

1691 Sea to Sky Highway and 7312 Macrae Road
Pemberton, BC

Agrologist Report



PREPARED FOR:

Pemberton Music Festival LP
Suite 103-924 Valmont Street
New Orleans, LA, USA
70115

PREPARED BY:

PGL Environmental Consultants
#1200 – 1185 West Georgia Street
Vancouver, BC V6E 4E6

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solve and simplify

Table of Contents

1.0	Introduction.....	1
2.0	Site Description	1
3.0	Site Soils.....	1
3.1	Soil Description.....	2
4.0	Agricultural Capability Classification.....	4
4.1	Historical Soil Survey.....	4
5.0	Outdoor Recreation Carrying Capacity.....	4
6.0	Suitable Crop Production	5
7.0	Squamish-Lillooet Regional District Information Request	6
8.0	Proposed Soil Mitigation Plan.....	7
8.1	Pre-Event Soil Mitigation Strategy.....	7
8.2	Event Soil Mitigation Strategy	8
8.3	Post-Event Soil Mitigation Strategy	8
9.0	Post-event Agricultural Capability.....	8
10.0	Summary	9

LIST OF FIGURES

Figure 1	Site Location
Figure 2	Historical Soil Survey (Ayers/McLeod Properties)
Figure 3	Historical Soil Survey (Phare Property)

LIST OF APPENDICES

Appendix 1	Photolog
Appendix 2	Agriculture Capability Classes

List of Acronyms

ALC	-	Agricultural Land Commission
ALR	-	Agricultural Land Reserve
PGL	-	PGL Environmental Consultants
PMF	-	Pemberton Music Festival

1.0 INTRODUCTION

Pemberton Festival LP retained PGL Environmental Consultants (PGL) to prepare a professional agrologist report as a part of their McLeod/Phare Agricultural Land Commission (ALC) Non-Farm Use Application as required by Squamish-Lillooet Regional District's April 15, 2016 request.

The McLeod/Phare ALC Non-Farm Use application is requesting approval to temporarily use a portion of the McLeod and Phare properties (Figure 1), which are located within the Agricultural Land Reserve (ALR), to host a portion of the festival activities, including parking on the Ayer/McLeod property and staff tent camping on the Phare property.

The Village of Pemberton previously submitted an application to use five properties in the ALR as the site for an annual Pemberton Music Festival. Following a review of the application, the ALC approved the application (Resolution #327/2012).

PGL's report provides an overview of the site's soils, agricultural capability, response to the Squamish-Lillooet Regional District information request, and soil management plan.

2.0 SITE DESCRIPTION

The Ayers/McLeod and Phare properties are located at 1691 Sea to Sky Highway, and 7312 Macrae Road (Figure 1), respectively, and they occur within the ALR. The Ayers/McLeod property is bisected by the Sea to Sky Highway. While the northern portion has been historically cleared, the southern portion was only cleared in 2015, and it is currently being put into agricultural production (photographs in Appendix 1). The Ayers/McLeod property is relatively flat and drains into the Lillooet River, which runs adjacent to much of the western portion of the property. The Phare property is also relatively flat but doesn't have an adjacent watercourse. The Lillooet River is located less than 500m south of the Phare property.

The legal descriptions of the parcels are provided below:

Table A: Legal Description

Legal Description	PID	Street Address
District Lot 213, Lillooet Land District, Except Plan 35687 and RP 36085, Manufact	013-256-378	1691 Sea to Sky Highway
Lot 11, Plan KAP1241, District Lot 210, Lillooet Land District	009-810-382	7312 Macrae Road

PID – Property Identification Number

3.0 SITE SOILS

Typically, soils in the area are relatively young, having developed from Lillooet River floodplain deposits. Four distinct soil associations have developed within the Ayers/McLeod and Phare properties. The Ayers/McLeod north property, intended for parking, is dominated by Wolverine soils which are characterized by very coarse to moderately coarse-textured fluvial deposits, with medium to moderately fine-textured Sankey deposits, originating from fluvial deposits occurring on the central portion of the property.

The Ayers/McLeod south property, also intended from parking, is dominated by a complex of soils originating from fluvial and floodplain deposits. Mapped soil series include Sankey and Wolverine in the north and Gates Lake and Walden throughout the central portion of the property with Scobie, Scullard, and Wallace in the southern portion.

Camping is proposed for the Phare property, whose soils are composed of Rutherford, Sankey, and Shantz soils composed of silty fluvial deposits. A small occurrence of silty fluvial Valteau soils was mapped along the northern border of the property.

