg. Sauces, jams, pickled vegetables). The other half is not currently being used for any agricultural or industrial activities.

8.2 Soils and Agricultural Capability

This assessment rated the soil moisture deficiencies at Class 5A (unimproved) for the entire Subject Property. The improved ratings for soil moisture on +/-91% of the Subject Property, based on the addition of irrigation, ranged from Class 3A to 1. The remaining 9% of the lot is unavailable for agricultural use. Variations in the soil moisture deficiency across the Subject Property were related to site-specific soil conditions (eg. soil texture) and anticipated responses to supplemental moisture;

This assessment rated undesirable soil structure at Class 3D for +/-91% of the Subject Property and was found to be a minor limitation on throughout the site. The remaining 9% of the lot is unavailable for agricultural use;

This assessment found that excess water was a limitation with a 4W (unimproved) rating on 91% of the Subject Property. The improved ratings for this portion of the property are 3W, based on ditching and/or installing artificial drainage to control the water in wetter months. The remaining 9% of the lot is unavailable for agricultural use;

The proposed improvements on the Subject Property included supplemental moisture (irrigation) during the dry months, as well as enhanced surface and soil profile drainage for the wet months. The results of this assessment suggest that these

improvements would be feasible for +/-91% (3.65 ha) of the Subject Property, where the agricultural capability ratings are expected to improve from Class 5 to Class 3;

The proposed improvements are not considered to be feasible for the remaining +/-9% (0.36 ha) of the Subject Property. This area is unavailable for agriculture due to existing residential structures and out buildings;

Under the current circumstances, and considering the cost and scope of required improvements for the Subject Property, no suitable agricultural uses have been identified for the Subject Property. The investments to date, combined with the high cost of removing wood waste and completing further assessments preclude the possibility of non-soil bound uses such as horticultural agricultural or an intensive livestock operation.

8.3 Proposed Project

The landowners are exploring a variety of potential future land uses, including the possibility of returning to an industrial use on the Subject Property. A specific activity has not been designated at this time. However, due to the significant scope and onerous costs of site rehabilitation still required agricultural production is not considered to be a feasible option.

8.4 Conclusion

The Subject Property is located in a rural/residential area of the City of Kelowna; it was operated historically as a saw mill until 2005, and has little to no current use on 91% of the property. While significant site rehabilitation and improvements could theoretically make the Subject Property suitable for agricultural production; the scope and costs of this work are well beyond what is generally considered to be typical farm improvement practices. Therefore, the rehabilitation of Subject Property for any agricultural purposes is not considered to be economically or practically feasible.

Generally speaking, inclusion of land that is improvable to class 3 into the ALR would be considered good practice; however, due to the historic industrial use of the Subject Property, rehabilitation of the Subject Property for agricultural use at the time of creation of the ALR (1974-1976) may already have well exceeded the potential returns from an agricultural operation. These conditions have been compounded to present day further limiting the land use options available to the current Landowners.

9 References

BC Ministry of Agriculture and Food and Ministry of Environment, April 1983. Land Capability for Agriculture in British Columbia. MOE Manual 1. Surveys and Resource Mapping Branch and Soils Branch: Kelowna, BC

BC Ministry of Environment, 1981. Climatic Capability Classification for Agriculture in British Columbia. Climatology Unit - Air Studies Branch; Victoria, BC

City of Kelowna, 2003, Consolidated Zoning Bylaw No. 8000, Kelowna BC
http://www.kelowna.ca/CM/page2561.aspx

BC Ministry of Environment, 1985Soils of the Okanagan and Similkameen Valleys, MoE, Victoria BC

BC Ministry of Environment, 1975. Land Capability for Agriculture of the Okanagan and Similkameen Valleys, Mapsheet 82L.094t 1:20,000. Thematic Mapping Unit, Surveys and Resource Mapping Branch: Victoria, British Columbia

City of Kelowna, City of Kelowna Map Viewer (online),
http://www.kelowna.ca/website/ikelowna_map_viewer/viewer.cfm , Kelowna, BC

10 Limitations

I, Matthew Davidson certify that I supervised and carried out the work as described in this report. The report is based upon and limited by circumstances and conditions referred to throughout the report and upon information available at the time of the site investigation. I have exercised reasonable skill, care and diligence to assess the information acquired during the preparation of this report. I believe this information is accurate but cannot guarantee or warrant its accuracy or completeness. Information provided by others was believed to be accurate but cannot be guaranteed.

The information presented in this report was acquired, compiled and interpreted exclusively for the purposes described in this report. I do not accept any responsibility for the use of this report, in whole or in part, for any purpose other than intended or to any third party for any use whatsoever. This report is valid for one year only after the date of production.

Respectfully Submitted,

Matthew Davidson, P.Ag.
Senior Environmental Scientist
Valhalla Environmental Consulting Inc.

Historic Land Use Additional Detail

The Subject Property was included in the ALR when the reserve was established (1974-1976). Encroachment of mill operations in the form of wood waste occurred after 1976, as indicated by historic aerial photography. Know approved expansion of the mill operations onto the Subject Property occurred in 1985 and 2000.

The Subject Property has reportedly been previously used by Better Earth Products a composting company. The owner, at that time, of Better Earth (Del Kohnke) reported operating from 2008 to 2011 on the Subject Property. The initial operation by this individual and by extension, this company is referred to in section 2.2.1 of the report as a wood waste contractor, who was screening and trucking the waste to Tolko Industries in Armstrong for use in their cogeneration plant. Due to contamination issues with the wood waste (such as paint) Tolko would no longer receive the product so Mr. Kohnke explored compost opportunities for the remaining wood waste material with his existing composting business Better Earth. As some of the material had naturally composted it was initially sold directly to market, however with little success. Introduction of green nitrogen sources was applied but did not produce a saleable product. The operation of Better Earth on the Subject Property became economically prohibitive and was not viewed as a success by the owner (pers.comm. DK).

Appendix A – Maps and Figures
982 Old Vernon Rd., Kelowna, BC

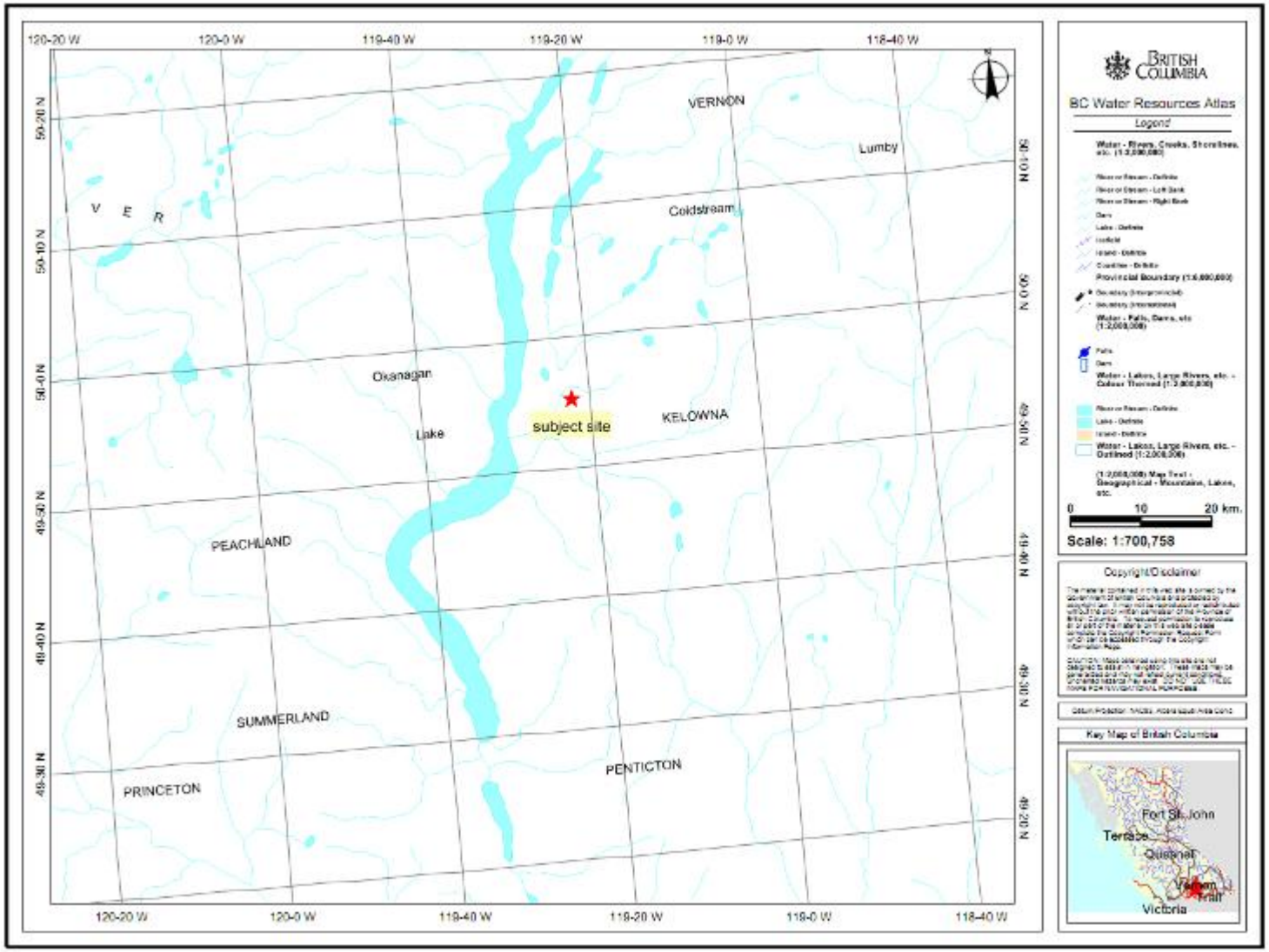


Figure 1: Regional Scale Location Map, 982 Old Vernon Rd., Kelowna BC (Not to scale for discussion purposes only)

Source: http://www.env.gov.bc.ca/wsd/data_searches/wrbc/index.html

Figure 2: Location Map, 982 Old Vernon Rd., Kelowna, BC

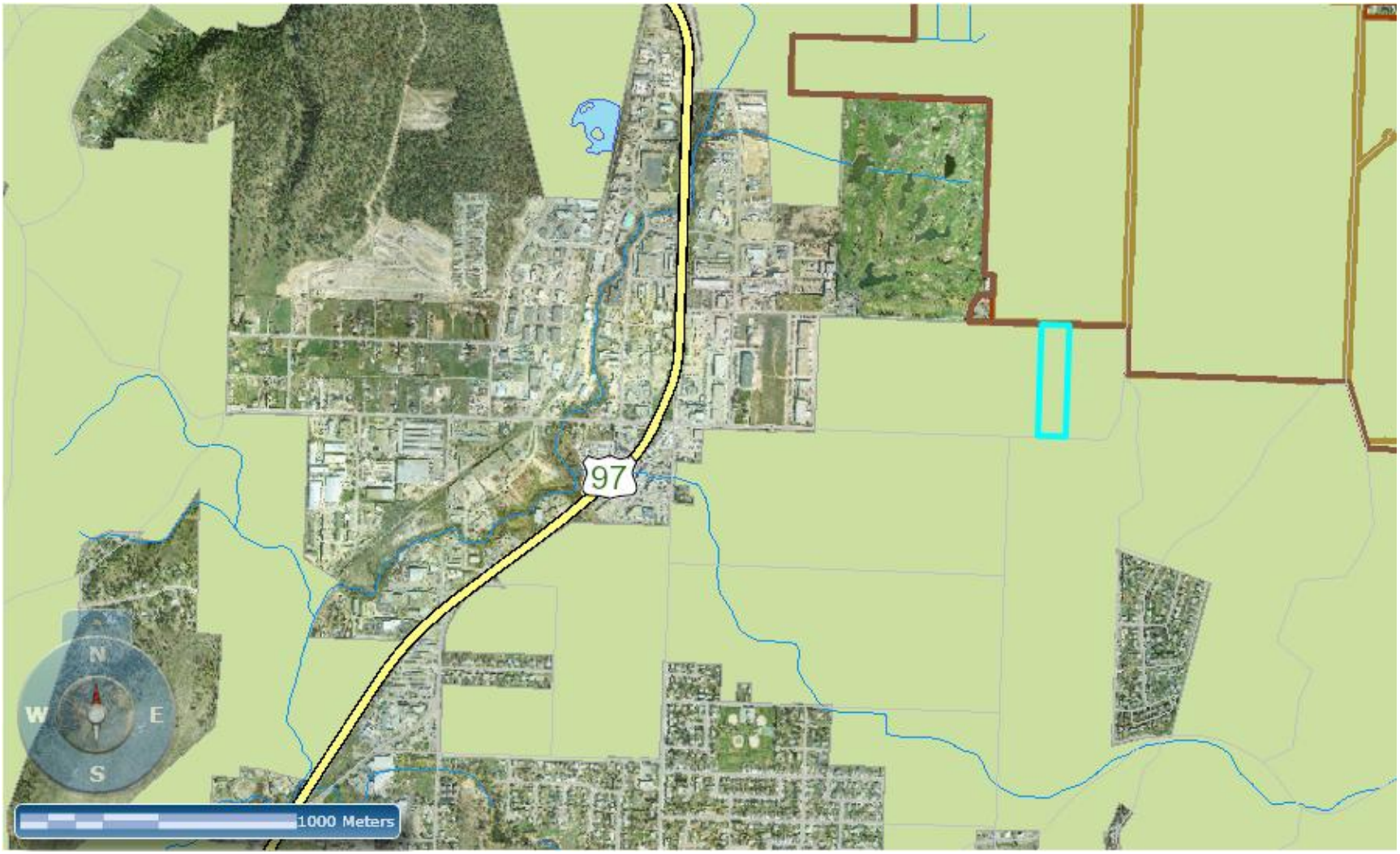


Figure 3: ALR, 982 Old Vernon Rd., Kelowna, BC

Source: RDCO Mapping - Accessed Nov. 15 2012
http://www.rdcogis.com/GIS_App/RDCO_GIS_App.html

site **ALR**

Figure 4: Contours, 982 Old Vernon Rd., Kelowna BC, 1m contour interval

Source: City of Kelowna - Accessed Nov 15 2012
http://www.kelowna.ca/website/ikelowna_map_viewer/viewer.cfm

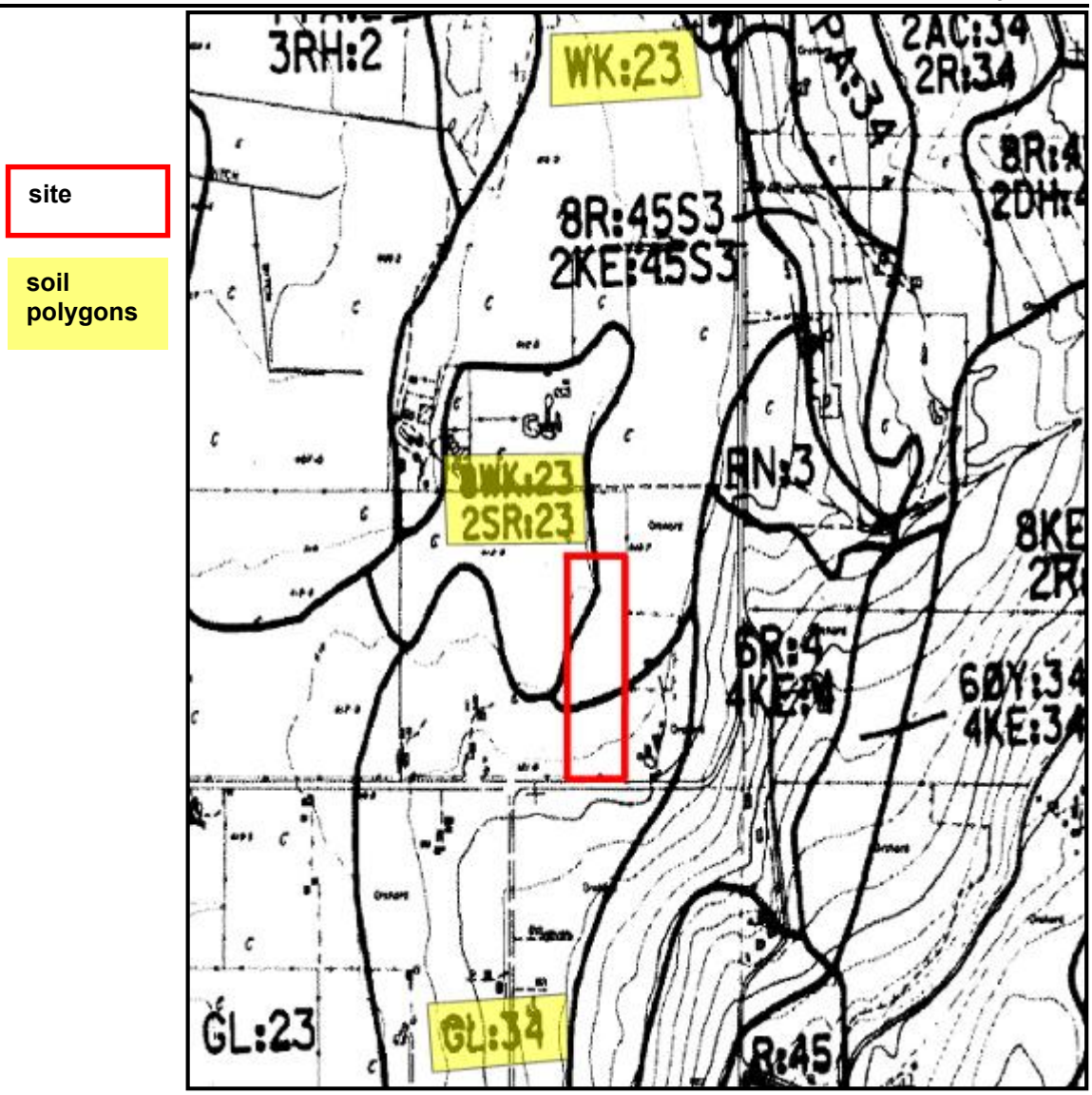


Figure 5: Soils Mapping, 982 Old Vernon Rd., Kelowna, BC, 5m contour interval

Source: BC MOE; Soil Survey Report No. 52 (1982); Mapsheet 82E.094 @1:20,000 (1987)

WK	WESTBANK	nearly level to strongly sloping stratified glaciolacustrine sediments	100 cm or more of clay, clay loam or silty clay	moderately well	Orthic Gray Luvisol
SR	SUMMERLAND	nearly level to strongly sloping fluvial veneer over glaciolacustrine sediments	10 to 100 cm of silty clay loam grading to clay loam	dominantly poor, ranging to imperfect; fluctuating groundwater table or seepage, subject to flooding	Orthic Humic Gleysol: calcareous and saline phases
GL	GLENMORE	nearly level to moderately sloping stratified glaciolacustrine sediments	100 cm or more of silt loam, silty clay loam or clay loam	well to moderately well	Eluviated Dark Brown