3.1 Soil Description

The soils on the subject property and the surrounding area consist of 10 main soil series. These soils were classified and mapped by Kuurne (1980)¹. Site soils are part of the Sankey, Shantz, Valteau, and Wolverine series. Soil series are described below.

Gates Lake

Gates Lake series soils formed on sandy fluvial deposits of the Lillooet River channel and are composed of nonstony, sandy loam or fine sandy loam, usually graded at depth. Gates Lake soils are acidic, well to moderately well drained, moderate pervious, and occur on gentle slopes. Gates Lake soils have little or no soil profile development and classified as **Orthic Regosol**.

Rutherford

Rutherford series soils formed from silty floodplain deposits of the Lillooet River and are composed mostly of non-stony silt loam or silty clay loam. Rutherford soils are very poorly drained due to high groundwater levels and are slowly pervious, which can result in surface ponding following high precipitation events and snowmelt. Most Rutherford soils are cultivated and are classified as **Rego Gleysol**.

Sankey

Sankey series soils are some of the most commonly occurring soils in the Lillooet River valley, and are formed on silty fluvial deposits. Sankey soils consist of non-stony silty clay loam or silt loam, and are slowly pervious with surface ponding following heavy precipitation events and snowmelt. Drainage is further hindered due to seasonally high groundwater levels. Sankey soils are commonly cultivated, and are classified as **Rego Gleysol**.

Scobie

Scobie soils formed from sandy floodplain deposits of the Lillooet River and are composed of non-stony fine sandy loam or sandy loam with a thin silt loam surface layer. Soils are moderately to rapidly pervious, and poorly drained due to seasonally high ground water levels. Scobie soils are classified as **Rego Gleysol**.

¹ Kuurne, R.L.B. 1980. Soil Survey of the Pemberton Valley, British Columbia – RAB Bulletin 16. Ministry of Environment.

Scullard

Scullard series soils form in veneers of silty fluvial deposits overlying deposits on the Lillooet River floodplain and are composed of 20 to 50cm of nonstony silty loam or silty clay loam overlying fine sandy loam or sandy loam. Scullard soils are acidic, and poorly drained due to seasonally high groundwater, occurrence on level to nearly level slopes and slow to moderate perviousness. Scullard soils are classified as **Rego Gleysol**.

Shantz

Shantz soils are formed in veneers of sandy fluvial deposits overlying silty fluvial deposits on the Lillooet River floodplain. Soils are non-stony and composed of fine sandy loam or sandy loam overlying silt loam or silty clay loam. Shantz soils experience occasional surface ponding resulting from slow to moderate perviousness and poor drainage due to seasonally high groundwater levels. Shantz soils are classified as **Rego Gleysol**.

Valleau

Valleau series soils are formed from interbedded silty fluvial deposits and organic deposits on the floodplain of the Lillooet River, and are non-stony silty loam or silty clay loam with organic or organic enriched layers interbedded. Soils are slowly pervious which often results in surface ponding following heavy precipitation or snowmelt, and they are poorly drained due to seasonally high water tables and slow permeability. Valleau series soils are classified as **Rego Gleysol: cumulic phase**.

Walden

Walden series soils form in veneers of sandy fluvial deposits overlying gravelly fluvial deposits on the Lillooet River floodplain and are composed of 20 to 50cm of nonstony loam or fine sandy loam overlying moderately stony gravelly to very gravelly sand or gravelly loamy sand. Walden soils are acidic and imperfectly drained due to fluctuating groundwater, occurring at the surface during some freshets, and rapid to moderate perviousness. Walden soils occur on nearly level to very gentle slopes and are classified as **Gleyed Regosol**.

Wallace

Wallace series soils form in silty fluvial veneers overlying sandy fluvial deposits on the Lillooet River floodplain and are composed of 20-50 cm of nonstony silt loam or silty clay loam overlying loamy sand or sandy loam. Wallace soils are acidic, slowly to moderately previous, imperfectly drained due to fluctuating groundwater, and occur on level to very gentle slopes. Wallace series soils are classified as **Gleyed Regosol**.

Wolverine

Wolverine soils formed in sandy fluvial deposits on the Lillooet River floodplain, typically on the levees adjacent to the Lillooet River. Wolverine soils are composed of non-stony loamy sand or sandy loam with occasional bands of fine sandy loam, and they are moderately to rapidly pervious and imperfectly drained due to fluctuating groundwater levels. Wolverine soils are classified as **Gleyed Regosol**.