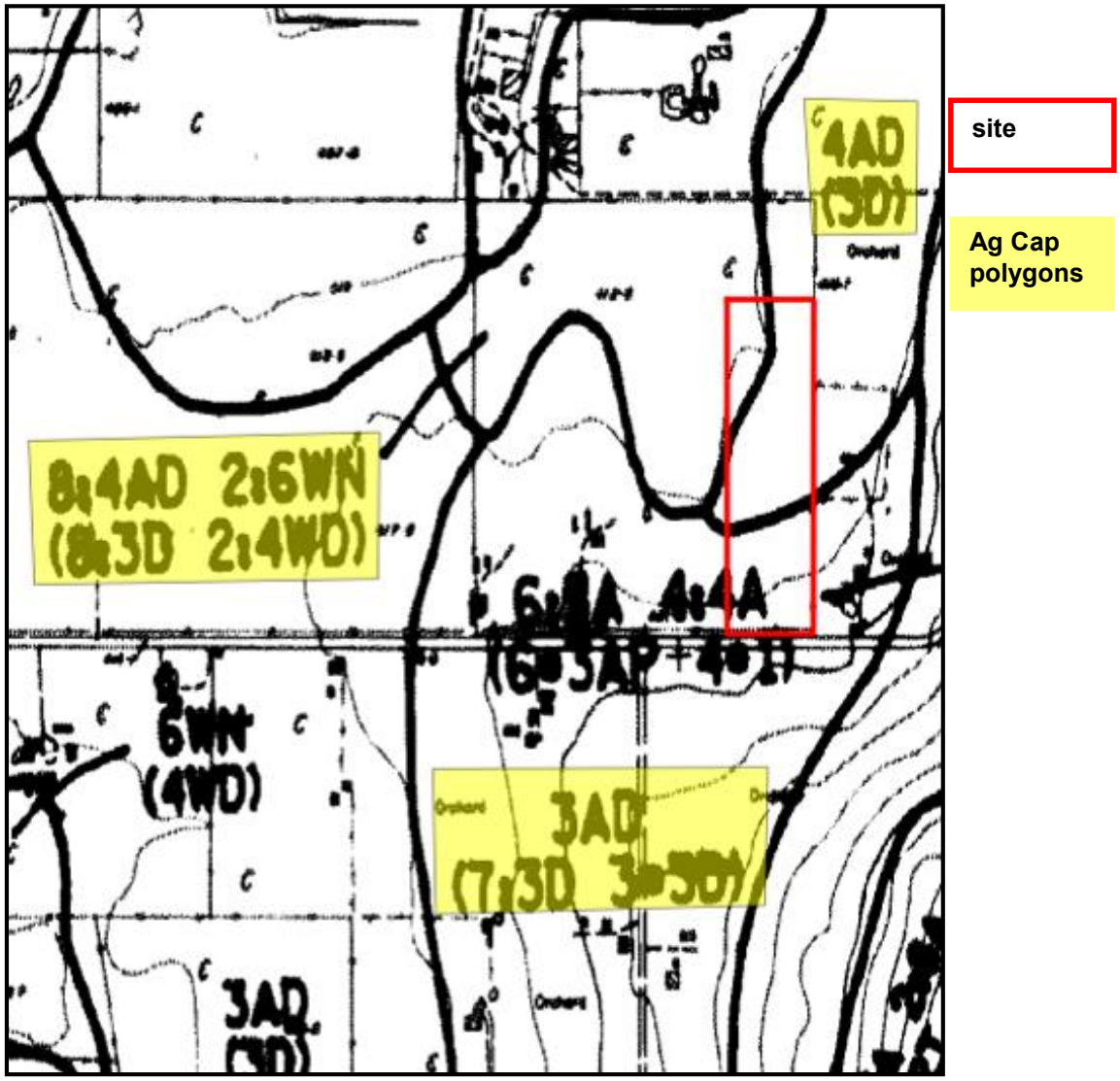


Figure 6: Agricultural Capability Mapping, 982 Old Vernon Rd., Kelowna, BC
Source: BC MOE; Mapsheet 82E.094 @1:20,000 (1987)

CAPABILITY CLASSIFICATIONS
5AP - Unimproved Rating
(3AP) - Improved Rating
*The asterisk is used with the Modified Land Capability Classification for Tree Fruits and Grapes.
It indicates the modified topography and/or stoniness classes have been used.

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

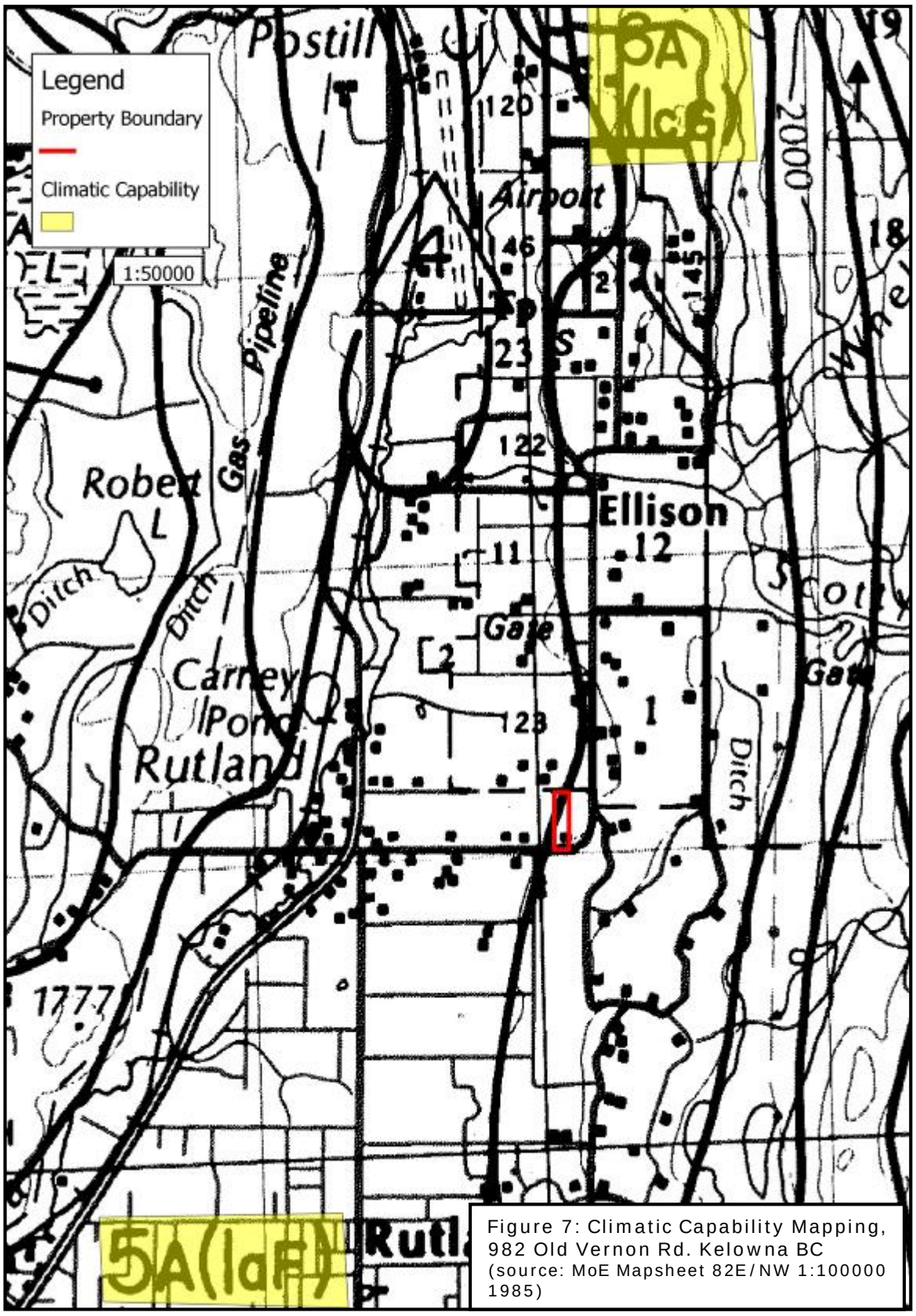


Figure 7: Climatic Capability Mapping, 982 Old Vernon Rd. Kelowna BC (source: MoE Mapsheet 82E/NW 1:100000 1985)

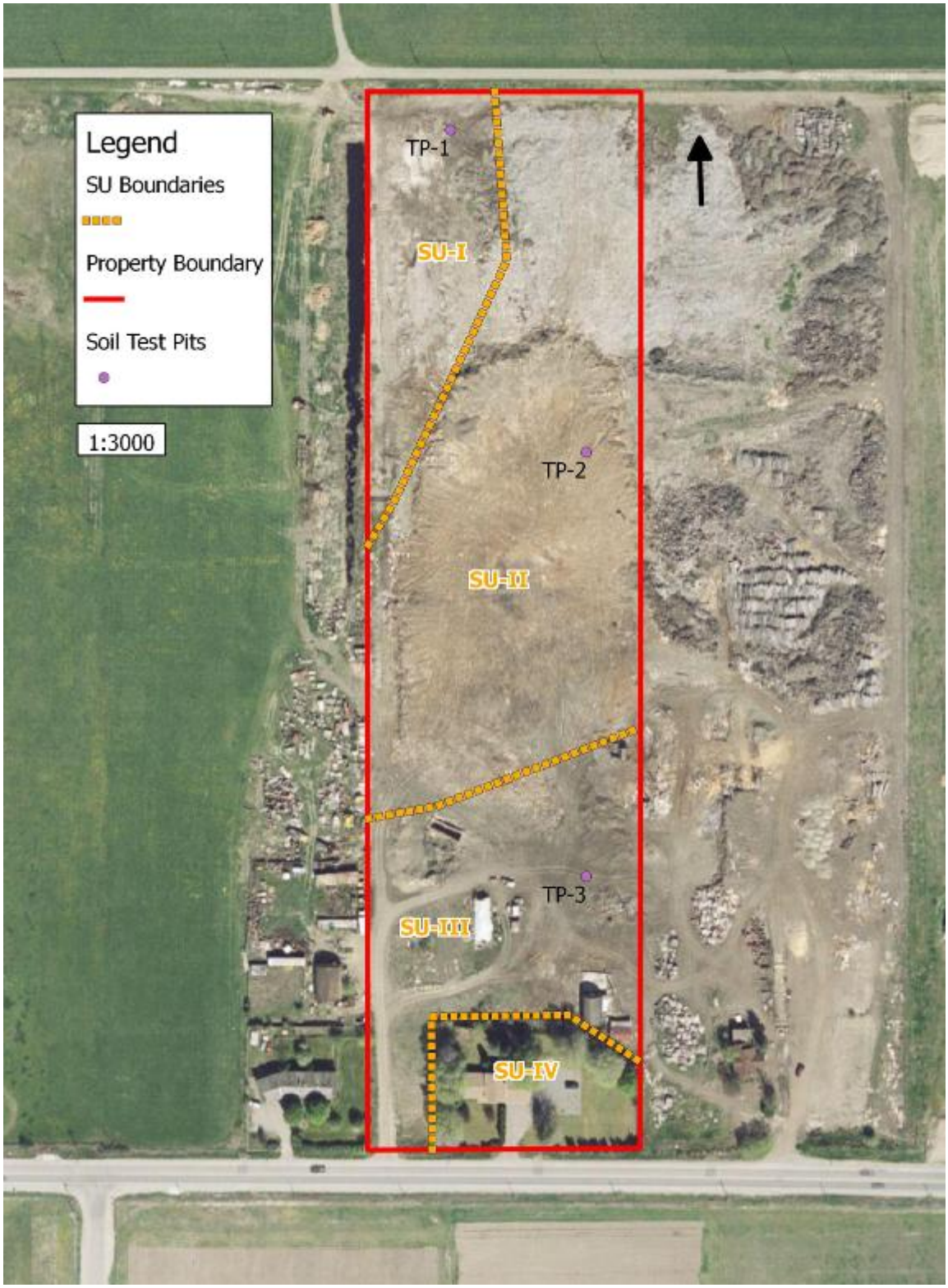


Figure 8: Soil Units and Test Pit Mapping, 982 Old Vernon Rd. Kelowna BC

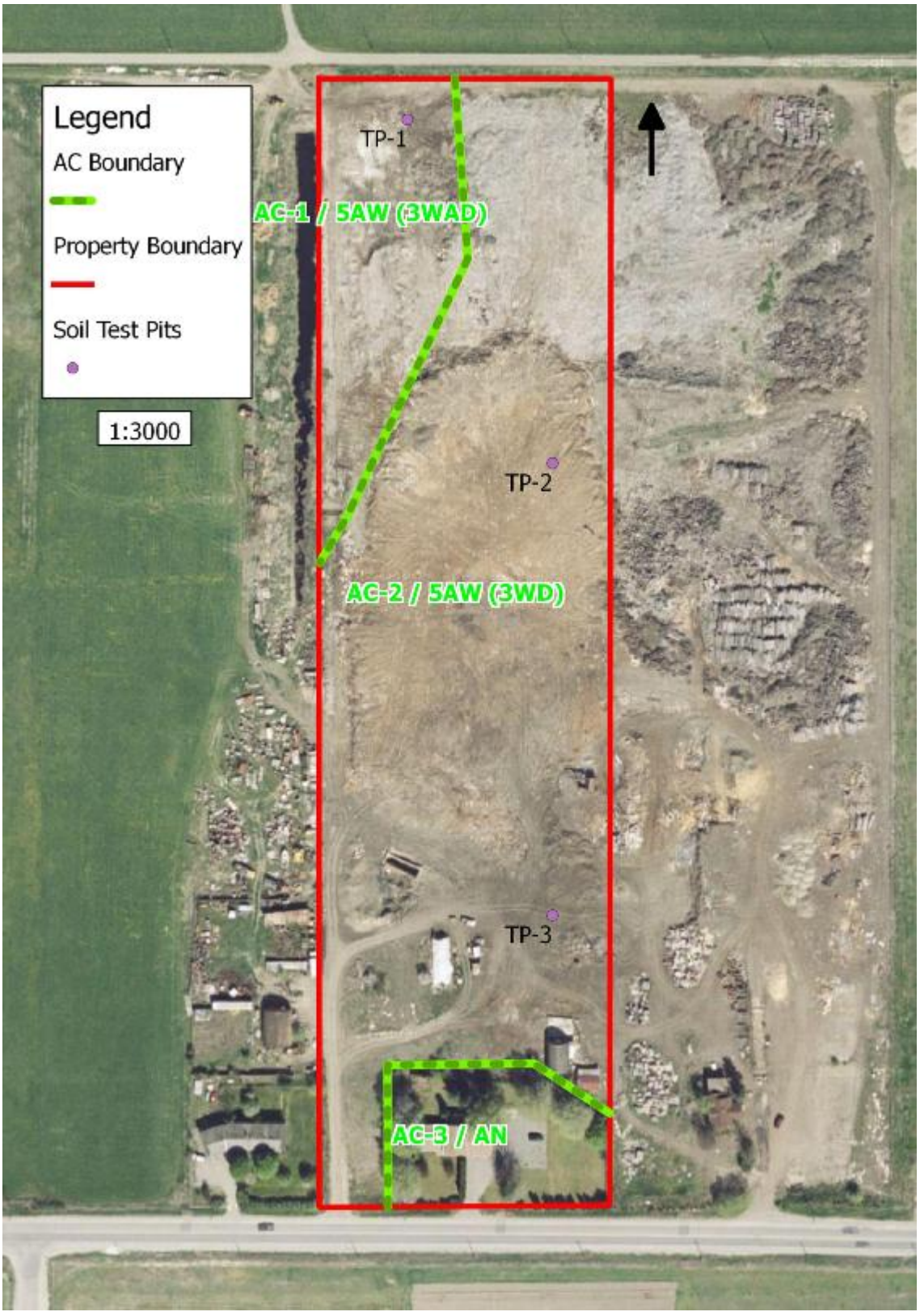


Figure 9: Agricultural Land Capability Mapping, 982 Old Vernon Rd., Kelowna BC

Appendix B – Site & Soil Test Pit Photos
982 Old Vernon Rd., Kelowna, BC

Figure 9: 982 Old Vernon Rd. Kelowna BC – Soil Inspection, Soil test pit location map

Photo 1: South portion of the site showing remaining footprint of mill work, stored machinery, storage bins and home site in background

Photo 2: Central portion of the site showing wood waste on the ground, weedy cover and a wood waste pile in background

Photo 3: Northern portion of the site showing wood waste on the ground, weedy cover and wood waste piles in background

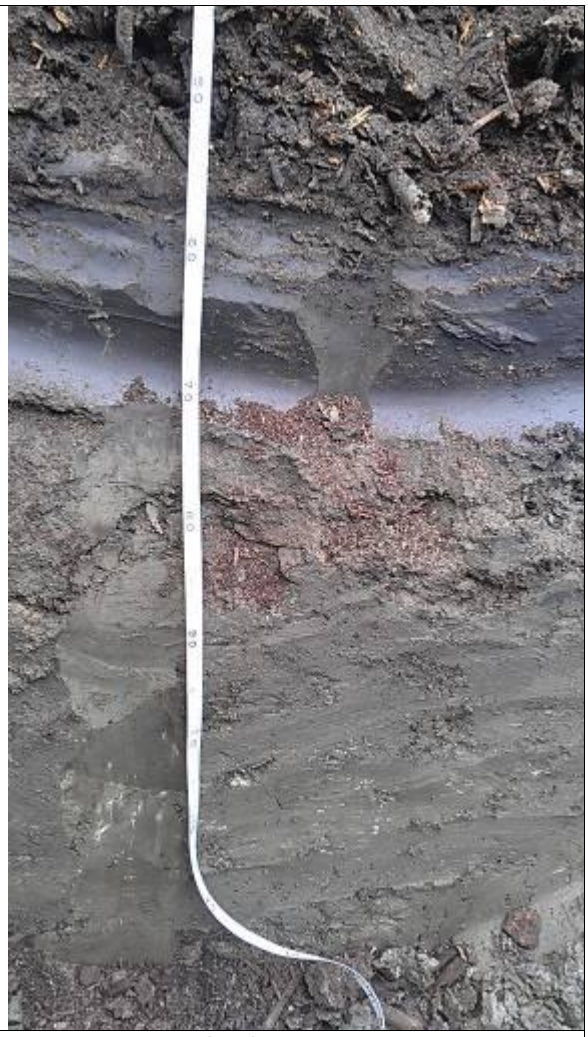
Project 12E043		TP #1	Slope N 1%		24-Oct-12	Overcast 2 C
Depth (cm)	Horizon	Texture	Consistence / Structure	Colour	Mottles	Coarse Fragments
2-0	LFH	-	thatch	-		
0-54	Fill	SL	admixed soil fill / WW	Dk Br	-	10% gravel*
54-70	B	C	firm / massive	DkGr	-	0% gravel
70+	C	HC	v. firm / blocky	Gr	-	0% gravel

Notes: All soil textures determined by laboritory testing, colour based on wet soils

Land Use – Former Mill
Vegetation grass and weeds
Poorly Drained Site
Gravel portion > 2.5 cm diameter
*Coarse fragments are estimated visually
WW - Wood Waste

0cm to 90cm depth

Photo 4: Test Pit 1 – 982 Old Vernon Rd., Kelowna, BC



50cm to 130cm depth

Photo 5: Test Pit 1 – 982 Old Vernon Rd., Kelowna, BC

Project 12E043		TP #2	Slope NW 2%		24-Oct-12	Overcast 2 C
Depth (cm)	Horizon	Texture	Consistence / Structure	Colour	Mottles	Coarse Fragments
2-0	LFH	-	thatch	-		
0-15	Fill	C	admixed soil fill	Dk Br	-	10% gravel*
15-35	B	C	firm / massive	Gr Br	-	0% gravel
35+	C	HC	v. firm / blocky	Br	-	0% gravel

Notes: All soil textures determined by laboritory testing, colour based on wet soils
Land Use – Former Mill Gravel portion > 2.5 cm diameter
Vegetation grass and weeds *Coarse fragments are estimated visually
Poorly Drained Site

0cm to 70cm depth

Photo 6: Test Pit 2 – 982 Old Vernon Rd., Kelowna, BC

50cm to 130cm depth

Photo 7: Test Pit 2 – 982 Old Vernon Rd., Kelowna, BC

Project 12E043		TP #3	Slope NW 1%		24-Oct-12	Overcast 2C
Depth (cm)	Horizon	Texture	Consistence / Structure	Colour	Mottles	Coarse Fragments
0-35	Fill	L	add mixed fill / WW	Br	-	10% gravel*
35-55	B	HC	v. firm / massive	DkGr	-	0% gravel*
55+	C	HC	v. firm / subangular blocky	Gr	-	0% gravel*

Notes: All soil textures determined by laboritory testing, colour determined with wet soil

Land Use – Former Mill
Vegetation grass and weeds
Poorly Drained Site
Gravel portion > 2.5 cm diameter
*Coarse fragments are estimated visually
WW - Wood Waste

0cm to 55cm depth

Photo 8: Test Pit 3 – 982 Old Vernon Rd., Kelowna, BC

50cm to 130cm depth

Photo 9: Test Pit 3 – 982 Old Vernon Rd., Kelowna, BC

Appendix C – Agricultural and Climatic Capability Class Descriptions

LAND CAPABILITY CLASSES FOR MINERAL SOILS

CLASS 1: LAND IN THIS CLASS EITHER HAS NO OR ONLY VERY SLIGHT LIMITATIONS THAT RESTRICT ITS USE FOR THE PRODUCTION OF COMMON AGRICULTURAL CROPS.