4.0 AGRICULTURAL CAPABILITY CLASSIFICATION

The land capability classification for agriculture (agricultural capability) identifies the potential for agriculture. The agricultural capability usually gives two ratings: unimproved, and improved. Unimproved ratings describe the land in its native condition without any improvements to the soil. Improved ratings indicate the land's potential once appropriate management practices have been implemented. An explanation for agricultural capability classes is attached in Appendix 2.

4.1 Historical Soil Survey

Historical surveys indicate the main agricultural limitation of the two properties is excess water on the Ayers/McLeod property, and soil moisture deficiency on the Phare property. The existing less-detailed historical survey mapped the site with:

- An improved agricultural capability classification of 80% 1 and 20% 2W², and an unimproved rating of 80% 2W and 20% 4W (Agricultural Capability Map 92J/7³) across the northern portion of the Ayers/McLeod property;
- An improved agricultural capability classification of 100% 1 and an unimproved rating of 100% 2W (Agricultural Capability Map 92J/7) across the northern portion of the Ayers/McLeod property; and
- An improved agricultural capability classification of 80% 2M⁴ and 20% 1 and an unimproved rating of 80% 4M and 20% 1 (Agricultural Capability Map 92J/7) across the majority of the Phare property.

5.0 OUTDOOR RECREATION CARRYING CAPACITY

Outdoor recreation carrying capacity refers to the inherent ability of the soils to sustain both intensive and extensive recreation use. Historical mapping of outdoor recreation carrying capacity was completed for the Pemberton region, and was included in the Soil Survey of the Pemberton Valley (1980) report.

Five carrying capacity classes occur, where Class 1 indicates that high amounts of intensive recreation use can be sustained. The remaining four classes with their increasing number and/or severity of limitations reflect a decreased ability to sustain intensive use. However, lower carrying capacity classes permit extensive use activities in certain landscapes. Based on the nature of the proposed land use for the Pemberton Music Festival, camping and parking, as well as the short duration of the festival, the activities would not be considered intensive nor extensive.

Outdoor recreation carrying capacity as detailed in the Soil Survey of Pemberton Valley (1980) for the site soils are summarized in Table B. Rutherford, Sankey, Scullard, Shantz, Valleau, and Walden soils are moderately limited (Class 3 and 4), primarily by poor to very poor soil drainage and/or potential susceptibility to flooding, while Gates Lake, Wallace and Wolverine soils are susceptible to occasional flooding and imperfect soil drainage (Class 2). These ratings apply to all times of the year including the wet season. Since the proposed activities would occur in the dry season, potential impacts would be considerably reduced.

² W- Excess Water agricultural capability subclass

³ Surveys and Mapping Branch, Department of Energy, Mines and Resources: Map 92 J/7, 1970

⁴ M – Soil Moisture Deficiency agricultural capability subclass

Based on site soil characteristics, calculated outdoor recreation carrying capacity, and proposed site activities, as well as seasonal moisture conditions, site soils have an inherent ability to sustain the proposed temporary non-farm use without adverse impacts.

Table B: Outdoor Recreation Carrying Capacity

Soil Series	Property/Festival Activity	Recreation Carrying Capacity Class	Limitation Type ⁵
Gates Lake	Ayers/McLeod (parking)	2 or 5	T ^{s1} , T ^{s2} , H ⁱ² , H ⁱ³
Rutherford	Phare (camping)	3-4	S ^{f2} , S ^{w3} , T ^{s1} , T ^{s2} , H ⁱ²
Sankey	Ayers/McLeod/Phare (parking/camping)	3-4	S ^{f2} , S ^{w3} , T ^{s1} , T ^{s2} , H ⁱ²
Scullard	Ayers/McLeod (parking)	3-4	S ^{f2} , S ^{w3} , T ^{s1} , T ^{s2} , H ⁱ²
Shantz	Phare (camping)	3	S ^{w3} , T ^{s1} , T ^{s2} , H ⁱ²
Valleau	Phare (camping)	3	S ^{w2} , T ^{s1} , T ^{s2} , H ⁱ³
Walden	Ayers/McLeod (parking)	3	S ^{w2} , T ^{s1} , T ^{s2} , H ⁱ³
Wallace	Ayers/McLeod (parking)	2-3	S ^{f2} , S ^{w2} , T ^{s1} , T ^{s2} , H ⁱ²
Wolverine	Ayers/McLeod (parking)	2	S ^{f2} , S ^{w3} , H ⁱ²

6.0 SUITABLE CROP PRODUCTION

Based on the historically mapped agricultural capability, the properties have the potential to produce a wide variety of soil-based crops. Within the Lillooet River Valley, some of the suitable crops identified by Kuurne (1980) include: cauliflower, cabbage, lettuce, parsnip, turnip, beets, carrots, early hybrid corn varieties, wheat barley, oats, peas, onions, asparagus, pumpkin, squash, cucumbers, timothy, clover, potato, and strawberry.

While the northern portion of the Ayers/McLeod property and Phare property have historically been cleared for agriculture, the southern portion of the Ayers/McLeod property has only been recently been cleared and was being prepared for agricultural use at the time of the April 2016 site inspection. Following preparation of the soil bed, the newly cleared parcel will be seeded with six tonnes of oats to establish cover and an additional one tonne of Helavang seed mix which will propagate and produce a forage crop in future years.

The proposed planting plan is similar to the oat seed mix used in 2014 for the recently cleared IR #2 lands which were also used for parking associated with the Pemberton Music Festival. PGL's post-event inspections following completion of the 2015 music festival did not identify any impacts associated with festival-related parking. The planting stabilized newly exposed soil, while providing soil erosion control.

⁵ S^{f2} – moderate fine textured soil limitation; S^{w3} – soil wetness severe; T^{s1-2} – slight to moderate topographic; Hⁱ²⁻³ – moderate to severe flooding

7.0 SQUAMISH-LILLOOET REGIONAL DISTRICT INFORMATION REQUEST

The Squamish-Lillooet Regional District requested that the following information be provided within the Professional Agrologist Report:

1. *'General impacts of the proposed Pemberton Music Festival (PMF) non-farm uses on the agricultural productivity of the subject properties, in the short and long term'*

Festival activities associated with the Ayers/McLeod and Phare properties include festival parking and tent camping, respectively. Primary impacts, both in the short and long term include compaction and surface erosion. Proposed mitigation, before, during, and after the festival are detailed in Section 8.0 of the report.

The proposed mitigation plan is based on PGL's previous experience with the PMF for which we have prepared the required pre-event plans and confirmation reports confirming the post-event clean-up has been successfully completed to an agricultural standard as required by the ALC authorization for a non-farm use. The existing ALC authorization permits ALR zoned land to be temporarily used to host a portion of the festival activities, including festival area, camping fields, and parking areas.

2. *'The type of forage crops that are proposed for the non-PMF time period'*

The northern portion of the Ayers/McLeod property and the Phare property have been historically converted into agricultural land use. Up until 2015, the southern portion of the Ayers/McLeod property was forested and was not agriculturally productive. As detailed in Section 6.0, following clearing and soil preparation, a mixture of oats to establish cover and Helavang seed mix will be planted – these are crops well suited for the site's soil and climate.

3. *'The ability of the proposed forage crops and rotational grazing to occur around the non-PMF-farm uses; if possible, when and what is required to ensure these agricultural uses persist'*

Based on previous PMF experience, a crop should be harvested prior to the festival, harvested in early September, or both, depending on weather and crop productivity. For parking and camping purposes, the crop will need to be harvested for trafficability and safety (reduced fire hazard), ensuring that the agricultural use persists.

Grazing will be at the discretion of the land owner, and will be subject to cattle needs.

4. *'Whether the soil can be remediated for agricultural uses in the short and long term';*

Soils can be adequately remediated for agricultural uses as detailed in Section 8.0 of the report. A post-event closure report will confirm whether soils have been impacted, and detail any necessary remedial activities if required.

5. *'As we now understand that the proposed surfacing structure is intended to be oats, what is the viability of the oats to uphold a parking lot (in both dry and wet conditions)';*

The same oat seed mix was sown following clearing of IR#2 lands, which were put into agricultural production and were subsequently used for short-term festival parking. The post-event inspection found that oats successfully bound the soil, prevented surface erosion, and did not show any impacts from parking activities.

No negative impacts, outside of areas impacted by recent flooding (Photographs in Appendix 1), were observed during PGL's April 2016 inspection of the IR#2 lands.