Land in Class 1 is level or nearly level. The soils are deep, well to imperfectly drained under natural conditions, or have good artificial water table control, and hold moisture well. They can be managed and cropped without difficulty. Productivity is easily maintained for a wide range of field crops.

CLASS 2 : LAND IN THIS CLASS HAS MINOR LIMITATIONS THAT REQUIRE GOOD ONGOING MANAGEMENT PRACTISES OR SLIGHTLY RESTRICT THE RANGE OF CROPS, OR BOTH.

Land in class 2 has limitations which constitute a continuous minor management problem or may cause lower crop yields compared to Class 1 land but which does not pose a threat of crop loss under good management. The soils in Class 2 are deep, hold moisture well and can be managed and cropped with little difficulty.

CLASS 3: LAND IN THIS CLASS HAS LIMITATIONS THAT REQUIRE MODERATELY INTENSIVE MANAGEMENT PRACTISES OR MODERATELY RESTRICT THE RANGE OF CROPS, OR BOTH.

The limitations are more severe than for Class 2 land and management practises are more difficult to apply and maintain. The limitations may restrict the choice of suitable crops or affect one or more of the following practises: timing and ease of tillage, planting and harvesting, and methods of soil conservation.

CLASS 4: LAND IN THIS CLASS HAS LIMITATIONS THAT REQUIRE SPECIAL MANAGEMENT PRACTISES OR SEVERELY RESTRICT THE RANGE OF CROPS, OR BOTH.

Land in Class 4 has limitations which make it suitable for only a few crops, or the yield for a wide range of crops is low, or the risk of crop failure is high, or soil conditions are such that special development and management practises are required. The limitations may seriously affect one or more of the following practises: timing and ease of tillage, planting and harvesting, and methods of soil conservation.

CLASS 5: LAND IN THIS CLASS HAS LIMITATIONS THAT RESTRICT ITS CAPABILITY TO PRODUCING PERENNIAL FORAGE CROPS OR OTHER SPECIALLY ADAPTED CROPS.

Land in Class 5 is generally limited to the production of perennial crops or other specially adapted crops. Productivity of these suited crops may be high. Class 5 lands can be cultivated and some may be used for cultivated field crops provided unusually intensive management is employed and/or the crop is particularly adapted to the conditions peculiar to these lands. Cultivated field crops may be grown on some Class 5 land where adverse climate is the main limitation, but crop failure can be expected under average conditions. Note that in areas which are climatically suitable for growing tree fruits and grapes the limitations of stoniness and/or topography on some Class 5 lands are not significant limitations to these crops.

CLASS 6: LAND IN THIS CLASS IS NONARABLE BUT IS CAPABLE OF PRODUCING NATIVE AND OR UNCULTIVATED PERENNIAL FORAGE CROPS.

Land in Class 6 provides sustained natural grazing for domestic livestock and is not arable in its present condition. Land is placed in this class because of severe climate, or the terrain is unsuitable for cultivation or use of farm machinery, or the soils do not respond to intensive improvement practises. Some unimproved Class 6 lands can be improved by draining and/or diking.

CLASS 7: LAND IN THIS CLASS HAS NO CAPAPBILITY FOR ARABLE OR SUSTAINED NATURAL GRAZING.

All classified areas not included in Classes 1 to 6 inclusive are placed in this class. Class 7 land may have limitations equivalent to Class 6 land but they do not provide natural sustained grazing by domestic livestock due to climate and resulting unsuitable natural vegetation. Also included are rockland, other nonsoil areas, and small water-bodies not shown on maps. Some unimproved Class 7 land can be improved by draining or diking.

Source: ALC http://www.alc.gov.bc.ca/alr/ag_cap_details.htm, Accessed December 2012

Appendix D – Analytical Data
982 Old Vernon Rd., Kelowna BC

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#104, 19575-55 A Ave.
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V3S 8P8, Canada

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W: www.exova.com

Report Transmission Cover Page

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Contact & Affiliation	Address	Delivery Commitments
Matt Davidson Valhalla Environmental	2503 35th Avenue Vernon, British Columbia V1T 2S6 Phone: (250) 275-1471 Fax: (866) 485-1471 Email: matt@valhallaconsulting.ca	On [Report Approval] send (Test Report) by Email - Single Report
Manraj Kandola Manraj Kandola	982 Old Vernon Road Kelowna, British Columbia V1X 6T8 Phone: (250) 765-0619 Fax: null Email: manrajkandola@hotmail.com	On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report

Notes To Clients:

- Insufficient sample volume to complete dry sieve analysis on sample 902099-1.
- Report was re-issued to include missing dry sieve analysis on samples 902099-2 to 8. Report 1785767 replaces original report 1779561.

Exova
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V3S 8P8, Canada

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E: Surrey@exova.com
W: www.exova.com

Sample Custody

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Sample Disposal Date: December 05, 2012

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

Exova
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Exova

Analytical Report

Bill To:	Manraj Kandola	Project:		Lot ID:	**902099**
Report To:	Manraj Kandola	ID:	12 E043	Control Number:	196-1001
	982 Old Vernon Road	Name:	Kandola- Ag Cap	Date Received:	Oct 26, 2012
	Kelowna, BC, Canada	Location:	Kelowna	Date Reported:	Nov 22, 2012
	V1X 6T8	LSD:		Report Number:	1785767
Attn:	Manraj Kandola	P.O.:			
Sampled By:	MD	Acct code:			
Company:	Valhalla				

Reference Number	902099-1
Sample Date	Oct 24, 2012
Sample Time	NA
Sample Location	
Sample Description	TP1 / TP1-01 / 30cm
Matrix	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Available Nutrients						
Nitrate - N	Available	ug/g	3			2
Phosphorus	Available	ug/g	8			5
Potassium	Available	ug/g	492			25
Sulfate-S	Available	mg/kg	<10			1
Calcium	Available	mg/kg	4580			30
Magnesium	Available	mg/kg	990			5
Sodium	Available	mg/kg	520			30
Ammonium - N	Available-dry basis	ug/g	122			0.3
Soil Acidity						
pH	1:2 Soil:Water	pH	6.2			
Electrical Conductivity	Sat. Paste equiv based on 1:2	dS/m at 25 C	0.54			0.02
Electrical Conductivity	1:2 Soil:Water	dS/m at 25 C	0.26			0.01

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Analytical Report

Bill To:	Manraj Kandola	Project:		Lot ID:	**902099**
Report To:	Manraj Kandola	ID:	12 E043	Control Number:	196-1001
	982 Old Vernon Road	Name:	Kandola- Ag Cap	Date Received:	Oct 26, 2012
	Kelowna, BC, Canada	Location:	Kelowna	Date Reported:	Nov 22, 2012
	V1X 6T8	LSD:		Report Number:	1785767
Attn:	Manraj Kandola	P.O.:			
Sampled By:	MD	Acct code:			
Company:	Valhalla				

		Reference Number	902099-1	902099-2	902099-3	
		Sample Date	Oct 24, 2012	Oct 24, 2012	Oct 24, 2012	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	TP1 / TP1-01 / 30cm	TP1 / TP1-02 / 60cm	TP1 / TP1-03 / 100cm	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties						
Moisture at 1/3 bar		%	35.6	38.8	36.8	0.1
Moisture at 15 bar		%	28.1	23.3	23.1	0.1
Texture			Sandy Loam	Clay	Heavy Clay	
Sand	50 µm - 2 mm	% by weight	62.7	19.6	7.6	0.1
Silt	2 µm - 50 µm	% by weight	27.3	33.4	15.4	0.1
Clay	<2 µm	% by weight	10.0	47.0	77.0	0.1

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Analytical Report

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Reference Number		902099-2	902099-3	902099-4
Sample Date		Oct 24, 2012	Oct 24, 2012	Oct 24, 2012
Sample Time		NA	NA	NA
Sample Location				
Sample Description		TP1 / TP1-02 / 60cm	TP1 / TP1-03 / 100cm	TP2 / TP2-01 / 15cm
Matrix		Soil	Soil	Soil

Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Particle Size Analysis - Dry Sieve						
2.0 mm sieve	% Retained	% by weight	1.2	0.2	10.6	0.1
500 micron sieve	% Retained	% by weight	0.9	0.7	9.8	0.1
250 micron sieve	% Retained	% by weight	1.1	0.8	3.7	0.1
53 micron sieve	% Retained	% by weight	12.0	1.4	10.0	0.1

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Analytical Report

Bill To:	Manraj Kandola	Project:		Lot ID:	**902099**
Report To:	Manraj Kandola	ID:	12 E043	Control Number:	196-1001
	982 Old Vernon Road	Name:	Kandola- Ag Cap	Date Received:	Oct 26, 2012
	Kelowna, BC, Canada	Location:	Kelowna	Date Reported:	Nov 22, 2012
	V1X 6T8	LSD:		Report Number:	1785767
Attn:	Manraj Kandola	P.O.:			
Sampled By:	MD	Acct code:			
Company:	Valhalla				

		Reference Number	902099-4	902099-5	902099-6	
		Sample Date	Oct 24, 2012	Oct 24, 2012	Oct 24, 2012	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	TP2 / TP2-01 / 15cm	TP2 / TP2-02 / 30cm	TP3 / TP3-01 / 20cm	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties						
Moisture at 1/3 bar		%	50.4	40.7	57.7	0.1
Moisture at 15 bar		%	28.2	27.4	37.8	0.1
Texture			Clay	Clay	Loam	
Sand	50 µm - 2 mm	% by weight	25.6	15.2	44.3	0.1
Silt	2 µm - 50 µm	% by weight	27.0	27.8	30.7	0.1
Clay	<2 µm	% by weight	47.4	57.0	25.0	0.1

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Analytical Report

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

		Reference Number	902099-5	902099-6	902099-7
		Sample Date	Oct 24, 2012	Oct 24, 2012	Oct 24, 2012
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	TP2 / TP2-02 / 30cm	TP3 / TP3-01 / 20cm	TP3 / TP3-02 / 45cm
		Matrix	Soil	Soil	Soil
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Particle Size Analysis - Dry Sieve						
2.0 mm sieve	% Retained	% by weight	0.1	20.8	0.3	0.1
500 micron sieve	% Retained	% by weight	0.5	16.4	0.7	0.1
250 micron sieve	% Retained	% by weight	0.4	8.0	0.7	0.1
53 micron sieve	% Retained	% by weight	3.9	12.8	5.2	0.1

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Analytical Report

Bill To:	Manraj Kandola	Project:		Lot ID:	**902099**
Report To:	Manraj Kandola	ID:	12 E043	Control Number:	196-1001
	982 Old Vernon Road	Name:	Kandola- Ag Cap	Date Received:	Oct 26, 2012
	Kelowna, BC, Canada	Location:	Kelowna	Date Reported:	Nov 22, 2012
	V1X 6T8	LSD:		Report Number:	1785767
Attn:	Manraj Kandola	P.O.:			
Sampled By:	MD	Acct code:			
Company:	Valhalla				

		Reference Number	902099-7	902099-8		
		Sample Date	Oct 24, 2012	Oct 24, 2012		
		Sample Time	NA	NA		
		Sample Location				
		Sample Description	TP3 / TP3-02 / 45cm	TP3 / TP3-03 / 100cm		
		Matrix	Soil	Soil		
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties						
Moisture at 1/3 bar		%	38.7	43.7		0.1
Moisture at 15 bar		%	23.9	25.3		0.1
Texture			Heavy Clay	Heavy Clay		
Sand	50 µm - 2 mm	% by weight	15.6	8.6		0.1
Silt	2 µm - 50 µm	% by weight	19.4	9.4		0.1
Clay	<2 µm	% by weight	65.0	82.0		0.1

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Analytical Report

Bill To:	Manraj Kandola	Project:		Lot ID:	**902099**
Report To:	Manraj Kandola	ID:	12 E043	Control Number:	196-1001
	982 Old Vernon Road	Name:	Kandola- Ag Cap	Date Received:	Oct 26, 2012
	Kelowna, BC, Canada	Location:	Kelowna	Date Reported:	Nov 22, 2012
	V1X 6T8	LSD:		Report Number:	1785767
Attn:	Manraj Kandola	P.O.:			
Sampled By:	MD	Acct code:			
Company:	Valhalla				

Reference Number	902099-8
Sample Date	Oct 24, 2012
Sample Time	NA
Sample Location	
Sample Description	TP3 / TP3-03 / 100cm
Matrix	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Particle Size Analysis - Dry Sieve						
2.0 mm sieve	% Retained	% by weight	<0.1			0.1
500 micron sieve	% Retained	% by weight	0.2			0.1
250 micron sieve	% Retained	% by weight	0.2			0.1
53 micron sieve	% Retained	% by weight	0.6			0.1

Approved by:

Mathieu Simoneau
Operations Manager

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Quality Control

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Available Nutrients

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Ammonium - N	mg/L	0.035	-0.3	0.3	yes
Nitrate - N	mg/L	0.149	-1	1	yes
Phosphorus	mg/L	0.289	-4	5	yes
Potassium	mg/L	0.074	-3	10	yes
Sulfate-S	mg/L	0.1064	0	1	yes
Calcium	mg/L	1.029	-1	3	yes
Magnesium	mg/L	0.1713	-0	0	yes
Sodium	mg/L	0.8753	-0	2	yes
Date Acquired:	October 29, 2012				

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Ammonium - N	ug/g	826	854	10	0.6	yes
Nitrate - N	ug/g	36	37	10	2	yes
Phosphorus	ug/g	80	80	10	5	yes
Potassium	ug/g	1620	1550	10	10	yes
Date Acquired:	October 29, 2012					

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Ammonium - N	ug/g	8.3	6.3	9.5	yes
Nitrate - N	ug/g	42	33	47	yes
Phosphorus	ug/g	16	12	18	yes
Potassium	ug/g	280	234	288	yes
Sulfate-S	mg/kg	644	560	806	yes
Calcium	mg/kg	7440	6135	8301	yes
Magnesium	mg/kg	648	550	744	yes
Sodium	mg/kg	80	61	99	yes
Date Acquired:	October 29, 2012				
Ammonium - N	ug/g	4.0	3.6	4.2	yes
Nitrate - N	ug/g	4	3	5	yes
Phosphorus	ug/g	3	2	4	yes
Potassium	ug/g	31	24	36	yes
Sulfate-S	mg/kg	1	1	1	yes
Calcium	mg/kg	10	9	11	yes
Magnesium	mg/kg	10	9	11	yes
Sodium	mg/kg	10	9	11	yes
Date Acquired:	October 29, 2012				

Physical and Aggregate Properties

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Moisture	%	13.2	12.8	10	0.3	yes
Date Acquired:	November 05, 2012					

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Quality Control

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Physical and Aggregate Properties - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Moisture at 1/3 bar	%	27.2	20.5	32.5	yes
Moisture at 15 bar	%	15.5	11.0	23.0	yes
Date Acquired: October 29, 2012					
Moisture at 1/3 bar	%	38.3	0.0	0.0	yes
Moisture at 15 bar	%	36.9	0.0	0.0	yes
Sand	% by weight	39.6	35.8	45.4	yes
Silt	% by weight	41.0	31.0	43.6	yes
Clay	% by weight	19.4	15.6	28.8	yes
<50 um	% by weight	60.4	54.700	64.300	yes
Date Acquired: October 29, 2012					

Particle Size Analysis - Dry Sieve

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
2.0 mm sieve	% by weight	0.1	0.0	0.0	yes
500 micron sieve	% by weight	3.9	0.0	0.0	yes
250 micron sieve	% by weight	7.6	0.0	0.0	yes
53 micron sieve	% by weight	28.2	0.0	0.0	yes
Date Acquired: November 16, 2012					
2.0 mm sieve	% by weight	0.1	0.0	0.0	yes
500 micron sieve	% by weight	3.0	0.0	0.0	yes
250 micron sieve	% by weight	7.4	0.0	0.0	yes
53 micron sieve	% by weight	23.3	0.0	0.0	yes
Date Acquired: November 16, 2012					

Soil Acidity

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
pH	pH	6	5.3	7.2	yes
Electrical Conductivity	dS/m at 25 C	0.005	-0.00	0.01	yes
Date Acquired: October 30, 2012					

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
pH	pH	7.3	7.0	7.4	yes
Electrical Conductivity	dS/m at 25 C	1.30	1.15	2.05	yes
Date Acquired: October 30, 2012					

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Methodology and Notes

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Ammonium-N (Extractable) in Soil	Carter	*	Extraction of NO3-N and NH4-N with 2.0 M KCl, 6.2	29-Oct-12	Exova Edmonton
Macronutrients in General Soils	McKeague	*	Ammonium Acetate Extractable Cations, 4.51	29-Oct-12	Exova Edmonton
Nutrients in General Soil	Comm. Soil Sci. Pl. Anal.	*	Modified Kelowna Soil Test, Vol 26, 1995	29-Oct-12	Exova Edmonton
Particle Size Analysis - GS	Carter	*	Hydrometer Method, 55.3	29-Oct-12	Exova Edmonton
Particle Size by Dry Sieve	Carter	*	Sieve Analysis (Mechanical Method), 55.4	16-Nov-12	Exova Edmonton
pH and Conductivity in general soil 1:2	McKeague	*	1:2 Soil:Water Ratio, 4.12	29-Oct-12	Exova Edmonton
Sulfate in General Soil	McKeague	*	Sulfate Extractable by 0.1M CaCl2, 4.47	29-Oct-12	Exova Edmonton
Water Retention Curves	Agronomy No 9, Part 1	*	Water Retention: Laboratory Methods, 26-6	29-Oct-12	Exova Edmonton

** Reference Method Modified*

References

Agronomy No 9, Part	Methods of Soil Analysis, Part 1
Carter	Soil Sampling and Methods of Analysis.
Comm. Soil Sci. Pl.	Communications in Soil Science and Plant Analysis
McKeague	Manual on Soil Sampling and Methods of Analysis

Comments:

- Insufficient sample volume to complete dry sieve analysis on sample 902099-1.
- Report was re-issued to include missing dry sieve analysis on samples 902099-2 to 8. Report 1785767 replaces original report 1779561.