6. *'What is the potential/impact for soil contamination of utilizing the land for parking; and what, if any, remediation and rehabilitation activities are necessary to address soil contamination, compaction and other impacts identified in the Agrologist Report.'*

Use of the Ayers/McLeod property for vehicle parking does not pose a significant risk of soil contamination. Contamination may only be expected in the instance of a large-scale spill which is not likely given the proposed parking and lack of refuelling/handling of fuel on the site. Given the site use, any spills would likely be minor. In the event of a spill, impacted soils would be stripped and disposed of offsite at an approved facility. Following removal of the soil, confirmatory soil samples will be collected and analyzed for petroleum hydrocarbons to ensure that soil meets the applicable BC Contaminated Sites Regulations agricultural land use standard. The excavated portion of the site would be backfilled with agricultural quality soil and reseeded.

Analytical results will be tabulated, and a confirmation of remediation report will be required and submitted to the ALC to confirm the agricultural capability of the site has not been compromised.

Mitigation of compaction and surface erosion are the most likely impacts to site soils. Rehabilitation activities are detailed in Section 8.0 of the report.

8.0 PROPOSED SOIL MITIGATION PLAN

Site activities associated with the Pemberton Music Festival on the Ayers/McLeod and Phare properties include: parking (Ayers/McLeod property), and staff camping (Phare property). Additional permitted activities will occur on other ALR and non-ALR lands, which have not been included in our agrologist report.

Access to the staff camping fields will be by foot. Camping fields will be limited to tents, with any vehicles restricted to offsite parking. Within the camping fields, the only other structures will include washroom and garbage disposal facilities. Pathways within the camping area will be established to control movement, and will be covered with a mulch to reduce the potential for surface erosion. Pedestrian traffic between the camping area and festival area will be limited to previously established farm roads.

Impacts to Site soils and agricultural capability that could result from Site activities include compaction and loss of topsoil. These impacts can be mitigated and avoided by activities undertaken prior to, during, and following the event. Strategies designed to prevent and mitigate soil disturbance for the three phases of the event are detailed below.

8.1 Pre-Event Soil Mitigation Strategy

The event, excluding set up and decommissioning, will be limited to a four-day duration during which time minor compaction of the finer-textured soils on the Site could occur. Potential compaction in the camping fields will be limited by the restriction of vehicle access and/or storage, and the short duration in which those areas will be occupied.

Although the potential for compaction is the most significant concern for the Site, a review of Site soils indicated that they are primarily floodplain deposits characterized by moderately fine to moderately coarse-textured soils including silty clay loam to sandy loam soils, which are less susceptible to compaction. Soils in the parking areas in which the potential for compaction is

greater, given the temporary storage of vehicles, are better suited to resist compaction since they are characterized by very coarse to moderately coarse-textured fluvial deposits, which are less susceptible to compaction associated with short-term activity.

To minimize any potential surface erosion, the Pemberton Music Festival will complete a final cut prior to the event, and irrigate the camping sites completely to increase the moisture content in the soil and reduce dust generation.

In addition to the soil mitigation strategies that will be employed prior to the event, the Pemberton Music Festival has also undertaken additional measures to improve the agricultural capability of the Ayers/McLeod property south of the Sea to Sky Highway by clearing and improving 54 acres of ALR land which was previously not in production. Following preparation of the site, the parcel will be planted into a forage crop, increasing the area of agricultural land actively farmed within the Pemberton River Valley.

8.2 Event Soil Mitigation Strategy

Following site preparation, the Pemberton Music Festival will be prepared to prevent impacts that may result from foot traffic if adverse weather conditions are experienced during the event. Historically, the level of precipitation in the Pemberton area during the event is typically low. If heavy precipitation does occur during the event, potential erosion and runoff of surface soils will be mitigated by the placement of straw, which will be subsequently incorporated into Site soils following the event. Gravel or other coarse materials will not be used to improve trafficability.

8.3 Post-Event Soil Mitigation Strategy

Following the event, a professional agrologist will complete an inspection and report to assess whether site soils have been impacted by festival activities. Should compaction be observed, soils will be tilled to mitigate compaction, which is an accepted agricultural practice. In an attempt to maintain soil fertility, tillage activities will be restricted to dry periods to minimize further compaction. Tilling is expected to reduce compaction and improve infiltration rates. Subsoiling could also be an option, but it is unlikely that it will be required due to the limited potential for deep compaction.

In addition to compaction, loss of plant cover and erosion may occur due to foot traffic and potential heavy precipitation. Following the event, the Site will be reseeded and surface cover will be re-established. Re-establishment will be enhanced through use of the irrigation water if deemed necessary. Gravel cover will not be used to ensure that site soil capability is not impaired.