Appendix E – Resumes

Valhalla Environmental Consulting Inc

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Matthew Davidson BSc., P.Ag., EP., AScT. – Environmental Scientist

Matthew Davidson is an Environmental Scientist with a background in environmental biology, environmental assessment, land services and contaminated sites. With a diverse work history Matthew has worked for clients in various sectors including oil and gas, forestry, agriculture, land development, construction, recycling, and waste management industries. Project work has taken Matthew throughout British Columbia, into Alberta and the North West Territories. Matthew is a founding partner of Sage Environmental Consulting Ltd and is presently a Partner at Valhalla Environmental Consulting Inc. Coldstream, BC

Environmental Work Experience (11 Years)

Partner / Environmental Scientist Valhalla Environmental Consulting Ltd, Coldstream, BC	July 2011
Owner / Environmental Scientist Sage Environmental Consulting Ltd, Vernon, BC	January 2008
Environmental Scientist TerraWest Environmental Consultants Ltd., Victoria, BC	August 2005
Field Foreman Alpine Environmental Ltd. Fort St. John, BC	May 2001

Education

BSc. Environmental Science, Royal Roads University	2005
Dipl.Tech. Environmental Science, Camosun College	2002
A.S. Biology, Camosun College	1999

Professional Associations

P.Ag. – British Columbia Institute of Agrologists (**BCIA**)
AScT. – Applied Science Technologists and Technicians of British Columbia (**ASTTBC**)
E.P. – Environmental Professional (Eco Canada)
A5 - Restoration & Reclamation
A7 - Environmental Protection Management
SER – Member of the Society for Ecological Restoration

Environmental Work Summary

- Stage 1 & 2 preliminary site investigations (PSI), Detailed Site Investigations (DSI) & Land Remediation
- Ecological Restoration Project Design and Management
- Environmental Impact Assessments
- Riparian Areas Assessments
- Environmental Monitoring for Construction Projects and Instream Works
- Erosion and Sediment Control Design, Implementation and Monitoring
- Spill response, and remediation of terrestrial and aquatic spills
- Policy writing & application package preparation
- Facility audit design and implementation for environmental compliance and performance
- Environmental Sampling Program Design and Implementation
- Instructor for Malaspina College; WHMIS, TDG, Spill Response and Environmental Awareness courses
- Site assessments and inspections for pipelines right of way and oil and gas well sites
- Industrial waste management, for the upstream Oil & Gas Industry
- Agricultural Land Capability Assessments (ALR)
- Habitat Assessment and Mapping
- Groundwater / Water Quality Monitoring Design and Implementation

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Select Project Portfolio

Construction Environmental Monitoring – BC 2012 – Services included environmental monitoring for two bridge construction projects over fish bearing streams in BC's southern interior. Daily logging and summary reporting were provided to the client and Ministry of Forests Lands and Natural Resource Operations.

Environmentally Sensitive Areas Assessment and Terrestrial Habitat Mapping – Vernon BC 2011/2012 – Provided habitat mapping of the Foothills Neighbourhood in Vernon BC to inform the City of Vernon neighbourhood plan development. Services included review of existing TEM and SEI 1:20000 mapping, confirmation field visits to updated and correct existing mapping to current conditions, creation of site specific 1:3000 habitat mapping, invasive species survey, rare and endangered species survey, and reporting.

Spill Remediation Confirmation Analysis – West Kootenay BC 2011/2012 – Scope of services induced; sampling plan design to meet MoE standards, sampling for laboratory analysis, contractor liaison regarding remediation measures, compliance analysis with BC CSR, and confirmation of remediation reporting

Spill Remediation Confirmation Analysis – CSRD BC 2011 – Scope of services induced; sampling plan design to meet MoE standards, sampling for laboratory analysis, contractor liaison regarding remediation measures, compliance analysis with BC CSR, and confirmation of remediation reporting

Agricultural Land Capability Assessments (ALR Exclusion, Inclusion, Development) – BC 2011/2012: Scope of services includes; ALR soil mapping review, on site soil survey, analytical testing, agricultural capability assessment and reporting prepared for the Agricultural Land Commission

Contaminated Site Investigation and Remediation Various Clients, throughout BC 2005 to Present: Stage 1 & 2 Preliminary Site Investigations (Phase 1&2 ESAs), Detailed Site Investigations, Land Remediation

Spill Response/Remediation/Habitat Restoration – Cherryville, (Gagney Creek), BC– 2009 (Currently in Monitoring Phase): Scope of services included; emergency spill response, installation of water treatment, land remediation, instream works, environmental monitoring, habitat reconstruction and ecological restoration, long term monitoring, regulatory liaison, environmental , freshwater invertebrate surveys

Environmentally Sensitive Areas Assessments – Various Clients, Okanagan BC – 2010 / 2011: Identify, classify, rate and map terrestrial ecosystems based on vulnerability and scarcity. Provide GIS mapping, interpretation and methods reporting including mitigation measures for proposed development projects.

Habitat Restoration Plan – Vernon Airport, Vernon, BC - 2009 – Designed a habitat restoration plan for riparian habitat adjacent to the Vernon Airport.

Habitat Restoration Plan – Private Land Owner Salmon Arm, BC 2008: Prepared a restoration strategy to guide the ecological repair of a heavily degraded site along a wetland boundary, to meet regulatory requirements. The final plan incorporated current riparian areas management and restoration practice recommendations to best re-establish a native ecosystem and provide long term support for this location.

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Environmental Impact Assessment – Environmental Assessment - Private Agricultural Land Owner Land, (Grandon Creek), Qualicum, BC 2006: Developed and implemented a sampling program to determine the impact to soils and surface water on a farm that was subject to composted biosolid application. This project involved designing a sampling plan and method, laying out a representative predetermined sample plan with GIS before conducting sampling, GPS location and confirmation of sample point, collection of soil and surface water samples, soil profiling, determining appropriate laboratory analyses, interpretation of analytical results, and synthesis of a final report.

Environmental Impact Assessment, Facility Design and Construction Monitoring - Composting Operation, Ladysmith BC 2007: Designed and performed an Environmental Impact Assessment for a proposed composting facility to meet the requirements of the Organic Materials Recycling Regulation, assisted in facility design to ensure efficient operation and minimize environmental impacts, developed and implemented a long term surface and groundwater monitoring program.

Groundwater Monitoring Cowichan, (Gordon River), BC 2005-2007: Surface Water and Groundwater sampling, analysis and interpretation for impacts to groundwater and freshwater aquatic habitat due to numerous wood waste landfills

Groundwater Monitoring, Chasm, BC 2005-2008: West Fraser Mills – Conducted groundwater monitoring for on site woodwaste landfills at the Chasm Mill

Spill Remediation – EnviroWest, Nanaimo BC 2006: Spill response on a property bordering a salt water marsh, duties included supervision of response activities, sampling of impacted soils and nearby surface water, sample analysis prescription, delineating spill extent, manifested removal of impacted soils to approved treatment facility, reconstruction of the damaged site, analysis interpretation and final report synthesis.

Riparian Areas Regulation – Various Clients, Southern BC 2006 to Present: Duties include habitat and site assessment, riparian habitat enhancement measures, impact mitigation management, regulatory liaison, reporting, environmental monitoring, variance applications.

Environmental Impact Assessment – Land Lessee, Quaaout Reserve, (Little Shuswap Lake), BC – 2009: Comprehensive EIA performed to review a riparian construction project on Quaaout Reserve. EIA for the project was approved by INAC and DFO.

Environmental Impact Assessment – Land Owner, Central Okanagan, (Okanagan Lake,) BC – 2009: Comprehensive EIA performed to review a riparian construction project on Okanagan Lake. EIA for the project was approved by RDCO and MoE.

Construction Environmental Monitoring Vernon, BC with Naito Environmental, 2010: Provided daily monitoring during the demolition of a bridge over Vernon Creek. Including on-site technical support, mitigation measure design and implementation, creek condition monitoring, regulatory liaison and reporting.

Construction Environmental Monitoring Okanagan, (Kalamalka Lake) BC Parks with Naito Environmental, 2010: Daily Monitoring during the installation of two wharf structures in Kalamalka Lake with bedrock drilled piers in an area of high quality fish habitat. Services included onsite technical support, environmental mitigation measures, reporting, and regulatory liaison.

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Construction Environmental Monitoring for – Katchmar Construction, (Sheridan Lake, Staley Lake, Staley Lake Ck) BC – March 2008 to April 2008: Provided on-site environmental monitoring for a wetland crossing road construction project. Duties included: daily monitoring, daily log, reporting, regulatory liaison, onsite advice and restoration design

Skills and Certifications

Fieldwork

- Stream surveys & Riparian Areas Assessment
- Freshwater, groundwater, and marine water sampling
- Monitoring well and drill sampling supervision
- Soil texturing, profiling and sampling
- Soil vapour sampling
- Sediment sampling
- Site assessment, descriptions and mapping
- Spill response, investigation, assessment and remediation
- Orienteering and survival knowledge

Equipment

- Experience with various field meters, multi meters, monitoring apparatus, high flow and low flow purging and sample pumps
- GPS field operator
- SCBA, and SCUBA
- ATV, snowmobile and helicopter awareness
- Small engine use and repair
- Boating 200+ hours (marine and freshwater)

I.T.

- GIS, CAD
- Web page development
- Office suite competency
- Statistical analysis software
- Data base development
- Data analysis applications

Courses and Certificates

- Contaminated Site Investigation
- Soil Bioengineering
- Soil Vapour Assessment
- Environmental Monitoring for Construction
- Erosion and Sediment Control
- Riparian Area Regulation Training
- Pleasure Craft Operator
- Streamkeeper Training
- Level 1 First Aid
- Radio telephone operator certificate
- P.A.D.I. advanced open water diver
- R.I.C. certified level 3 GPS field operator
- Class 5 drivers license
- Defensive driving course
- Ecological Control for Invasive Species

CATHERINE ORBAN, MSC, PAG

ENVIRONMENTAL PLANNER/INSPECTOR & SOIL SPECIALIST

1977 HARLEQUIN CRES
NANOOSE BAY, BC, V9P 9J2
OFFICE: 250-468-7959
CELL: 250-612-2166
catherineo@telus.net

EDUCATION

- **M.Sc., Physical Geography (Specializing in Soils) 1990**
  University of Calgary, Calgary, Alberta
- **B.Sc., Physical Geography, 1985**
  University of Calgary, Calgary, Alberta
- **Fine Art - General Studies, 1980**
  Alberta College of Art, Calgary, Alberta

SPECIALIZED TRAINING

- Standard First Aid & CPR
  St John's Ambulance
- H2S Alive
- WHMIS
- ATV – 4x4 Training Course
- Riparian Area Regulation (BC).
  Malaspina University College (2006)
- Remediation Processes for Contaminated Soil and Groundwater.
  EPIC Educational Program Innovations Centre (2001).
- Environmental Regulation in the Oil & Gas Industry.
  Canadian Association of Petroleum Landmen (1996).
- Decommissioning and Reclamation of Small Oil & Gas Sites.
  Petroleum Industry Training Service (1996).
- Introduction to Avalanche & Backcountry Safety

PROFESSIONAL AFFILIATIONS

- British Columbia Institute of Agrologists (P. Ag.)
- Qualified Environmental Professional (QEP)
- Canadian Land Reclamation Association (CLRA)
- Columbia Mountains Institute (CMI)

EMPLOYMENT HISTORY

2002 - Present **Environmental Planner/Inspector/Soil Specialist (Independent Consultant)**
Selected Clients:

TERA Environmental Consultants
Calgary, Alberta

C&F Land Resource Consultants Ltd.
Victoria, BC

Spectra Energy (formerly Duke Energy Gas Transmission & Westcoast Energy Inc.)
Prince George, BC

2001 - Present **Part Time Instructor (Short Courses)**
Various courses in soil management, erosion & sediment control, environmental monitoring & inspection, and planning for pipeline construction projects
ENFORM Canada (formerly the Petroleum Industry Training Service [PITS])
Calgary, Alberta

Vancouver Island University (VIU), Natural Resources Extension Program
Nanaimo, BC

1996 - 2002 **Project Manager/Staff Agrologist**
Matrix Solutions Inc.
Calgary, Alberta

1992 - 1996 **Consulting Soil Specialist/ Environmental Inspector (Independent Consultant)**
Soils & General Environmental Expertise
Oil & Gas Sites, Pipelines & Related Projects
Alberta & BC

1990 - 1992 **Project Consultant**
AGRA Earth & Environmental Ltd.
Calgary, Alberta

1986 - 1990 **Project Coordinator**
Small Island Research Group (SIRG)
Calgary, Alberta & St Vincent, WI

1986 - 1990 **Graduate Student/Teaching Assistant**
University of Calgary,
Department of Geography
Calgary, Alberta

1982 - 1984 &1990 **Interpretive Naturalist (Seasonal)**
Alberta Provincial Parks

CAREER AND PROJECT EXPERIENCE

Soil Surveys, Agricultural Land Capability & Terrain Assessments

- Conducted soils and terrain assessments and prepared reports for various pipeline, wellsite and access road construction projects.
- Conducted detailed soil surveys on government and private properties, and prepared reports for submission to the Agricultural Land Commission (ALC).
- Prepared soil survey and construction as-built reports including; environmental overviews, soil descriptions and classifications, soil handling and reclamation recommendations/plans, and monitoring information.
  - West Wapiti Pipeline Project – Central Alberta Midstream (2005)
  - Lougheed Loop - Southern Mainline Expansion - Duke Energy (2002-2003)
  - Goodrich Acid Gas Re-injection Pipeline - Duke Energy (2003)
  - Calgary-Cochrane Wastewater Pipeline – Stanley Engineering (1999)
  - Empress Gas Plant Expansion (1998)
  - Savona Loop – Westcoast Energy (1995)
  - Alexandria Loop – Westcoast Energy (1995)
  - McLeod Lake Loop – Westcoast Energy (1995)
  - Wolf 16" Pipeline – Westcoast Energy (1994)

Contaminated Sites

- Developed, managed and implemented a variety of environmental assessment, remediation and reclamation projects, from individual leases to an active gas plant site, and a pipeline gathering system.
- Conducted pre-construction as well as Phase I & II assessments and prepared reports for oil and gas sites and facilities.
  - Carstairs-Crossfield Gas Plant – Anderson Exploration Ltd. (1996 – 2002)
  - Midale Oil Pipeline Gathering System – Shell Canada Ltd & Enbridge Pipelines Inc (1999 – 2000)
  - South Elkton Gas Plant – Anderson Exploration Ltd. (1996 – 2002)
  - Wildhay Gas Plant – Berkley Petroleum (2001)

International Work Experience

- CIDA Agronomy Training Projects for farmers, teachers, government personnel and extension officers, St Vincent, WI.
  - Shared responsibility for development and implementation of Agronomy Training Projects (3½ years total), based in St. Vincent, West Indies (completed thesis research concurrently).
- CIDA Angele-Bolhamo irrigation feasibility study, Awash Valley, Ethiopia.
  - Conducted a Socio-Economic Impact Assessment for this irrigation feasibility study in Ethiopia.

Project Management/Leadership/Training

- Updated and delivered the following short courses:
  - "Soils and the Planning Process" ½ day module (Enform)
  - "Soil Handling for Pipeline Construction"1/2 day module (Enform)
  - "Environmental Planning for Linear Development" 2 day course (Enform)
  - "Pipeline Environmental Inspection" 3 day course (Enform)
  - "Environmental Monitoring for Construction Projects" 3 day course (VIU, NREP)
  - "Erosion & Sediment Control" 3-day course (VIU, NREP)
  - "Aboriginal Environmental Technician Training Program" 5 day course
- Worked with and supervised contractors, consultants and summer students in all areas of expertise (outlined above).
- Acted as liaison with representatives from various regulatory agencies during implementation of various oil and gas projects.
- Prepared a Pest Management Plan for a pipeline corridor in south-central BC.
- Landmark Education - Leadership & Communications – Core Curriculum & Seminars
- Eastern Caribbean Islands - Student Leader - 6-wk field school – U of C Geography

Pipeline Inspection (Environmental & Soils)

- Supervised implementation of general environmental protection measures during pipeline construction and reclamation activities.
- Conducted liaison with various regulatory agencies during pipeline construction project planning, audits and inspections.
- Supervised soil salvage and handling during pipeline construction, clean-up and reclamation activities.
- Prepared daily progress and as-built reports for environmental protection measures on pipeline construction projects.
  - Joffre CO_2 Pipeline - Penn West (2007)
  - Bullmoose Development Project – Tumbler Ridge, BC – Shell Canada Ltd. (2006-2007)
  - TMX Pump Station Upgrades – Kinder-Morgan (2006)
  - Hythe SW Loop – Encana (2005)
  - Pine Pass Replacement – Duke Energy (2003)
  - Fort St John Replacement – Westcoast Energy (1995)
  - Savona Loop – Westcoast Energy (1995)
  - Alexandria Loop – Westcoast Energy (1995)
  - Wolf 16" Pipeline – Westcoast Energy (1994)
  - South Okanagan Natural Gas Pipeline – BC Gas (1994)
  - Blue Hills Pipeline – Westcoast Energy (1993)

Environmental Planning

- Carried out coordination, review and management activities for environmental impact assessments and environmental protection plans for various pipeline construction projects in BC, Alberta and the Northwest Territories.
- Conducted environmental orientations, audits and inspections for various pipeline construction projects throughout BC.
- Shared responsibility for development and preparation of the Pest Management Plan (PMP) for Duke Energy Mainline – Southern Region (2003)
- Carried out mapping and data analysis for the purposes of evaluating and selecting sites and routing corridors for natural areas preservation, transmission lines and pipelines.
- Shared responsibility for the development and preparation of environmental and socio-economic impact assessments.
- Responsible for advertising, interviewing, hiring, coordinating & evaluating work for the Aboriginal Environmental Inspector Apprentices on two pipeline construction projects in BC.
  - Access Pipeline Project - Access Pipeline Ltd. (2004)
  - Goodrich Acid Gas Re-injection Pipeline - Duke Energy (2003)
  - Southern Mainline Expansion - Duke Energy (2002-2003)
  - Grizzly Valley Extension - Duke Energy (2003)

PUBLICATIONS AND PRESENTATIONS

Orban, C.M., Gayle, J.E., Smith, B.S. and Leggett, S.A. 2000. "Use of Statistical Methods to Assess Soil Conditions Related to Linear Property Transactions." Matrix Solutions Inc., Shell Canada Ltd., Enbridge Pipelines Inc., September 2000.

Orban, C. 1990. "Patterns of Variations in Selected Soil Properties, St. Vincent, West Indies." University of Calgary, Master's Thesis.

Orban, C., and W. Matadial. 1989. "Fertilizer Trials on Selected Root Crops in St. Vincent." Paper presented at the 25th Annual Caribbean Food Crop Society Meeting, Guadeloupe, July, 1989.

Historic Land Use Additional Detail

The Subject Property was included in the ALR when the reserve was established (1974-1976). Encroachment of mill operations in the form of wood waste occurred after 1976, as indicated by historic aerial photography. Know approved expansion of the mill operations onto the Subject Property occurred in 1985 and 2000.

The Subject Property has reportedly been previously used by Better Earth Products a composting company. The owner, at that time, of Better Earth (Del Kohnke) reported operating from 2008 to 2011 on the Subject Property. The initial operation by this individual and by extension, this company is referred to in section 2.2.1 of the report as a wood waste contractor, who was screening and trucking the waste to Tolko Industries in Armstrong for use in their cogeneration plant. Due to contamination issues with the wood waste (such as paint) Tolko would no longer receive the product so Mr. Kohnke explored compost opportunities for the remaining wood waste material with his existing composting business Better Earth. As some of the material had naturally composted it was initially sold directly to market, however with little success. Introduction of green nitrogen sources was applied but did not produce a saleable product. The operation of Better Earth on the Subject Property became economically prohibitive and was not viewed as a success by the owner (pers.comm. DK).

Appendix A – Maps and Figures
982 Old Vernon Rd., Kelowna, BC

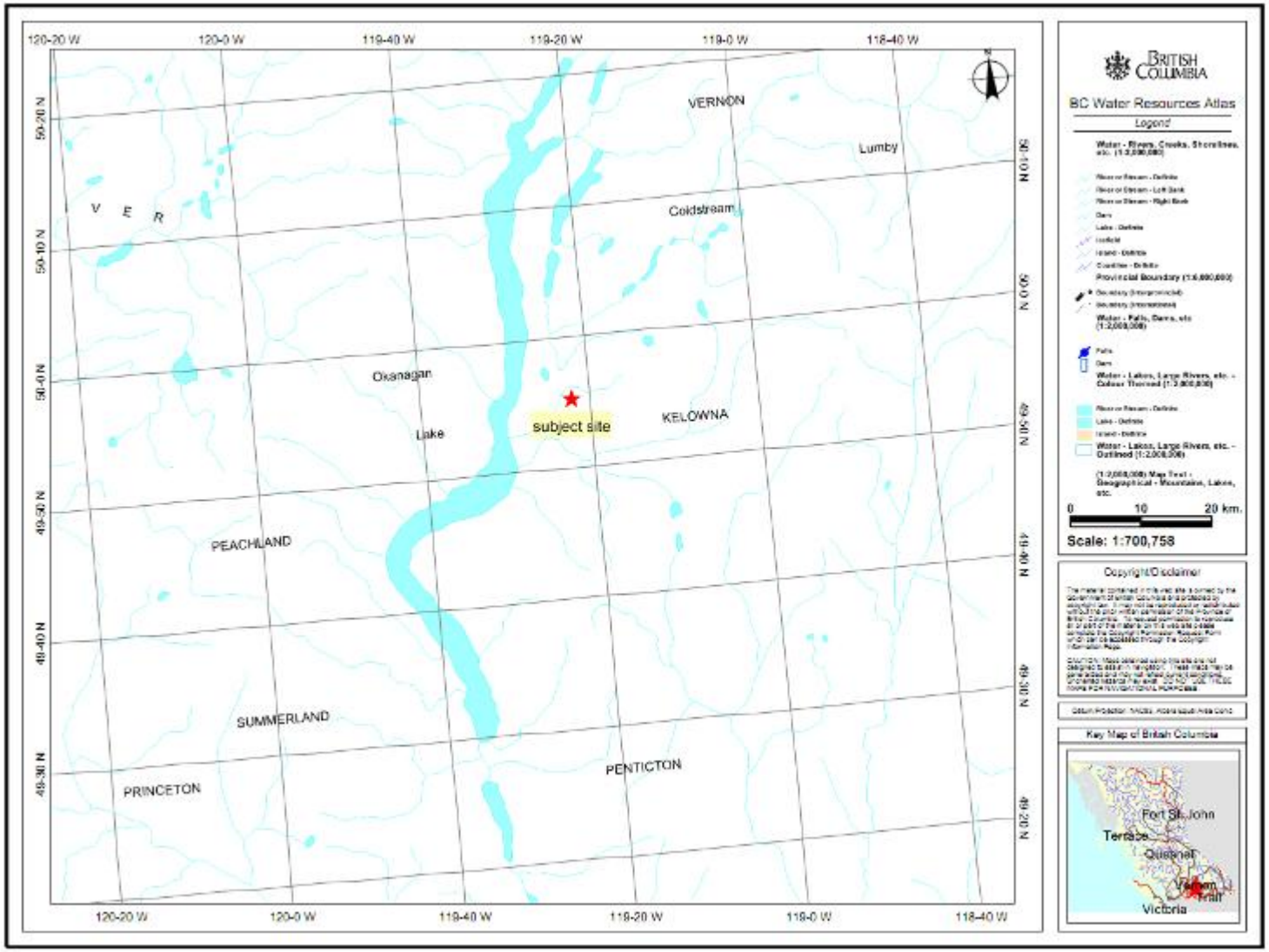


Figure 1: Regional Scale Location Map, 982 Old Vernon Rd., Kelowna BC (Not to scale for discussion purposes only)

Source: http://www.env.gov.bc.ca/wsd/data_searches/wrbc/index.html

Figure 2: Location Map, 982 Old Vernon Rd., Kelowna, BC

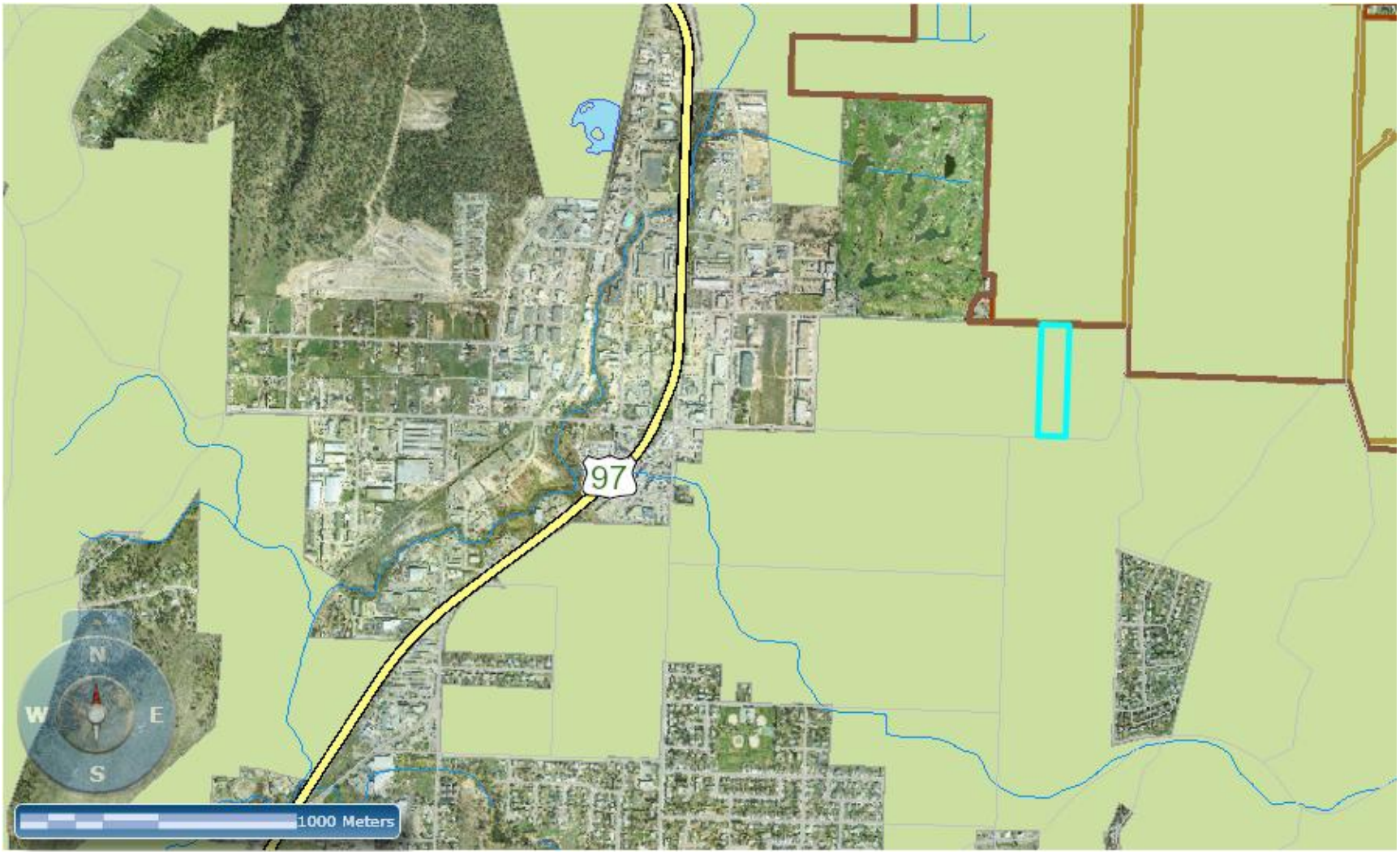


Figure 3: ALR, 982 Old Vernon Rd., Kelowna, BC

Source: RDCO Mapping - Accessed Nov. 15 2012
http://www.rdcogis.com/GIS_App/RDCO_GIS_App.html

site **ALR**

Figure 4: Contours, 982 Old Vernon Rd., Kelowna BC, 1m contour interval

Source: City of Kelowna - Accessed Nov 15 2012
http://www.kelowna.ca/website/ikelowna_map_viewer/viewer.cfm

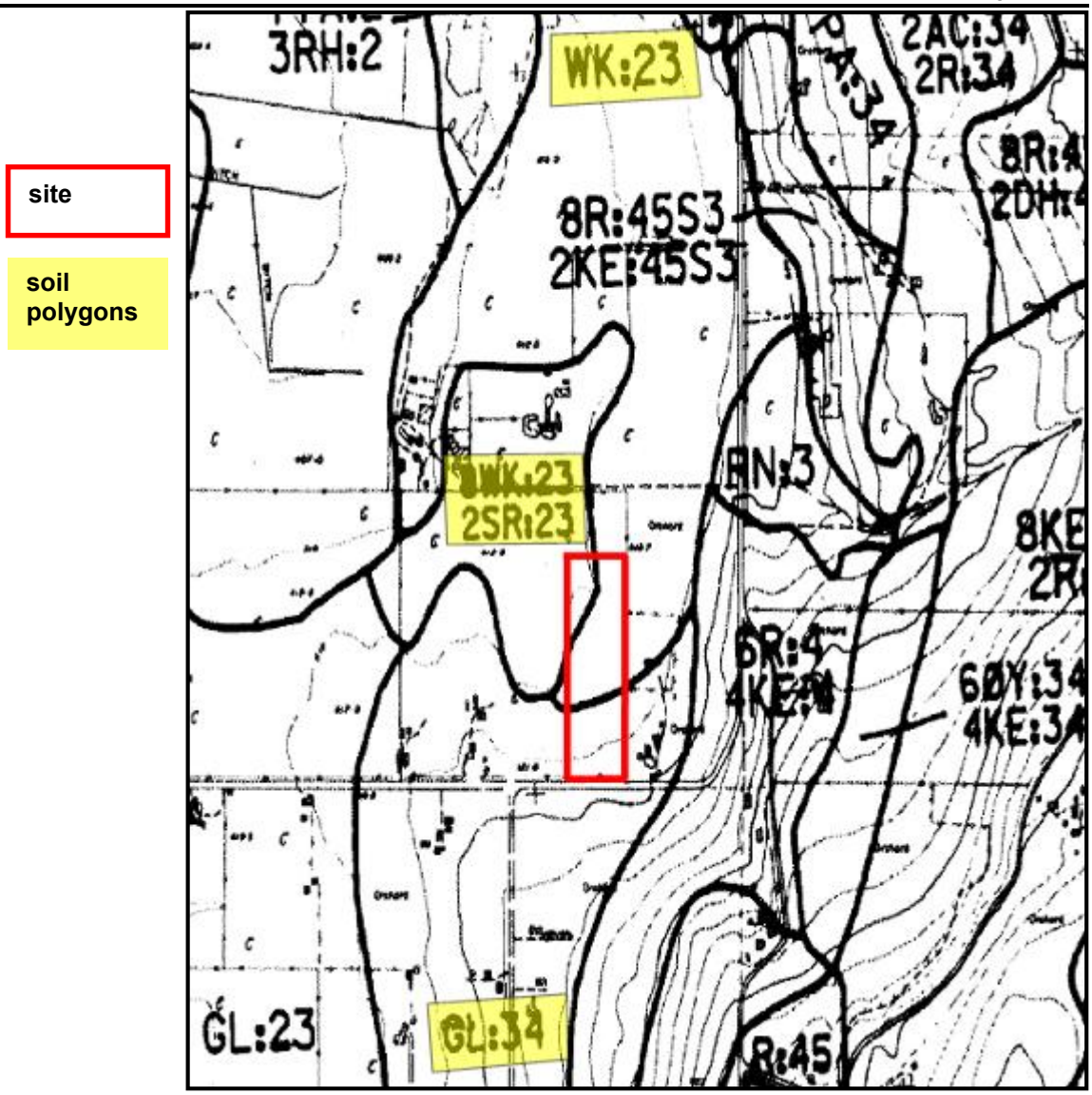


Figure 5: Soils Mapping, 982 Old Vernon Rd., Kelowna, BC, 5m contour interval

Source: BC MOE; Soil Survey Report No. 52 (1982); Mapsheet 82E.094 @1:20,000 (1987)

WK	WESTBANK	nearly level to strongly sloping stratified glaciolacustrine sediments	100 cm or more of clay, clay loam or silty clay	moderately well	Orthic Gray Luvisol
SR	SUMMERLAND	nearly level to strongly sloping fluvial veneer over glaciolacustrine sediments	10 to 100 cm of silty clay loam grading to clay loam	dominantly poor, ranging to imperfect; fluctuating groundwater table or seepage, subject to flooding	Orthic Humic Gleysol: calcareous and saline phases
GL	GLENMORE	nearly level to moderately sloping stratified glaciolacustrine sediments	100 cm or more of silt loam, silty clay loam or clay loam	well to moderately well	Eluviated Dark Brown

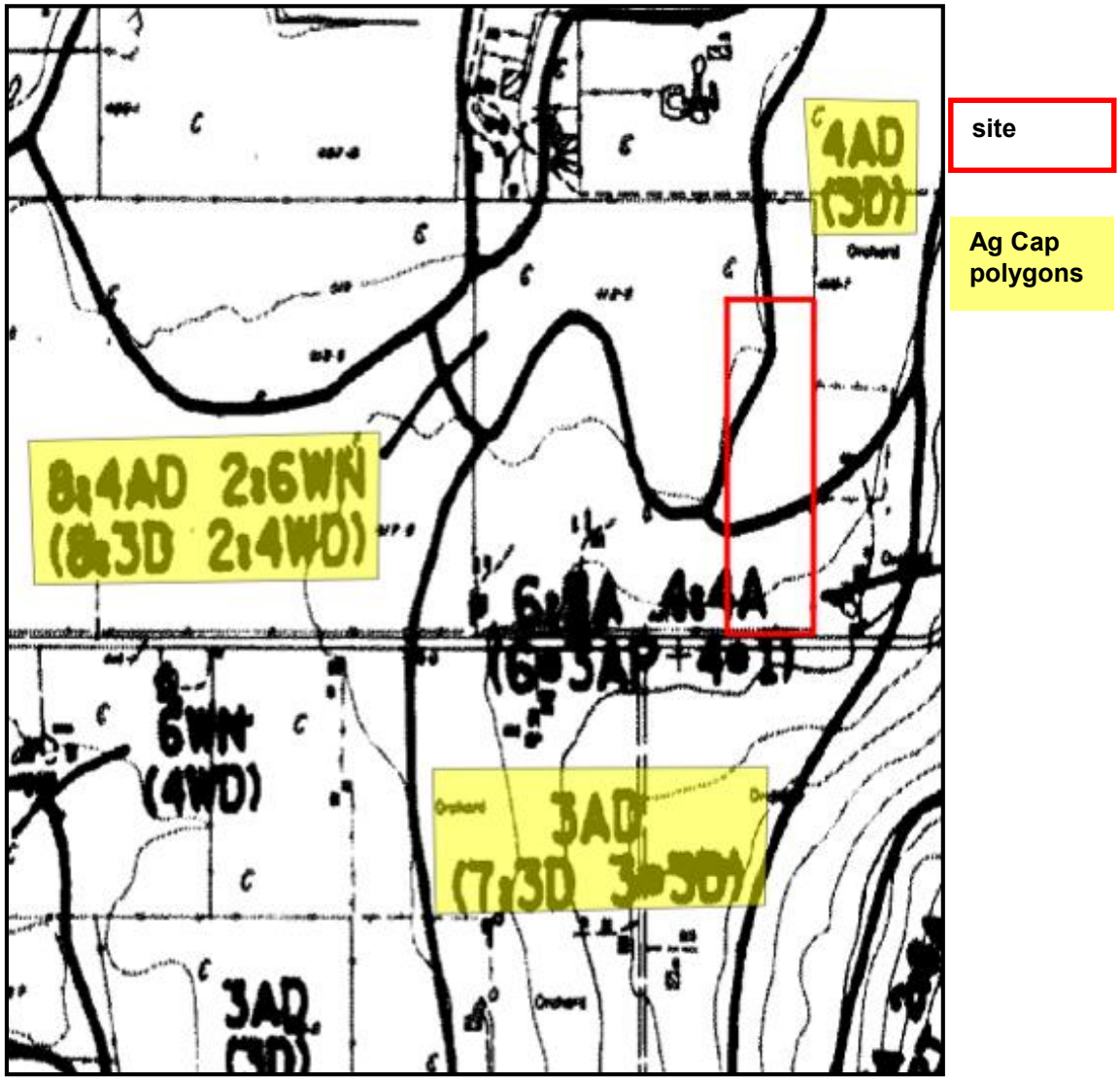


Figure 6: Agricultural Capability Mapping, 982 Old Vernon Rd., Kelowna, BC
Source: BC MOE; Mapsheet 82E.094 @1:20,000 (1987)

CAPABILITY CLASSIFICATIONS
5AP - Unimproved Rating
(3AP) - Improved Rating
*The asterisk is used with the Modified Land Capability Classification for Tree Fruits and Grapes.
It indicates the modified topography and/or stoniness classes have been used.