9.0 POST-EVENT AGRICULTURAL CAPABILITY

The limited duration of the festival activities (neither intensive nor extensive) and proposed site preparation activities coupled with the proposed reclamation strategy will ensure that site soils and agricultural capability will not be negatively impacted. The proposed strategy has been developed to minimize and mitigate any potential compaction, erosion, and loss of surface cover, and it has been successfully implemented on other ALR land associated with the festival in previous years. In addition to the outlined activities, the Pemberton Music Festival has improved the agricultural capability of the Ayers/McLeod property through clearing and soil preparation which will improve overall utilization of the site for future agricultural activities.

10.0 SUMMARY

Based on PGL's review of the site's soils, the proposed short-term festival activities, clearing of 54 acres of land on the Ayers/McLeod property, and the proposed soil mitigation plan, the Pemberton Music Festival appears to offer substantial benefits to agriculture such as clearing and tilling of the previously forested Ayers/McLeod south property, and avoids any negative impacts to agriculture. The PMF provides other benefits to agriculture including direct investment, infrastructure improvement, local farmer opportunities, farming area awareness, local agriculture product use, direct land improvement, and showcasing local agricultural product, the Pemberton Music Festival Agricultural Reserve and Community Opportunities (ARCO) Fund, and agricultural showcases and opportunities. PGL believes that this will result in substantial net benefits to agriculture on the site as well as to the farm community.

Respectfully submitted,

PGL ENVIRONMENTAL CONSULTANTS

Per:



Stewart Brown, M.Sc. P.Ag., R.P.Bio.
Senior Environmental Consultant

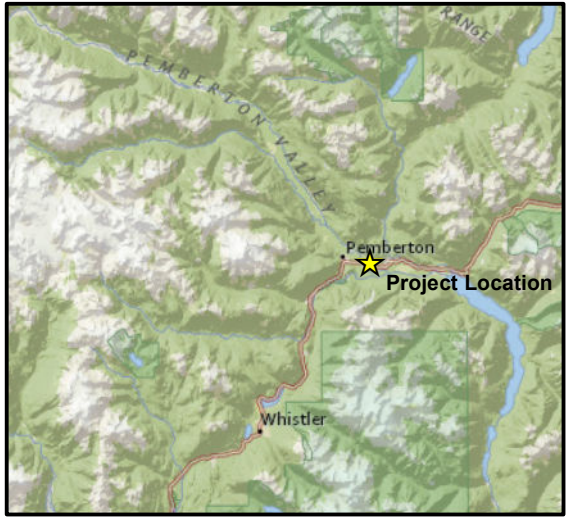
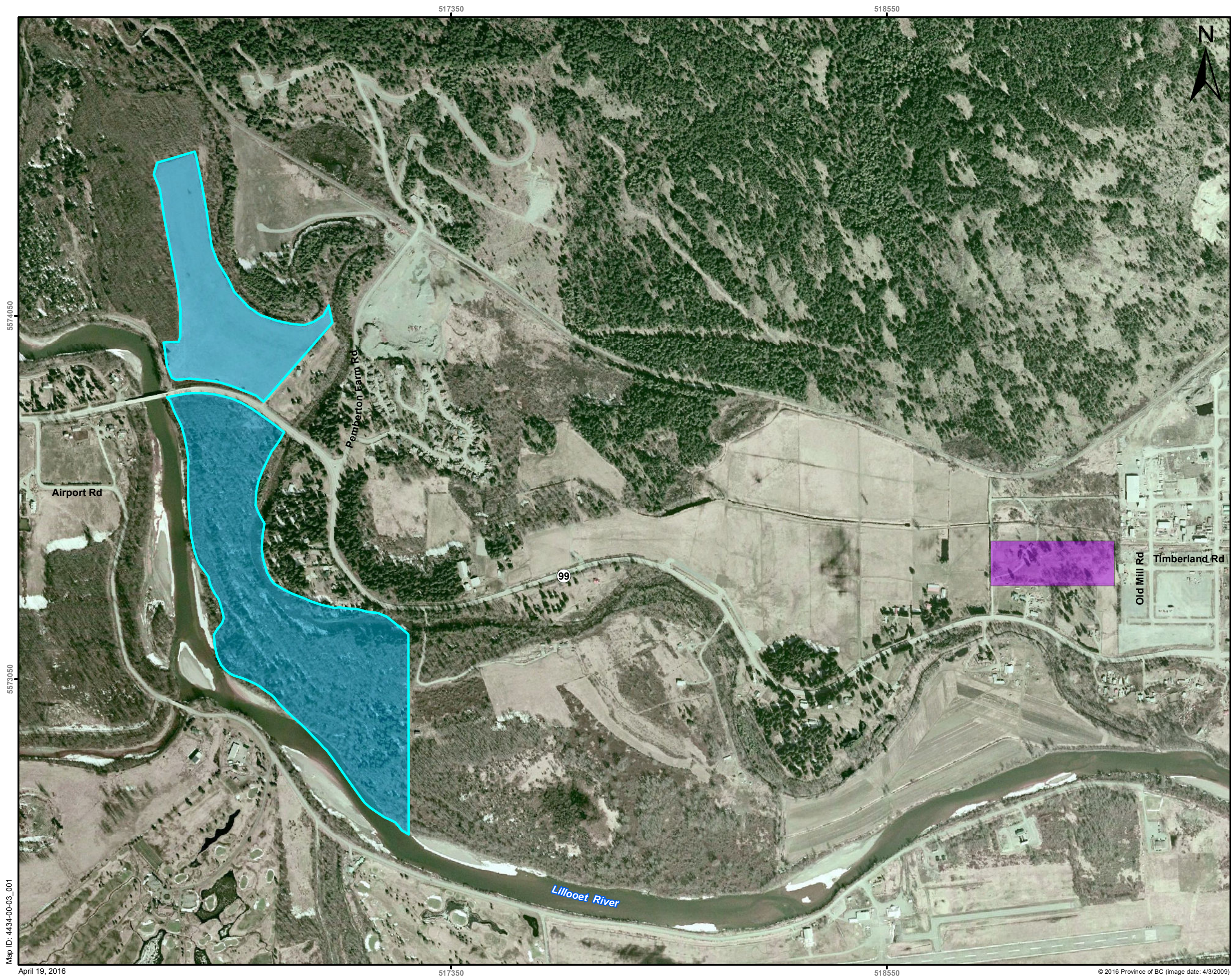


E.L. (Ned) Pottinger, M.Sc., P.Geo., P.Ag.
Chairman

CSB/ELP/mtl/slr

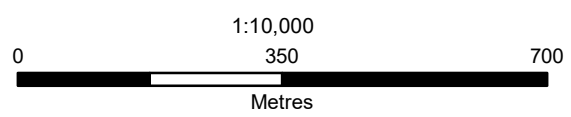
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Figures



Site Location

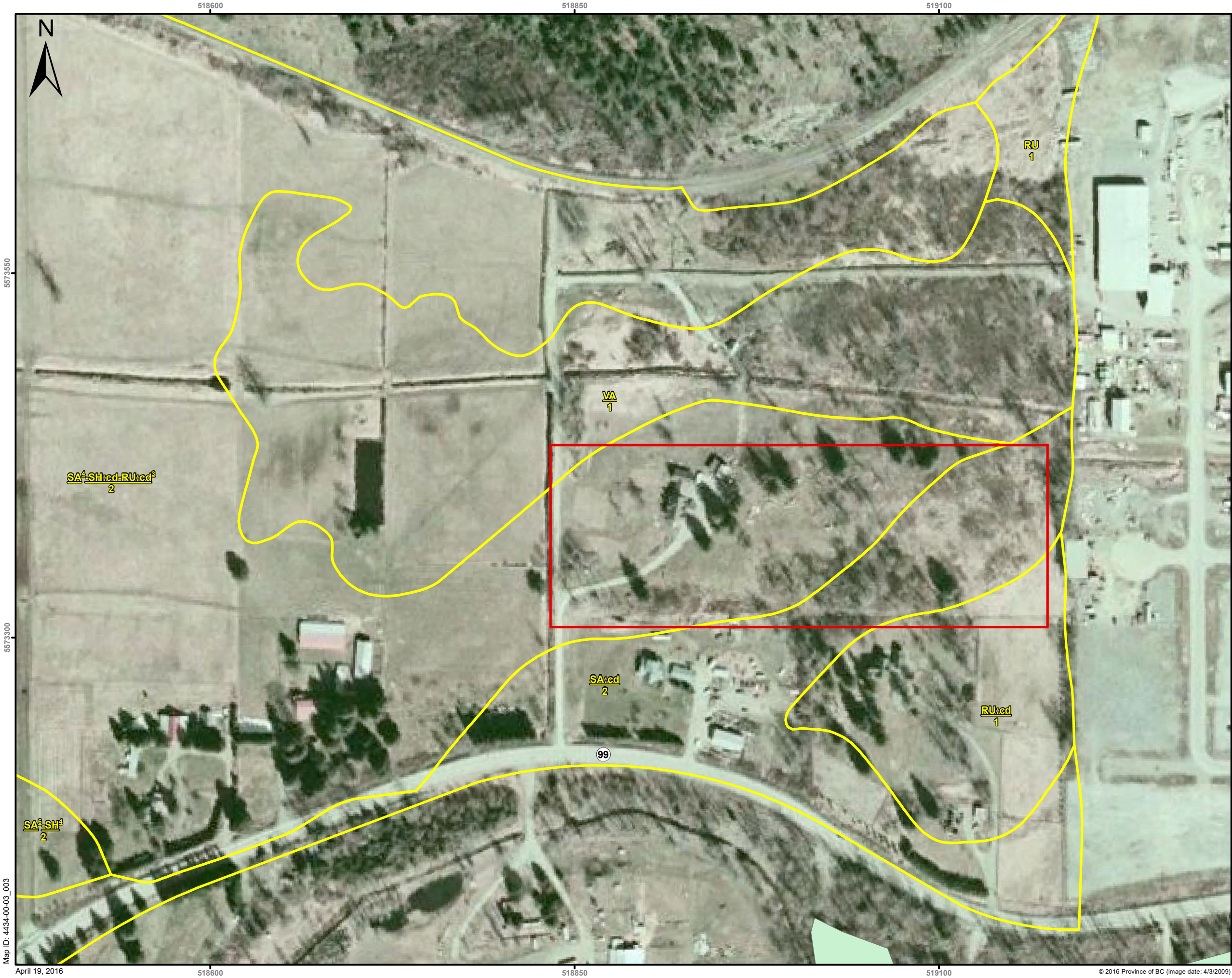
-  Ayers/McLeod Properties
-  Phare Property