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

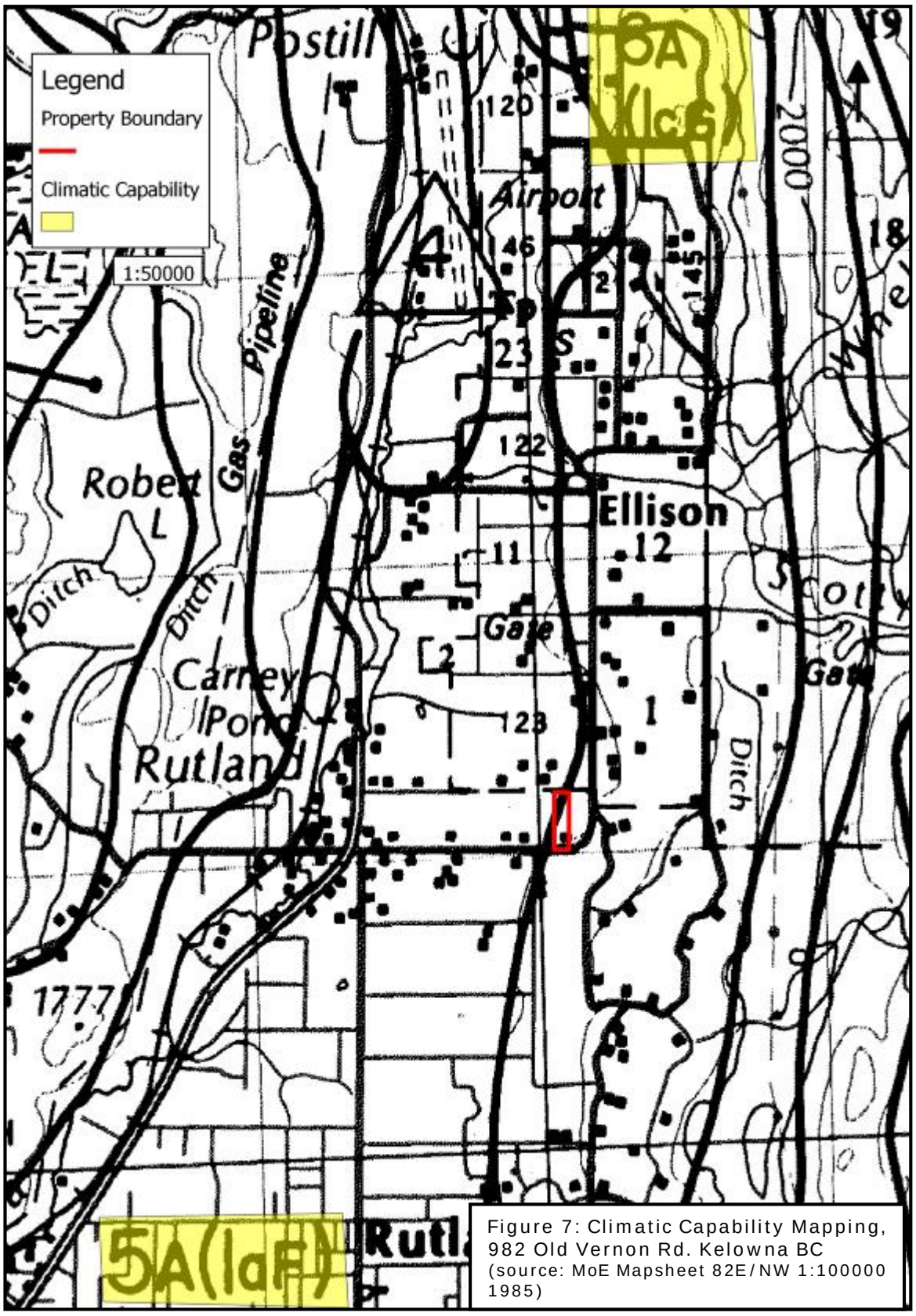


Figure 7: Climatic Capability Mapping, 982 Old Vernon Rd. Kelowna BC (source: MoE Mapsheet 82E/NW 1:100000 1985)

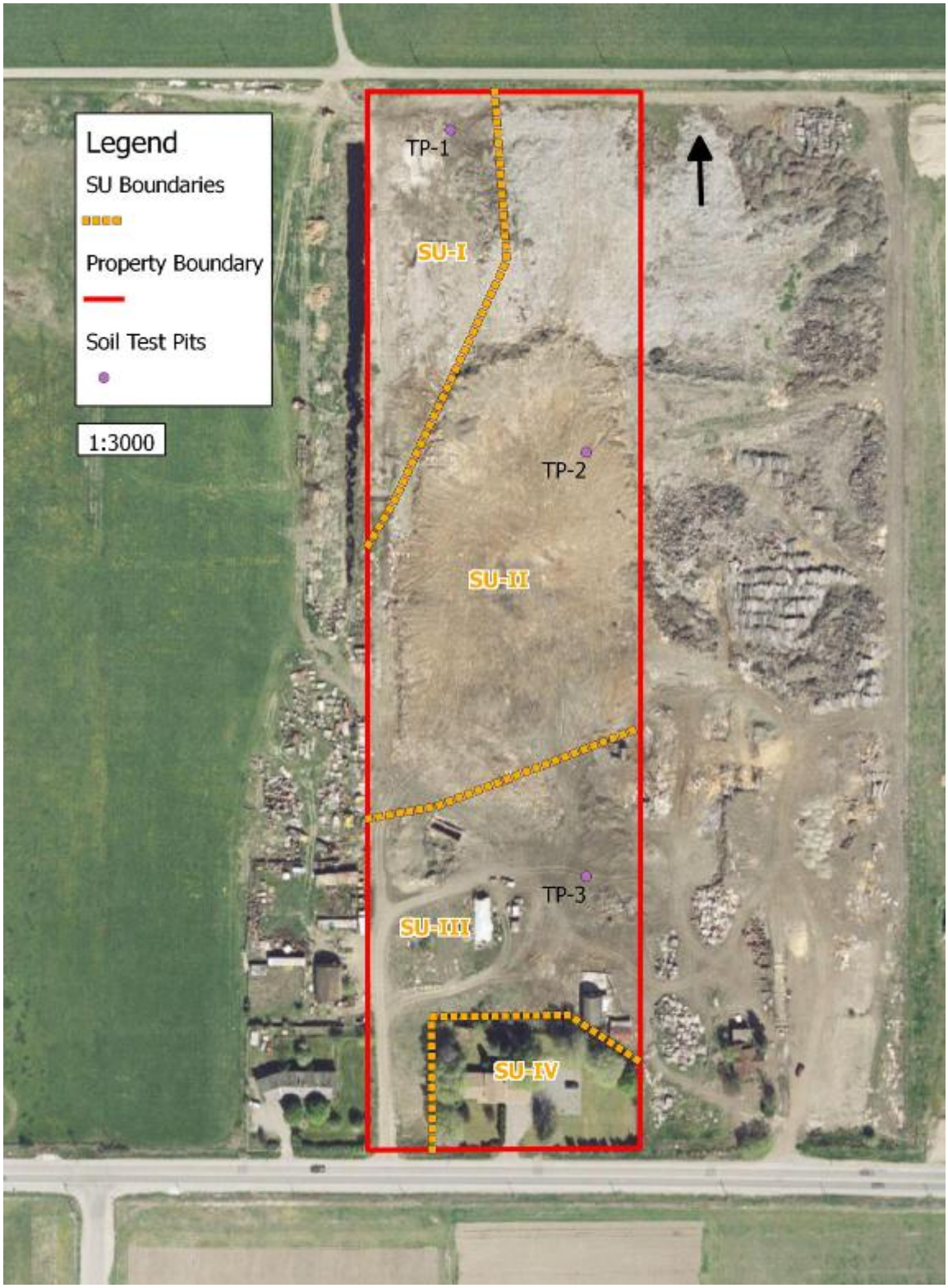


Figure 8: Soil Units and Test Pit Mapping, 982 Old Vernon Rd. Kelowna BC

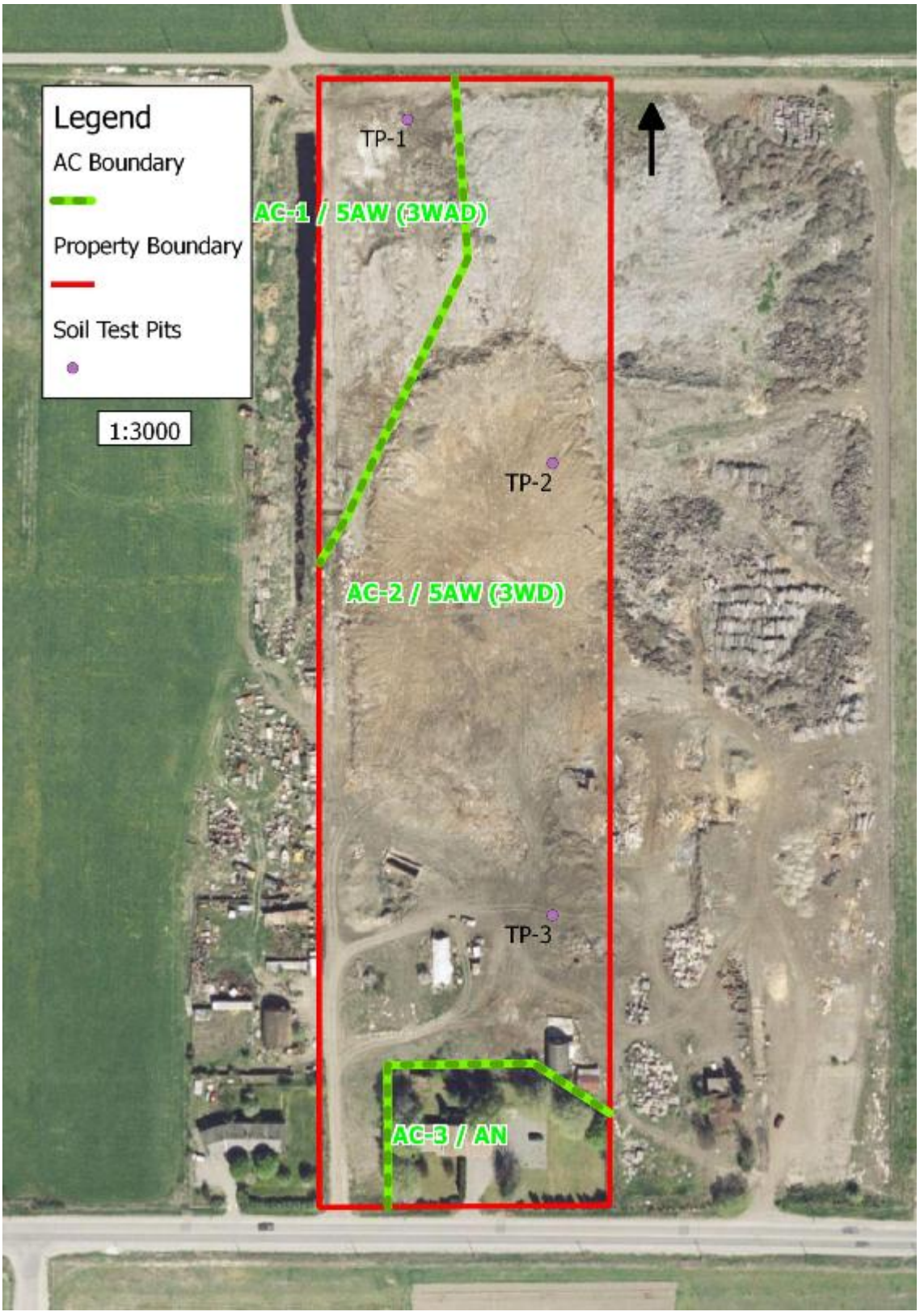


Figure 9: Agricultural Land Capability Mapping, 982 Old Vernon Rd., Kelowna BC

Appendix B – Site & Soil Test Pit Photos
982 Old Vernon Rd., Kelowna, BC

Figure 9: 982 Old Vernon Rd. Kelowna BC – Soil Inspection, Soil test pit location map

Photo 1: South portion of the site showing remaining footprint of mill work, stored machinery, storage bins and home site in background

Photo 2: Central portion of the site showing wood waste on the ground, weedy cover and a wood waste pile in background

Photo 3: Northern portion of the site showing wood waste on the ground, weedy cover and wood waste piles in background

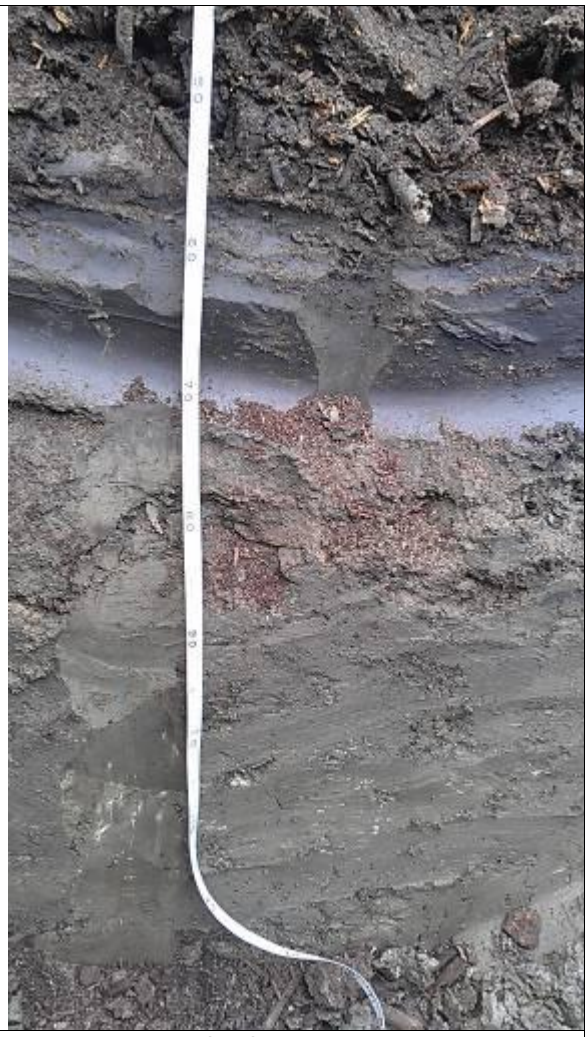
Project 12E043		TP #1	Slope N 1%		24-Oct-12	Overcast 2 C
Depth (cm)	Horizon	Texture	Consistence / Structure	Colour	Mottles	Coarse Fragments
2-0	LFH	-	thatch	-		
0-54	Fill	SL	admixed soil fill / WW	Dk Br	-	10% gravel*
54-70	B	C	firm / massive	DkGr	-	0% gravel
70+	C	HC	v. firm / blocky	Gr	-	0% gravel

Notes: All soil textures determined by laboritory testing, colour based on wet soils

Land Use – Former Mill
Vegetation grass and weeds
Poorly Drained Site
Gravel portion > 2.5 cm diameter
*Coarse fragments are estimated visually
WW - Wood Waste

0cm to 90cm depth

Photo 4: Test Pit 1 – 982 Old Vernon Rd., Kelowna, BC



50cm to 130cm depth

Photo 5: Test Pit 1 – 982 Old Vernon Rd., Kelowna, BC

Project 12E043		TP #2	Slope NW 2%		24-Oct-12	Overcast 2 C
Depth (cm)	Horizon	Texture	Consistence / Structure	Colour	Mottles	Coarse Fragments
2-0	LFH	-	thatch	-		
0-15	Fill	C	admixed soil fill	Dk Br	-	10% gravel*
15-35	B	C	firm / massive	Gr Br	-	0% gravel
35+	C	HC	v. firm / blocky	Br	-	0% gravel

Notes: All soil textures determined by laboritory testing, colour based on wet soils
Land Use – Former Mill Gravel portion > 2.5 cm diameter
Vegetation grass and weeds *Coarse fragments are estimated visually
Poorly Drained Site

0cm to 70cm depth

Photo 6: Test Pit 2 – 982 Old Vernon Rd., Kelowna, BC

50cm to 130cm depth

Photo 7: Test Pit 2 – 982 Old Vernon Rd., Kelowna, BC

Project 12E043		TP #3	Slope NW 1%		24-Oct-12	Overcast 2C
Depth (cm)	Horizon	Texture	Consistence / Structure	Colour	Mottles	Coarse Fragments
0-35	Fill	L	add mixed fill / WW	Br	-	10% gravel*
35-55	B	HC	v. firm / massive	DkGr	-	0% gravel*
55+	C	HC	v. firm / subangular blocky	Gr	-	0% gravel*

Notes: All soil textures determined by laboritory testing, colour determined with wet soil

Land Use – Former Mill
Vegetation grass and weeds
Poorly Drained Site
Gravel portion > 2.5 cm diameter
*Coarse fragments are estimated visually
WW - Wood Waste

0cm to 55cm depth

Photo 8: Test Pit 3 – 982 Old Vernon Rd., Kelowna, BC

50cm to 130cm depth

Photo 9: Test Pit 3 – 982 Old Vernon Rd., Kelowna, BC

Appendix C – Agricultural and Climatic Capability Class Descriptions

LAND CAPABILITY CLASSES FOR MINERAL SOILS

CLASS 1: LAND IN THIS CLASS EITHER HAS NO OR ONLY VERY SLIGHT LIMITATIONS THAT RESTRICT ITS USE FOR THE PRODUCTION OF COMMON AGRICULTURAL CROPS.

Land in Class 1 is level or nearly level. The soils are deep, well to imperfectly drained under natural conditions, or have good artificial water table control, and hold moisture well. They can be managed and cropped without difficulty. Productivity is easily maintained for a wide range of field crops.

CLASS 2 : LAND IN THIS CLASS HAS MINOR LIMITATIONS THAT REQUIRE GOOD ONGOING MANAGEMENT PRACTISES OR SLIGHTLY RESTRICT THE RANGE OF CROPS, OR BOTH.

Land in class 2 has limitations which constitute a continuous minor management problem or may cause lower crop yields compared to Class 1 land but which does not pose a threat of crop loss under good management. The soils in Class 2 are deep, hold moisture well and can be managed and cropped with little difficulty.

CLASS 3: LAND IN THIS CLASS HAS LIMITATIONS THAT REQUIRE MODERATELY INTENSIVE MANAGEMENT PRACTISES OR MODERATELY RESTRICT THE RANGE OF CROPS, OR BOTH.

The limitations are more severe than for Class 2 land and management practises are more difficult to apply and maintain. The limitations may restrict the choice of suitable crops or affect one or more of the following practises: timing and ease of tillage, planting and harvesting, and methods of soil conservation.

CLASS 4: LAND IN THIS CLASS HAS LIMITATIONS THAT REQUIRE SPECIAL MANAGEMENT PRACTISES OR SEVERELY RESTRICT THE RANGE OF CROPS, OR BOTH.

Land in Class 4 has limitations which make it suitable for only a few crops, or the yield for a wide range of crops is low, or the risk of crop failure is high, or soil conditions are such that special development and management practises are required. The limitations may seriously affect one or more of the following practises: timing and ease of tillage, planting and harvesting, and methods of soil conservation.

CLASS 5: LAND IN THIS CLASS HAS LIMITATIONS THAT RESTRICT ITS CAPABILITY TO PRODUCING PERENNIAL FORAGE CROPS OR OTHER SPECIALLY ADAPTED CROPS.