Coordinate System: NAD 1983 UTM Zone 10N



Figure 1



Historical Soil Survey
(Phare Property)

- Phare Property
- Soils

Map Symbol	Soil Name
CE	Collister Soil Series
RU	Rutherford Soil Series
RO	Rock land
RN	Ranson Soil Series
SA	Sankey Soil Series
SC	Scobie Soil Series
SH	Shantz Soil Series
SN	Sangster Soil Series
VA	Valieau Soil Series
WO	Wolverine Soil Series

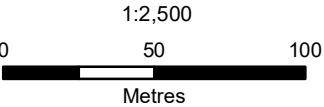
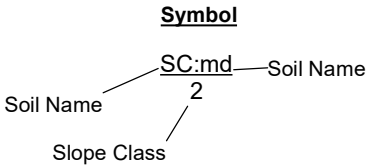


Figure 3

Appendix 1

Photolog



Photograph 1:

Looking south at the post-clearing of the converted Ayers/McLeod South property, from forested land to agricultural land



Photograph 2:

Ayers/McLeod South property, cleared for the intended event parking



Photograph 3:

Clearing and tiling activities on the Ayers/McLeod South property



Photograph 4:

Material cleared from the Ayers/McLeod South property



Photograph 5:

**Intended event parking for the
Ayers/McLeod North property**



Photograph 6:

**The poorly drained and
flooded section of the IR2
property, for the intended
event parking**



Photograph 7:

The drier section of the IR2 property that was previously used for event parking

Appendix 2
Agriculture Capability Classes

Agriculture Capability Classes

Class 1 land is capable of producing the very widest range of crops. Soil and climate conditions are optimum, resulting in easy management.

Class 2 land is capable of producing a wide range of crops. Minor restrictions of soil or climate may reduce capability but pose no major difficulties in management.

Class 3 land is capable of producing a fairly wide range of crops under good management practices. Soil and/or climate limitations are somewhat restrictive.

Class 4 land is capable of a restricted range of crops. Soil and climate conditions require special management considerations.

Class 5 land is capable of production of cultivated perennial forage crops and specially adapted crops. Soil and/or climate conditions severely limit capability.

Class 6 land is important in its natural state as grazing land. These lands cannot be cultivated due to soil and/or climate limitations.

Class 7 land has no capability for soil bound agriculture.

Agriculture Capability Subclasses

A & M	Soil moisture deficiency	N	Salinity
C	Adverse climate (excluding precipitation)	P	Stoniness
D	Undesirable soil structure	R	Shallow soil over bedrock and/or bedrock outcropping
E	Erosion	S & X	Cumulative and minor characteristics
F	Low fertility	T	Topography
I	Inundation adverse (flooding by streams, etc.)	W	Excess water

Unimproved ratings describe the land in its native condition without any improvements to the soil.