Land in Class 5 is generally limited to the production of perennial crops or other specially adapted crops. Productivity of these suited crops may be high. Class 5 lands can be cultivated and some may be used for cultivated field crops provided unusually intensive management is employed and/or the crop is particularly adapted to the conditions peculiar to these lands. Cultivated field crops may be grown on some Class 5 land where adverse climate is the main limitation, but crop failure can be expected under average conditions. Note that in areas which are climatically suitable for growing tree fruits and grapes the limitations of stoniness and/or topography on some Class 5 lands are not significant limitations to these crops.

CLASS 6: LAND IN THIS CLASS IS NONARABLE BUT IS CAPABLE OF PRODUCING NATIVE AND OR UNCULTIVATED PERENNIAL FORAGE CROPS.

Land in Class 6 provides sustained natural grazing for domestic livestock and is not arable in its present condition. Land is placed in this class because of severe climate, or the terrain is unsuitable for cultivation or use of farm machinery, or the soils do not respond to intensive improvement practises. Some unimproved Class 6 lands can be improved by draining and/or diking.

CLASS 7: LAND IN THIS CLASS HAS NO CAPAPBILITY FOR ARABLE OR SUSTAINED NATURAL GRAZING.

All classified areas not included in Classes 1 to 6 inclusive are placed in this class. Class 7 land may have limitations equivalent to Class 6 land but they do not provide natural sustained grazing by domestic livestock due to climate and resulting unsuitable natural vegetation. Also included are rockland, other nonsoil areas, and small water-bodies not shown on maps. Some unimproved Class 7 land can be improved by draining or diking.

Source: ALC http://www.alc.gov.bc.ca/alr/ag_cap_details.htm, Accessed December 2012

Appendix D – Analytical Data
982 Old Vernon Rd., Kelowna BC

Exova
#104, 19575-55 A Ave.
Surrey, British Columbia
V3S 8P8, Canada

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: Surrey@exova.com
W: www.exova.com

Report Transmission Cover Page

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Contact & Affiliation	Address	Delivery Commitments
Matt Davidson Valhalla Environmental	2503 35th Avenue Vernon, British Columbia V1T 2S6 Phone: (250) 275-1471 Fax: (866) 485-1471 Email: matt@valhallaconsulting.ca	On [Report Approval] send (Test Report) by Email - Single Report
Manraj Kandola Manraj Kandola	982 Old Vernon Road Kelowna, British Columbia V1X 6T8 Phone: (250) 765-0619 Fax: null Email: manrajkandola@hotmail.com	On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report

Notes To Clients:

- Insufficient sample volume to complete dry sieve analysis on sample 902099-1.
- Report was re-issued to include missing dry sieve analysis on samples 902099-2 to 8. Report 1785767 replaces original report 1779561.

Exova
#104, 19575-55 A Ave.
Surrey, British Columbia
V3S 8P8, Canada

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F: +1 (604) 514-3323
E: Surrey@exova.com
W: www.exova.com

Sample Custody

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Sample Disposal Date: December 05, 2012

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

Exova
#104, 19575-55 A Ave.
Surrey, British Columbia
V3S 8P8, Canada

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F: +1 (604) 514-3323
E: Surrey@exova.com
W: www.exova.com

Exova

Analytical Report

Bill To:	Manraj Kandola	Project:		Lot ID:	**902099**
Report To:	Manraj Kandola	ID:	12 E043	Control Number:	196-1001
	982 Old Vernon Road	Name:	Kandola- Ag Cap	Date Received:	Oct 26, 2012
	Kelowna, BC, Canada	Location:	Kelowna	Date Reported:	Nov 22, 2012
	V1X 6T8	LSD:		Report Number:	1785767
Attn:	Manraj Kandola	P.O.:			
Sampled By:	MD	Acct code:			
Company:	Valhalla				

Reference Number	902099-1
Sample Date	Oct 24, 2012
Sample Time	NA
Sample Location	
Sample Description	TP1 / TP1-01 / 30cm
Matrix	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Available Nutrients						
Nitrate - N	Available	ug/g	3			2
Phosphorus	Available	ug/g	8			5
Potassium	Available	ug/g	492			25
Sulfate-S	Available	mg/kg	<10			1
Calcium	Available	mg/kg	4580			30
Magnesium	Available	mg/kg	990			5
Sodium	Available	mg/kg	520			30
Ammonium - N	Available-dry basis	ug/g	122			0.3
Soil Acidity						
pH	1:2 Soil:Water	pH	6.2			
Electrical Conductivity	Sat. Paste equiv based on 1:2	dS/m at 25 C	0.54			0.02
Electrical Conductivity	1:2 Soil:Water	dS/m at 25 C	0.26			0.01

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Analytical Report

Bill To:	Manraj Kandola	Project:		Lot ID:	**902099**
Report To:	Manraj Kandola	ID:	12 E043	Control Number:	196-1001
	982 Old Vernon Road	Name:	Kandola- Ag Cap	Date Received:	Oct 26, 2012
	Kelowna, BC, Canada	Location:	Kelowna	Date Reported:	Nov 22, 2012
	V1X 6T8	LSD:		Report Number:	1785767
Attn:	Manraj Kandola	P.O.:			
Sampled By:	MD	Acct code:			
Company:	Valhalla				

		Reference Number	902099-1	902099-2	902099-3	
		Sample Date	Oct 24, 2012	Oct 24, 2012	Oct 24, 2012	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	TP1 / TP1-01 / 30cm	TP1 / TP1-02 / 60cm	TP1 / TP1-03 / 100cm	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties						
Moisture at 1/3 bar		%	35.6	38.8	36.8	0.1
Moisture at 15 bar		%	28.1	23.3	23.1	0.1
Texture			Sandy Loam	Clay	Heavy Clay	
Sand	50 µm - 2 mm	% by weight	62.7	19.6	7.6	0.1
Silt	2 µm - 50 µm	% by weight	27.3	33.4	15.4	0.1
Clay	<2 µm	% by weight	10.0	47.0	77.0	0.1

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Analytical Report

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Reference Number		902099-2	902099-3	902099-4
Sample Date		Oct 24, 2012	Oct 24, 2012	Oct 24, 2012
Sample Time		NA	NA	NA
Sample Location				
Sample Description		TP1 / TP1-02 / 60cm	TP1 / TP1-03 / 100cm	TP2 / TP2-01 / 15cm
Matrix		Soil	Soil	Soil

Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Particle Size Analysis - Dry Sieve						
2.0 mm sieve	% Retained	% by weight	1.2	0.2	10.6	0.1
500 micron sieve	% Retained	% by weight	0.9	0.7	9.8	0.1
250 micron sieve	% Retained	% by weight	1.1	0.8	3.7	0.1
53 micron sieve	% Retained	% by weight	12.0	1.4	10.0	0.1

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Analytical Report

Bill To:	Manraj Kandola	Project:		Lot ID:	**902099**
Report To:	Manraj Kandola	ID:	12 E043	Control Number:	196-1001
	982 Old Vernon Road	Name:	Kandola- Ag Cap	Date Received:	Oct 26, 2012
	Kelowna, BC, Canada	Location:	Kelowna	Date Reported:	Nov 22, 2012
	V1X 6T8	LSD:		Report Number:	1785767
Attn:	Manraj Kandola	P.O.:			
Sampled By:	MD	Acct code:			
Company:	Valhalla				

		Reference Number	902099-4	902099-5	902099-6	
		Sample Date	Oct 24, 2012	Oct 24, 2012	Oct 24, 2012	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	TP2 / TP2-01 / 15cm	TP2 / TP2-02 / 30cm	TP3 / TP3-01 / 20cm	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties						
Moisture at 1/3 bar		%	50.4	40.7	57.7	0.1
Moisture at 15 bar		%	28.2	27.4	37.8	0.1
Texture			Clay	Clay	Loam	
Sand	50 µm - 2 mm	% by weight	25.6	15.2	44.3	0.1
Silt	2 µm - 50 µm	% by weight	27.0	27.8	30.7	0.1
Clay	<2 µm	% by weight	47.4	57.0	25.0	0.1

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Analytical Report

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

		Reference Number	902099-5	902099-6	902099-7
		Sample Date	Oct 24, 2012	Oct 24, 2012	Oct 24, 2012
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	TP2 / TP2-02 / 30cm	TP3 / TP3-01 / 20cm	TP3 / TP3-02 / 45cm
		Matrix	Soil	Soil	Soil
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Particle Size Analysis - Dry Sieve						
2.0 mm sieve	% Retained	% by weight	0.1	20.8	0.3	0.1
500 micron sieve	% Retained	% by weight	0.5	16.4	0.7	0.1
250 micron sieve	% Retained	% by weight	0.4	8.0	0.7	0.1
53 micron sieve	% Retained	% by weight	3.9	12.8	5.2	0.1

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Analytical Report

Bill To:	Manraj Kandola	Project:		Lot ID:	**902099**
Report To:	Manraj Kandola	ID:	12 E043	Control Number:	196-1001
	982 Old Vernon Road	Name:	Kandola- Ag Cap	Date Received:	Oct 26, 2012
	Kelowna, BC, Canada	Location:	Kelowna	Date Reported:	Nov 22, 2012
	V1X 6T8	LSD:		Report Number:	1785767
Attn:	Manraj Kandola	P.O.:			
Sampled By:	MD	Acct code:			
Company:	Valhalla				

		Reference Number	902099-7	902099-8		
		Sample Date	Oct 24, 2012	Oct 24, 2012		
		Sample Time	NA	NA		
		Sample Location				
		Sample Description	TP3 / TP3-02 / 45cm	TP3 / TP3-03 / 100cm		
		Matrix	Soil	Soil		
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties						
Moisture at 1/3 bar		%	38.7	43.7		0.1
Moisture at 15 bar		%	23.9	25.3		0.1
Texture			Heavy Clay	Heavy Clay		
Sand	50 µm - 2 mm	% by weight	15.6	8.6		0.1
Silt	2 µm - 50 µm	% by weight	19.4	9.4		0.1
Clay	<2 µm	% by weight	65.0	82.0		0.1

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Analytical Report

Bill To:	Manraj Kandola	Project:		Lot ID:	**902099**
Report To:	Manraj Kandola	ID:	12 E043	Control Number:	196-1001
	982 Old Vernon Road	Name:	Kandola- Ag Cap	Date Received:	Oct 26, 2012
	Kelowna, BC, Canada	Location:	Kelowna	Date Reported:	Nov 22, 2012
	V1X 6T8	LSD:		Report Number:	1785767
Attn:	Manraj Kandola	P.O.:			
Sampled By:	MD	Acct code:			
Company:	Valhalla				

Reference Number	902099-8
Sample Date	Oct 24, 2012
Sample Time	NA
Sample Location	
Sample Description	TP3 / TP3-03 / 100cm
Matrix	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Particle Size Analysis - Dry Sieve						
2.0 mm sieve	% Retained	% by weight	<0.1			0.1
500 micron sieve	% Retained	% by weight	0.2			0.1
250 micron sieve	% Retained	% by weight	0.2			0.1
53 micron sieve	% Retained	% by weight	0.6			0.1

Approved by:

Mathieu Simoneau
Operations Manager

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Quality Control

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Available Nutrients

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Ammonium - N	mg/L	0.035	-0.3	0.3	yes
Nitrate - N	mg/L	0.149	-1	1	yes
Phosphorus	mg/L	0.289	-4	5	yes
Potassium	mg/L	0.074	-3	10	yes
Sulfate-S	mg/L	0.1064	0	1	yes
Calcium	mg/L	1.029	-1	3	yes
Magnesium	mg/L	0.1713	-0	0	yes
Sodium	mg/L	0.8753	-0	2	yes
Date Acquired:	October 29, 2012				

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Ammonium - N	ug/g	826	854	10	0.6	yes
Nitrate - N	ug/g	36	37	10	2	yes
Phosphorus	ug/g	80	80	10	5	yes
Potassium	ug/g	1620	1550	10	10	yes
Date Acquired:	October 29, 2012					

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Ammonium - N	ug/g	8.3	6.3	9.5	yes
Nitrate - N	ug/g	42	33	47	yes
Phosphorus	ug/g	16	12	18	yes
Potassium	ug/g	280	234	288	yes
Sulfate-S	mg/kg	644	560	806	yes
Calcium	mg/kg	7440	6135	8301	yes
Magnesium	mg/kg	648	550	744	yes
Sodium	mg/kg	80	61	99	yes
Date Acquired:	October 29, 2012				
Ammonium - N	ug/g	4.0	3.6	4.2	yes
Nitrate - N	ug/g	4	3	5	yes
Phosphorus	ug/g	3	2	4	yes
Potassium	ug/g	31	24	36	yes
Sulfate-S	mg/kg	1	1	1	yes
Calcium	mg/kg	10	9	11	yes
Magnesium	mg/kg	10	9	11	yes
Sodium	mg/kg	10	9	11	yes
Date Acquired:	October 29, 2012				

Physical and Aggregate Properties

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Moisture	%	13.2	12.8	10	0.3	yes
Date Acquired:	November 05, 2012					

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Quality Control

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Physical and Aggregate Properties - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Moisture at 1/3 bar	%	27.2	20.5	32.5	yes
Moisture at 15 bar	%	15.5	11.0	23.0	yes
Date Acquired: October 29, 2012					
Moisture at 1/3 bar	%	38.3	0.0	0.0	yes
Moisture at 15 bar	%	36.9	0.0	0.0	yes
Sand	% by weight	39.6	35.8	45.4	yes
Silt	% by weight	41.0	31.0	43.6	yes
Clay	% by weight	19.4	15.6	28.8	yes
<50 um	% by weight	60.4	54.700	64.300	yes
Date Acquired: October 29, 2012					

Particle Size Analysis - Dry Sieve

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
2.0 mm sieve	% by weight	0.1	0.0	0.0	yes
500 micron sieve	% by weight	3.9	0.0	0.0	yes
250 micron sieve	% by weight	7.6	0.0	0.0	yes
53 micron sieve	% by weight	28.2	0.0	0.0	yes
Date Acquired: November 16, 2012					
2.0 mm sieve	% by weight	0.1	0.0	0.0	yes
500 micron sieve	% by weight	3.0	0.0	0.0	yes
250 micron sieve	% by weight	7.4	0.0	0.0	yes
53 micron sieve	% by weight	23.3	0.0	0.0	yes
Date Acquired: November 16, 2012					

Soil Acidity

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
pH	pH	6	5.3	7.2	yes
Electrical Conductivity	dS/m at 25 C	0.005	-0.00	0.01	yes
Date Acquired: October 30, 2012					

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
pH	pH	7.3	7.0	7.4	yes
Electrical Conductivity	dS/m at 25 C	1.30	1.15	2.05	yes
Date Acquired: October 30, 2012					

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Methodology and Notes

Bill To:	Manraj Kandola	Project:	
Report To:	Manraj Kandola	ID:	12 E043
	982 Old Vernon Road	Name:	Kandola- Ag Cap
	Kelowna, BC, Canada	Location:	Kelowna
	V1X 6T8	LSD:	
Attn:	Manraj Kandola	P.O.:	
Sampled By:	MD	Acct code:	
Company:	Valhalla		

Lot ID:	**902099**
Control Number:	196-1001
Date Received:	Oct 26, 2012
Date Reported:	Nov 22, 2012
Report Number:	1785767

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Ammonium-N (Extractable) in Soil	Carter	*	Extraction of NO3-N and NH4-N with 2.0 M KCl, 6.2	29-Oct-12	Exova Edmonton
Macronutrients in General Soils	McKeague	*	Ammonium Acetate Extractable Cations, 4.51	29-Oct-12	Exova Edmonton
Nutrients in General Soil	Comm. Soil Sci. Pl. Anal.	*	Modified Kelowna Soil Test, Vol 26, 1995	29-Oct-12	Exova Edmonton
Particle Size Analysis - GS	Carter	*	Hydrometer Method, 55.3	29-Oct-12	Exova Edmonton
Particle Size by Dry Sieve	Carter	*	Sieve Analysis (Mechanical Method), 55.4	16-Nov-12	Exova Edmonton
pH and Conductivity in general soil 1:2	McKeague	*	1:2 Soil:Water Ratio, 4.12	29-Oct-12	Exova Edmonton
Sulfate in General Soil	McKeague	*	Sulfate Extractable by 0.1M CaCl2, 4.47	29-Oct-12	Exova Edmonton
Water Retention Curves	Agronomy No 9, Part 1	*	Water Retention: Laboratory Methods, 26-6	29-Oct-12	Exova Edmonton

** Reference Method Modified*

References

Agronomy No 9, Part	Methods of Soil Analysis, Part 1
Carter	Soil Sampling and Methods of Analysis.
Comm. Soil Sci. Pl.	Communications in Soil Science and Plant Analysis
McKeague	Manual on Soil Sampling and Methods of Analysis

Comments:

- Insufficient sample volume to complete dry sieve analysis on sample 902099-1.
- Report was re-issued to include missing dry sieve analysis on samples 902099-2 to 8. Report 1785767 replaces original report 1779561.

Appendix E – Resumes

Valhalla Environmental Consulting Inc

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Matthew Davidson BSc., P.Ag., EP., AScT. – Environmental Scientist

Matthew Davidson is an Environmental Scientist with a background in environmental biology, environmental assessment, land services and contaminated sites. With a diverse work history Matthew has worked for clients in various sectors including oil and gas, forestry, agriculture, land development, construction, recycling, and waste management industries. Project work has taken Matthew throughout British Columbia, into Alberta and the North West Territories. Matthew is a founding partner of Sage Environmental Consulting Ltd and is presently a Partner at Valhalla Environmental Consulting Inc. Coldstream, BC

Environmental Work Experience (11 Years)

Partner / Environmental Scientist Valhalla Environmental Consulting Ltd, Coldstream, BC	July 2011
Owner / Environmental Scientist Sage Environmental Consulting Ltd, Vernon, BC	January 2008
Environmental Scientist TerraWest Environmental Consultants Ltd., Victoria, BC	August 2005
Field Foreman Alpine Environmental Ltd. Fort St. John, BC	May 2001

Education

BSc. Environmental Science, Royal Roads University	2005
Dipl.Tech. Environmental Science, Camosun College	2002
A.S. Biology, Camosun College	1999

Professional Associations

P.Ag. – British Columbia Institute of Agrologists (**BCIA**)
AScT. – Applied Science Technologists and Technicians of British Columbia (**ASTTBC**)
E.P. – Environmental Professional (Eco Canada)
A5 - Restoration & Reclamation
A7 - Environmental Protection Management
SER – Member of the Society for Ecological Restoration

Environmental Work Summary

- Stage 1 & 2 preliminary site investigations (PSI), Detailed Site Investigations (DSI) & Land Remediation
- Ecological Restoration Project Design and Management
- Environmental Impact Assessments
- Riparian Areas Assessments
- Environmental Monitoring for Construction Projects and Instream Works
- Erosion and Sediment Control Design, Implementation and Monitoring
- Spill response, and remediation of terrestrial and aquatic spills
- Policy writing & application package preparation
- Facility audit design and implementation for environmental compliance and performance
- Environmental Sampling Program Design and Implementation
- Instructor for Malaspina College; WHMIS, TDG, Spill Response and Environmental Awareness courses
- Site assessments and inspections for pipelines right of way and oil and gas well sites
- Industrial waste management, for the upstream Oil & Gas Industry
- Agricultural Land Capability Assessments (ALR)
- Habitat Assessment and Mapping
- Groundwater / Water Quality Monitoring Design and Implementation

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Select Project Portfolio

Construction Environmental Monitoring – BC 2012 – Services included environmental monitoring for two bridge construction projects over fish bearing streams in BC's southern interior. Daily logging and summary reporting were provided to the client and Ministry of Forests Lands and Natural Resource Operations.

Environmentally Sensitive Areas Assessment and Terrestrial Habitat Mapping – Vernon BC 2011/2012 – Provided habitat mapping of the Foothills Neighbourhood in Vernon BC to inform the City of Vernon neighbourhood plan development. Services included review of existing TEM and SEI 1:20000 mapping, confirmation field visits to updated and correct existing mapping to current conditions, creation of site specific 1:3000 habitat mapping, invasive species survey, rare and endangered species survey, and reporting.

Spill Remediation Confirmation Analysis – West Kootenay BC 2011/2012 – Scope of services induced; sampling plan design to meet MoE standards, sampling for laboratory analysis, contractor liaison regarding remediation measures, compliance analysis with BC CSR, and confirmation of remediation reporting

Spill Remediation Confirmation Analysis – CSRD BC 2011 – Scope of services induced; sampling plan design to meet MoE standards, sampling for laboratory analysis, contractor liaison regarding remediation measures, compliance analysis with BC CSR, and confirmation of remediation reporting

Agricultural Land Capability Assessments (ALR Exclusion, Inclusion, Development) – BC 2011/2012: Scope of services includes; ALR soil mapping review, on site soil survey, analytical testing, agricultural capability assessment and reporting prepared for the Agricultural Land Commission

Contaminated Site Investigation and Remediation Various Clients, throughout BC 2005 to Present: Stage 1 & 2 Preliminary Site Investigations (Phase 1&2 ESAs), Detailed Site Investigations, Land Remediation

Spill Response/Remediation/Habitat Restoration – Cherryville, (Gagney Creek), BC– 2009 (Currently in Monitoring Phase): Scope of services included; emergency spill response, installation of water treatment, land remediation, instream works, environmental monitoring, habitat reconstruction and ecological restoration, long term monitoring, regulatory liaison, environmental , freshwater invertebrate surveys

Environmentally Sensitive Areas Assessments – Various Clients, Okanagan BC – 2010 / 2011: Identify, classify, rate and map terrestrial ecosystems based on vulnerability and scarcity. Provide GIS mapping, interpretation and methods reporting including mitigation measures for proposed development projects.

Habitat Restoration Plan – Vernon Airport, Vernon, BC - 2009 – Designed a habitat restoration plan for riparian habitat adjacent to the Vernon Airport.

Habitat Restoration Plan – Private Land Owner Salmon Arm, BC 2008: Prepared a restoration strategy to guide the ecological repair of a heavily degraded site along a wetland boundary, to meet regulatory requirements. The final plan incorporated current riparian areas management and restoration practice recommendations to best re-establish a native ecosystem and provide long term support for this location.

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Environmental Impact Assessment – Environmental Assessment - Private Agricultural Land Owner Land, (Grandon Creek), Qualicum, BC 2006: Developed and implemented a sampling program to determine the impact to soils and surface water on a farm that was subject to composted biosolid application. This project involved designing a sampling plan and method, laying out a representative predetermined sample plan with GIS before conducting sampling, GPS location and confirmation of sample point, collection of soil and surface water samples, soil profiling, determining appropriate laboratory analyses, interpretation of analytical results, and synthesis of a final report.

Environmental Impact Assessment, Facility Design and Construction Monitoring - Composting Operation, Ladysmith BC 2007: Designed and performed an Environmental Impact Assessment for a proposed composting facility to meet the requirements of the Organic Materials Recycling Regulation, assisted in facility design to ensure efficient operation and minimize environmental impacts, developed and implemented a long term surface and groundwater monitoring program.

Groundwater Monitoring Cowichan, (Gordon River), BC 2005-2007: Surface Water and Groundwater sampling, analysis and interpretation for impacts to groundwater and freshwater aquatic habitat due to numerous wood waste landfills

Groundwater Monitoring, Chasm, BC 2005-2008: West Fraser Mills – Conducted groundwater monitoring for on site woodwaste landfills at the Chasm Mill

Spill Remediation – EnviroWest, Nanaimo BC 2006: Spill response on a property bordering a salt water marsh, duties included supervision of response activities, sampling of impacted soils and nearby surface water, sample analysis prescription, delineating spill extent, manifested removal of impacted soils to approved treatment facility, reconstruction of the damaged site, analysis interpretation and final report synthesis.

Riparian Areas Regulation – Various Clients, Southern BC 2006 to Present: Duties include habitat and site assessment, riparian habitat enhancement measures, impact mitigation management, regulatory liaison, reporting, environmental monitoring, variance applications.

Environmental Impact Assessment – Land Lessee, Quaaout Reserve, (Little Shuswap Lake), BC – 2009: Comprehensive EIA performed to review a riparian construction project on Quaaout Reserve. EIA for the project was approved by INAC and DFO.

Environmental Impact Assessment – Land Owner, Central Okanagan, (Okanagan Lake,) BC – 2009: Comprehensive EIA performed to review a riparian construction project on Okanagan Lake. EIA for the project was approved by RDCO and MoE.

Construction Environmental Monitoring Vernon, BC with Naito Environmental, 2010: Provided daily monitoring during the demolition of a bridge over Vernon Creek. Including on-site technical support, mitigation measure design and implementation, creek condition monitoring, regulatory liaison and reporting.

Construction Environmental Monitoring Okanagan, (Kalamalka Lake) BC Parks with Naito Environmental, 2010: Daily Monitoring during the installation of two wharf structures in Kalamalka Lake with bedrock drilled piers in an area of high quality fish habitat. Services included onsite technical support, environmental mitigation measures, reporting, and regulatory liaison.

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Construction Environmental Monitoring for – Katchmar Construction, (Sheridan Lake, Staley Lake, Staley Lake Ck) BC – March 2008 to April 2008: Provided on-site environmental monitoring for a wetland crossing road construction project. Duties included: daily monitoring, daily log, reporting, regulatory liaison, onsite advice and restoration design

Skills and Certifications

Fieldwork

- Stream surveys & Riparian Areas Assessment
- Freshwater, groundwater, and marine water sampling
- Monitoring well and drill sampling supervision
- Soil texturing, profiling and sampling
- Soil vapour sampling
- Sediment sampling
- Site assessment, descriptions and mapping
- Spill response, investigation, assessment and remediation
- Orienteering and survival knowledge

Equipment

- Experience with various field meters, multi meters, monitoring apparatus, high flow and low flow purging and sample pumps
- GPS field operator
- SCBA, and SCUBA
- ATV, snowmobile and helicopter awareness
- Small engine use and repair
- Boating 200+ hours (marine and freshwater)

I.T.

- GIS, CAD
- Web page development
- Office suite competency
- Statistical analysis software
- Data base development
- Data analysis applications

Courses and Certificates

- Contaminated Site Investigation
- Soil Bioengineering
- Soil Vapour Assessment
- Environmental Monitoring for Construction
- Erosion and Sediment Control
- Riparian Area Regulation Training
- Pleasure Craft Operator
- Streamkeeper Training
- Level 1 First Aid
- Radio telephone operator certificate
- P.A.D.I. advanced open water diver
- R.I.C. certified level 3 GPS field operator
- Class 5 drivers license
- Defensive driving course
- Ecological Control for Invasive Species

CATHERINE ORBAN, MSC, PAG

ENVIRONMENTAL PLANNER/INSPECTOR & SOIL SPECIALIST

1977 HARLEQUIN CRES
NANOOSE BAY, BC, V9P 9J2
OFFICE: 250-468-7959
CELL: 250-612-2166
catherineo@telus.net

EDUCATION

- **M.Sc., Physical Geography (Specializing in Soils) 1990**
  University of Calgary, Calgary, Alberta
- **B.Sc., Physical Geography, 1985**
  University of Calgary, Calgary, Alberta
- **Fine Art - General Studies, 1980**
  Alberta College of Art, Calgary, Alberta

SPECIALIZED TRAINING

- Standard First Aid & CPR
  St John's Ambulance
- H2S Alive
- WHMIS
- ATV – 4x4 Training Course
- Riparian Area Regulation (BC).
  Malaspina University College (2006)
- Remediation Processes for Contaminated Soil and Groundwater.
  EPIC Educational Program Innovations Centre (2001).
- Environmental Regulation in the Oil & Gas Industry.
  Canadian Association of Petroleum Landmen (1996).
- Decommissioning and Reclamation of Small Oil & Gas Sites.
  Petroleum Industry Training Service (1996).
- Introduction to Avalanche & Backcountry Safety

PROFESSIONAL AFFILIATIONS

- British Columbia Institute of Agrologists (P. Ag.)
- Qualified Environmental Professional (QEP)
- Canadian Land Reclamation Association (CLRA)
- Columbia Mountains Institute (CMI)

EMPLOYMENT HISTORY

2002 - Present **Environmental Planner/Inspector/Soil Specialist (Independent Consultant)**
Selected Clients:

TERA Environmental Consultants
Calgary, Alberta

C&F Land Resource Consultants Ltd.
Victoria, BC

Spectra Energy (formerly Duke Energy Gas Transmission & Westcoast Energy Inc.)
Prince George, BC

2001 - Present **Part Time Instructor (Short Courses)**
Various courses in soil management, erosion & sediment control, environmental monitoring & inspection, and planning for pipeline construction projects
ENFORM Canada (formerly the Petroleum Industry Training Service [PITS])
Calgary, Alberta

Vancouver Island University (VIU), Natural Resources Extension Program
Nanaimo, BC

1996 - 2002 **Project Manager/Staff Agrologist**
Matrix Solutions Inc.
Calgary, Alberta

1992 - 1996 **Consulting Soil Specialist/ Environmental Inspector (Independent Consultant)**
Soils & General Environmental Expertise
Oil & Gas Sites, Pipelines & Related Projects
Alberta & BC

1990 - 1992 **Project Consultant**
AGRA Earth & Environmental Ltd.
Calgary, Alberta

1986 - 1990 **Project Coordinator**
Small Island Research Group (SIRG)
Calgary, Alberta & St Vincent, WI

1986 - 1990 **Graduate Student/Teaching Assistant**
University of Calgary,
Department of Geography
Calgary, Alberta

1982 - 1984 &1990 **Interpretive Naturalist (Seasonal)**
Alberta Provincial Parks

CAREER AND PROJECT EXPERIENCE

Soil Surveys, Agricultural Land Capability & Terrain Assessments

- Conducted soils and terrain assessments and prepared reports for various pipeline, wellsite and access road construction projects.
- Conducted detailed soil surveys on government and private properties, and prepared reports for submission to the Agricultural Land Commission (ALC).
- Prepared soil survey and construction as-built reports including; environmental overviews, soil descriptions and classifications, soil handling and reclamation recommendations/plans, and monitoring information.
  - West Wapiti Pipeline Project – Central Alberta Midstream (2005)
  - Lougheed Loop - Southern Mainline Expansion - Duke Energy (2002-2003)
  - Goodrich Acid Gas Re-injection Pipeline - Duke Energy (2003)
  - Calgary-Cochrane Wastewater Pipeline – Stanley Engineering (1999)
  - Empress Gas Plant Expansion (1998)
  - Savona Loop – Westcoast Energy (1995)
  - Alexandria Loop – Westcoast Energy (1995)
  - McLeod Lake Loop – Westcoast Energy (1995)
  - Wolf 16" Pipeline – Westcoast Energy (1994)

Contaminated Sites

- Developed, managed and implemented a variety of environmental assessment, remediation and reclamation projects, from individual leases to an active gas plant site, and a pipeline gathering system.
- Conducted pre-construction as well as Phase I & II assessments and prepared reports for oil and gas sites and facilities.
  - Carstairs-Crossfield Gas Plant – Anderson Exploration Ltd. (1996 – 2002)
  - Midale Oil Pipeline Gathering System – Shell Canada Ltd & Enbridge Pipelines Inc (1999 – 2000)
  - South Elkton Gas Plant – Anderson Exploration Ltd. (1996 – 2002)
  - Wildhay Gas Plant – Berkley Petroleum (2001)

International Work Experience

- CIDA Agronomy Training Projects for farmers, teachers, government personnel and extension officers, St Vincent, WI.
  - Shared responsibility for development and implementation of Agronomy Training Projects (3½ years total), based in St. Vincent, West Indies (completed thesis research concurrently).
- CIDA Angele-Bolhamo irrigation feasibility study, Awash Valley, Ethiopia.
  - Conducted a Socio-Economic Impact Assessment for this irrigation feasibility study in Ethiopia.

Project Management/Leadership/Training

- Updated and delivered the following short courses:
  - "Soils and the Planning Process" ½ day module (Enform)
  - "Soil Handling for Pipeline Construction"1/2 day module (Enform)
  - "Environmental Planning for Linear Development" 2 day course (Enform)
  - "Pipeline Environmental Inspection" 3 day course (Enform)
  - "Environmental Monitoring for Construction Projects" 3 day course (VIU, NREP)
  - "Erosion & Sediment Control" 3-day course (VIU, NREP)
  - "Aboriginal Environmental Technician Training Program" 5 day course
- Worked with and supervised contractors, consultants and summer students in all areas of expertise (outlined above).
- Acted as liaison with representatives from various regulatory agencies during implementation of various oil and gas projects.
- Prepared a Pest Management Plan for a pipeline corridor in south-central BC.
- Landmark Education - Leadership & Communications – Core Curriculum & Seminars
- Eastern Caribbean Islands - Student Leader - 6-wk field school – U of C Geography

Pipeline Inspection (Environmental & Soils)

- Supervised implementation of general environmental protection measures during pipeline construction and reclamation activities.
- Conducted liaison with various regulatory agencies during pipeline construction project planning, audits and inspections.
- Supervised soil salvage and handling during pipeline construction, clean-up and reclamation activities.
- Prepared daily progress and as-built reports for environmental protection measures on pipeline construction projects.
  - Joffre CO_2 Pipeline - Penn West (2007)
  - Bullmoose Development Project – Tumbler Ridge, BC – Shell Canada Ltd. (2006-2007)
  - TMX Pump Station Upgrades – Kinder-Morgan (2006)
  - Hythe SW Loop – Encana (2005)
  - Pine Pass Replacement – Duke Energy (2003)
  - Fort St John Replacement – Westcoast Energy (1995)
  - Savona Loop – Westcoast Energy (1995)
  - Alexandria Loop – Westcoast Energy (1995)
  - Wolf 16" Pipeline – Westcoast Energy (1994)
  - South Okanagan Natural Gas Pipeline – BC Gas (1994)
  - Blue Hills Pipeline – Westcoast Energy (1993)

Environmental Planning

- Carried out coordination, review and management activities for environmental impact assessments and environmental protection plans for various pipeline construction projects in BC, Alberta and the Northwest Territories.
- Conducted environmental orientations, audits and inspections for various pipeline construction projects throughout BC.
- Shared responsibility for development and preparation of the Pest Management Plan (PMP) for Duke Energy Mainline – Southern Region (2003)
- Carried out mapping and data analysis for the purposes of evaluating and selecting sites and routing corridors for natural areas preservation, transmission lines and pipelines.
- Shared responsibility for the development and preparation of environmental and socio-economic impact assessments.
- Responsible for advertising, interviewing, hiring, coordinating & evaluating work for the Aboriginal Environmental Inspector Apprentices on two pipeline construction projects in BC.
  - Access Pipeline Project - Access Pipeline Ltd. (2004)
  - Goodrich Acid Gas Re-injection Pipeline - Duke Energy (2003)
  - Southern Mainline Expansion - Duke Energy (2002-2003)
  - Grizzly Valley Extension - Duke Energy (2003)

PUBLICATIONS AND PRESENTATIONS

Orban, C.M., Gayle, J.E., Smith, B.S. and Leggett, S.A. 2000. "Use of Statistical Methods to Assess Soil Conditions Related to Linear Property Transactions." Matrix Solutions Inc., Shell Canada Ltd., Enbridge Pipelines Inc., September 2000.

Orban, C. 1990. "Patterns of Variations in Selected Soil Properties, St. Vincent, West Indies." University of Calgary, Master's Thesis.

Orban, C., and W. Matadial. 1989. "Fertilizer Trials on Selected Root Crops in St. Vincent." Paper presented at the 25th Annual Caribbean Food Crop Society Meeting, Guadeloupe, July, 1989.

ATTACHMENT F
This forms part of application
A19-0018
Planner Initials BC
City of Kelowna DEVELOPMENT PLANNING

CITY OF KELOWNA
MEMORANDUM

Date: November 26, 2019

File No.: A19-0018

To: Land Use Planning Manager (BC)

From: Development Engineering Manager (JK)

Subject: 982 Old Vernon Rd A1

The Development Engineering Branch has the following comments with regard to this application for non-farm use to allow for tree service operations on the subject property.

General

1. This application does not compromise any City of Kelowna municipal infrastructure.

James Kay

James Kay, P.Eng.
Development Engineering Manager

JKH

BRITISH COLUMBIA

November 25 2019

File: A19-0018

City of Kelowna
1435 Water Street
Kelowna BC V1Y 1J4
E-mail: planninginfo@kelowna.ca

Re: ALC Non-Farm Use Application A19-0018 at 982 Old Vernon Road

To the City of Kelowna,

Thank you for providing the B.C. Ministry of Agriculture the opportunity to comment on the Agricultural Land Commission non-farm use application at 982 Old Vernon Road. I have reviewed the documents you have provided. From an agricultural perspective I can provide the following comments for your consideration:

- The parcel is located within the Agricultural Land Reserve (ALR), a provincial zone in which agriculture is recognized as the priority use; where farming is encouraged, and non-agricultural uses are restricted.
- Ministry staff acknowledge the apparent efforts by the property owner in undertaking the rehabilitation of the property. The provided referral details describing how the tree chipping business's proposed operations may be advantageous in removing the existing wood debris are recognized. Ministry staff however have concerns regarding the business's potential amount of introduced additional material, the duration of the activity, and long-term impact on the parcel's agricultural viability.
- In addition, given the history of a sawmill on site, Ministry staff also have concerns regarding the potential for any pre-existing contamination and note that a Ministry of Environment (MOE) site profile has not been included in this referral. As described in the provincial *Environmental Management Act,* a site profile would be deemed required with the cease of sawmill operations post-1997 onward. There are other conditions requiring one as well, such as for soil removal and providing it to a municipality under certain circumstances. Ministry staff encourage the applicant to contact MOE staff to confirm if a site profile is required in accordance with provincial legislation, and for Kelowna staff to contact MOE staff to confirm any municipal administrative requirements.

If you have any questions, please contact me directly at christina.forbes@gov.bc.ca or 250-861-7201.

Sincerely,

Christina Forbes, P.Ag
Regional Agrologist
B.C. Ministry of Agriculture – Kelowna
Office: (250) 861-7201
E-mail: christina.forbes@gov.bc.ca
Email copy: ALC Planner, ALC.Okanagan@gov.bc.ca
Colleen Delaney, MOE Contaminated Sites Officer, Colleen.Delaney@gov.bc.ca